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CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90008779
PATENT NO. : 6199048
ART UNIT : 3900

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination	Control No. 90/008,779	Patent Under Reexamination 6199048	
	Examiner Anjan K. Deb	Art Unit 3992	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a☐ Responsive to the communication(s) filed on *16 October 2007* . b☐ This action is made FINAL.
c☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1-95* are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☒ Claims *1-95* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a)☐ approved (7b)☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
   1☐ been received.
   2☐ not been received.
   3☐ been filed in Application No. _____ .
   4☐ been filed in reexamination Control No. _____.
   5☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-3, 5, 16-34, 36-38, 40, 51-69, 71-73, 75, 86-95 are rejected under 35 U.S.C. 102(b) as being anticipated by Wellner (US 5,640,193) (hereinafter "the '193 patent") or, in the alternative, under 35 U.S.C. 103(a) as obvious over Berners-Lee et al. (RFC 1738, Uniform Resource Locators (URL)) document.**

Claim 1. A method of connecting a user computing device to one of a plurality of remote computers available for communication over a network comprising:

Regarding the preamble of claim 1, the '193 patent disclosed a method of connecting a user to one of a plurality of remote computers 13, 17 (servers) available for communication over a network 14 ("COMMUNICATION NETWORK") (col. 1, lines 33-35) (Fig. 1).

a. reading a data carrier modulated with an index;

The '193 patent disclosed reading a data carrier (signal) modulated with an index ("reading marks on an object") (col. 1 lines 36-39).

> communication medium. The apparatus includes a scanner means for reading marks on an object and for communicating a request signal, having an object code representing the read marks, to a user interface. The interface receives the

b. accessing a database with the index, the database comprising a plurality of records that link an index to a pointer which identifies a remote computer on the network;

The '193 patent disclosed accessing a database 13, 18, 17 ("database servers") (col. 5 lines 51-53) with the index ("an object code representing the read mark") (col. 6 lines 60-61).

c. extracting a pointer from the database as a function of the index; and

The '193 patent disclosed extracting a pointer[1] (matching text to keywords) as a function of the index (col. 4 lines 50-52).

d. using the pointer to establish communication with the remote computer identified thereby.

The '193 patent disclosed using the pointer (matching text to keywords) to establish communication with the remote computer 13, 17, 18 (servers) identified thereby (col. 4 lines 7-10, 46-55).

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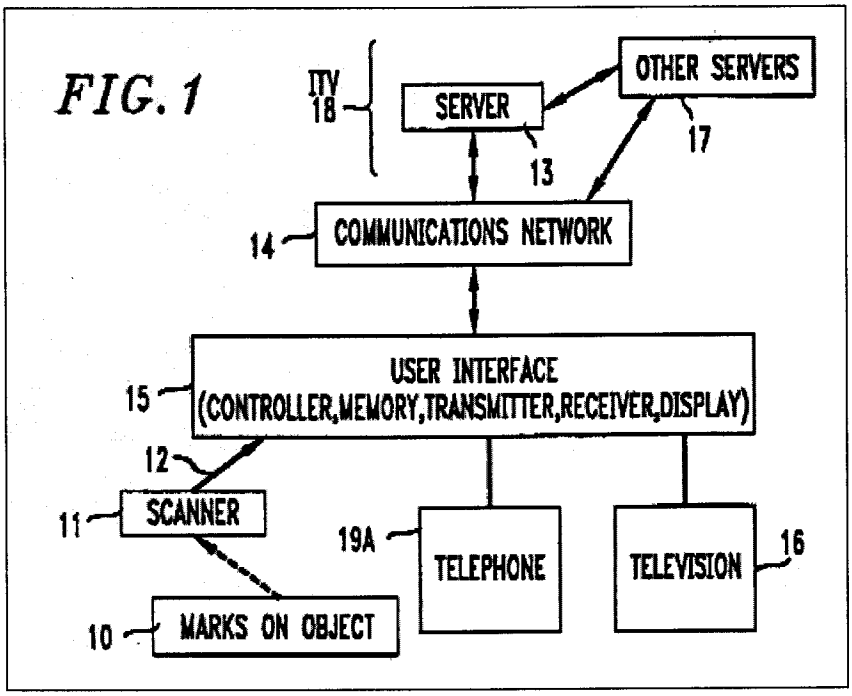
[1] In computer science, a pointer is a programming language data type whose value refers directly to (or "points to") another value stored elsewhere in the computer memory using its address (From Wikipedia, the free encyclopedia)

The use of a pointer is considered inherent to the method of retrieving/selecting multimedia documents by using URL identifiers (col. 4 lines 34-40) or by matching user input to keywords stored in data base servers disclosed in the '193 patent.



In the alternative that the '193 patent fails to disclose extracting a pointer from the database as a function of the index and using the pointer to establish communication with the remote computer identified thereby Berners-Lee et al. disclosed the use of pointers and URLs for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a standard internet protocol for extracting a pointer

from the database as a function of the index disclosed by Berners-Lee et al. for accessing network resource.

Claim 2. The method of claim 1 wherein the step of reading a data carrier modulated with an index comprises the step of reading a light pattern emanating from an object and demodulating the light pattern to obtain the index.

The '193 patent disclosed scanner 11 for reading a data carrier (signal) modulated with an index ("reading marks on an object") (col. 1 lines 36-39). The step of reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 3. The method of claim 2 wherein the step of reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises scanning a bar code symbol encoded with the index.

The '193 patent disclosed bar code (col. 2 lines 22-25) scanner 11 for reading a data carrier (signal) modulated with an index ("reading marks on an object") (col. 1 lines 36-39). The step of reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 5. The method of claim 2 wherein the step of reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises using optical character recognition techniques.

The '193 patent disclosed scanner for reading alphanumeric characters (col. 2, lines 22-25). The step of demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device. Additionally, the '193 patent disclosed decoding ("decodes") (col. 2 lines 51-53) scanner output which is broadly interpreted as demodulating for obtaining the index code.

Claim 16. The method of claim 1 wherein the steps of accessing a database and extracting a pointer therefrom are carried out on a server computer located remotely from the user computing device.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above including accessing a database ("database server") and extracting a pointer by a lookup function (matching text to keywords) therefrom are carried out on a server computer 13, 17, 18 located remotely from the user (col. 4 lines 46-57). As shown in Fig. 1, the server computer (13, 17, 18) is located remotely from the user computing device 15.

In the alternative that a lookup function (matching text to keyword) disclosed in the '193 patent is not considered the same as extracting a pointer, Berners-Lee et al. disclosed the use of pointers and URLs for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a means for extracting a pointer from a database by using URLs disclosed by Berners-Lee et al. for accessing network resource.

Claim 17. The method of claim 1 wherein the database is distributed over more than one computer.

The '193 patent disclosed wherein the database is distributed over more than one computer 13, 17 ("database servers") (col. 4 lines 49-55, col. 5 lines 50-53).

Claim 18. The method of claim 1 wherein the pointer comprises a network address.

The '193 patent disclosed the use of URL as a pointer which inherently comprises a network address (col. 4 lines 28-45).

Claim 19. The method of claim 1 wherein the pointer comprises a Uniform Resource Locator.

The '193 patent explicitly disclosed the use of URL as a pointer which comprises a network address (col. 4 lines 28-45).

Claim 20. The method of claim 1 wherein the pointer comprises the name of a remote computer.

The '193 patent explicitly disclosed the use of URL as a pointer to access remote computers (col. 4 lines 28-45). The URL is one means for naming a remote computer.

Claim 21. The method of claim 1 wherein the pointer comprises an IP address.

The '193 patent explicitly disclosed the use of URL as a pointer to access remote computers (col. 4 lines 28-45). A URL is a string that contains information that can be resolved

to an IP address through DNS. Additionally, it is well known that the URL may also comprise an IP address (Berners-Lee, section 3.1, page 6, lines 8-17).

Claim 22. The method of claim 1 wherein the index is comprised of a first field and a second field.

The '193 patent disclosed the use of barcode[2] which inherently comprises plurality of fields where data is stored in the widths and spacings of printed parallel lines.

Claim 23. The method of claim 22 wherein the step of accessing a database with an index comprises the steps of using only the first field of the index to access the database.

The '193 patent disclosed marks 10 (Fig. 2) represents code that could work in a similar manner as the well known URL that comprises plurality of fields. Therefore, a first field of the code (URL) could be used to access the database (col. 4 lines 31-37).

Claim 24. The method of claim 23 wherein a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

The '193 patent disclosed the use of standardized code (col. 2 line 53). Additionally it is well known that standardized code such as EAN/UPC[3] codes include multiple fields.

The '193 patent did not expressly disclose a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent to use only one field of the code such as the manufacturer identification number, for the lookup function disclosed in '193 patent (match text to keyword). Different products made by the same manufacturer would then return the same pointer, even if other fields of the index, such as the product identification number, were different.

Claim 25. The method of claim 24 wherein the first field is a manufacturer identification number and the second field is a product identification number.

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[2] A barcode (also bar code) is a machine-readable representation of information (usually dark ink on a light background to create high and low reflectance which is converted to 1s and 0s). Originally, barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software (From Wikipedia, the free encyclopedia)

[3] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10 checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

The '193 patent disclosed the use of standardized code (col. 2 line 53). Additionally it is well known that standardized EAN/UPC[4] code includes a first field that represents the manufacturer of the labeled item and the second field is a product identification number.

Claim 26. The method of claim 1 wherein the step of using the pointer to establish communication with the remote computer identified thereby is executed automatically by the user computing device without user intervention.

The '193 patent disclosed using the pointer (obtained by matching text to keywords) (col. 4 lines 50-52) to establish communication with the remote computer (server) identified thereby is executed automatically by the user computing device without user intervention (col. 4 lines 57-col. 5 lines 1-11).

Claim 27. The method of claim 26 wherein the automatic communication by the user computing device with the remote computer is executed by a web browser program running on the user computing device.

The '193 patent explicitly disclosed automatic communication by the user computing device with the remote computer is executed by a web browser program ("Internet client access software for World Wide Web") running on the user computing device (col. 4 lines 34-37).

Claim 28. The method of claim 1 wherein the step of using the pointer to establish communication with the remote computer identified thereby is executed by a user selecting hypertext link returned to the user computing device by the database.

[4] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10 checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

The '193 patent disclosed the step of using the pointer (matching text to keyword) to establish communication with the remote computer identified by the database 13,17 (server) for retrieving multimedia documents from the remote computer using well-known information retrieval techniques (col. 4 lines 45-56).

The '193 patent did not explicitly disclose that communication with the remote computer identified thereby is executed by a user selecting hypertext link returned to the user computing device by the database.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a hypertext link returned to the user computing device by the database to establish communication with the remote computer for retrieving multimedia documents therein as this is a well-known information retrieval technique[5].

Claim 29. The method of claim 1 wherein the network over which the user computing device establishes communication with the remote computer is a wide area network.

The '193 patent disclosed the user computing device establishes communication with the remote computer is a wide area network (internet) (col. 10, lines 1-4).

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[5] Hypertext and the World Wide Web: In the late 1980s, Berners-Lee, then a scientist at CERN, invented the World Wide Web to meet the demand for automatic information-sharing among scientists working in different universities and institutes all over the world. In 1992, Lynx was born as an early Internet web browser. Its ability to provide hypertext links within documents that could reach into documents anywhere on the Internet began the creation of the web on the Internet (From Wikipedia, the free encyclopedia)

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Claim 30. The method of claim 29 wherein the wide area network is the Internet.

The '193 patent disclosed the user computing device establishes communication with the remote computer is the internet (col. 10, lines 1-4).

Claim 31. The method of claim 29 wherein the wide area network is a proprietary online service.

The '193 patent disclosed wherein the wide area network is a proprietary online service ("cable TV company", "telephone company") (col. 3 lines 35-36, col. 4 lines 7-25).

Claim 32. The method of claim 31 wherein the database is resident on an online service provider computer with which the user computing device has established direct communication.

The '193 patent disclosed that the database (a database is inherent for performing the lookup function for matching text to keywords) (col. 4 lines 46-57) is resident on an online service ("particular service", "services identified") (col. 3 lines 7, 12-13), provider residing in severs 13, 17, 18 with which the user computing device 15 (the user interface unit comprises multimedia computer) (col. 3 lines 40-45) has established direct communication. As shown in Fig. 1 the user 15 communicates directly with servers 13, 17, 18 through the communication network 14.

Claim 33. The method of claim 32 wherein the online service provider computer additionally provides a gateway to the Internet.

The '193 patent disclosed that the online service provider computer 13, 17 (multimedia server) additionally provides a gateway to the Internet (col. 7 lines 11-12, col. 9 lines 3-5, col. 10 lines 1-4).

> **2. The apparatus of claim 1, wherein said multimedia server is on the Internet.**

Claim 34. The method of claim 1 wherein access to the database requires entry of a password.

It was well-known in the art that electronic resources, such as databases, are commonly secured through a user name/password mechanism. Additionally the '193 patent disclosed comparing the scanner ID code to determine if the user's request is authorized (col. 3 lines 3-13). Entering the scanner ID code for authorization is broadly interpreted as the entry of a password.

In the alternative that the '193 patent does not disclose a password, Berners-Lee explicitly disclosed the use of password as part of the common internet scheme syntax for accessing internet resources (page 5: section 3.1).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the URL disclosed in the '193 patent a password disclosed by Berners-Lee for accessing internet based network resource.

Claim 36. A system comprising:

The '193 patent disclosed a system ("multimedia system") comprising:

a. a user computing device;

The '193 patent disclosed a user computing device ("multimedia computer") (col. 3 lines 40-45).

b. an input device associated with the user computing device, configured to read a data carrier modulated with an index;

The '193 patent disclosed an input device 11 (scanner) associated with the user computing device, configured to read a data carrier (signal) modulated with an index ("an object code representing the read mark") (col. 6 lines 60-61).

c. means for storing a database comprising a plurality of records that link an index to a pointer which identifies a remote computer;

The '193 patent disclosed means for storing a database 13,18,17 ("database server") comprising a plurality of records that links an index to a pointer which identifies a remote computer 13, 17 ("The servers 13, 17 could match this text to keywords that describe stored documents on the network using well-known information retrieval techniques")(col. 4 lines 46-55). The use of a pointer is inherently disclosed in the process of matching text to keywords that the user scans to retrieve the multimedia documents stored on the network which is a well-known information retrieval technique.

wherein the user computing device comprises:

The '193 patent disclosed wherein the user computing device ("multimedia computer") comprises:

means for accessing the database to extract a pointer from the database as a function of the index; and

The '193 patent disclosed means for accessing the database 13, 18, 17 ("database server") to extract a pointer ("match this text to keywords") from the database as a function of the index ("an object code representing the read mark"); and

means for using the pointer to establish communication with the remote computer identified thereby.

The '193 patent disclosed means for using the pointer to establish communication with the remote computer 13, 17 (servers) identified thereby.

In the alternative that the '193 patent fails to disclose extracting a pointer from the database as a function of the index and using the pointer to establish communication with the remote computer identified thereby Berners-Lee et al. disclosed the use of pointers and URLs for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a standard internet protocol for extracting a pointer from the database as a function of the index disclosed by Berners-Lee et al. for accessing network resource.

Claim 37. The system of claim 36 wherein the user input device comprises means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index.

The '193 patent disclosed scanner 11 for reading bar codes (col. 2, lines 22-25). The means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 38. The system of claim 37 wherein the means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises means for scanning a bar code symbol encoded with the index.

The '193 patent disclosed scanner 11 for reading bar codes (col. 2, lines 22-25). The means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 40. The system of claim 37 wherein the means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises means for using optical character recognition techniques.

The '193 patent disclosed scanner for reading alphanumeric characters (col. 2, lines 22-25). The means for demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 51. The system of claim 36 wherein the means for storing a database is located on a server computer located remotely from the user computing device.

The '193 patent disclosed in Fig. 1, the server computer (13, 17, 18) are located remotely from the user computing device 15.

Claim 52. The system of claim 36 wherein the means for storing a database is distributed over more than one computer.

The '193 patent disclosed the means for storing a database is distributed over more than one computer 13, 17 ("database servers") (col. 5 lines 51-53).

Claim 53. The system of claim 36 wherein the pointer comprises a network address.

The '193 patent disclosed the use of URL as a pointer which comprises a network address (col. 4 lines 28-45).

Claim 54. The system of claim 36 wherein the pointer comprises a Uniform Resource Locator.

The '193 patent explicitly disclosed the pointer comprises a Uniform Resource Locator (URL) (col. 4 lines 28-45).

Claim 55. The system of claim 36 wherein the pointer comprises the name of a remote computer.

The '193 patent explicitly disclosed the use of URL as a pointer to access remote computers (col. 4 lines 28-45). The URL is one means for naming a remote computer.

Claim 56. The system of claim 36 wherein the pointer comprises an IP address.

The '193 patent explicitly disclosed the use of URL as a pointer to access remote computers (col. 4 lines 28-45). A URL is a string that contains information that can be resolved to an IP address through DNS. Additionally, it is well known that the URL may also comprise an IP address (Berners-Lee, section 3.1, page 6, lines 8-17).

Claim 57. The system of claim 36 wherein the index is comprised of a first field and a second field.

The '193 patent disclosed the use of barcode[6] which inherently comprises plurality of fields where data is stored in the widths and spacings of parallel lines.

Claim 58. The system of claim 57 wherein the means for accessing a database with an index comprises means for using only the first field of the index to access the database.

The '193 patent disclosed marks 10 (Fig. 2) represents code that could work in a similar manner as the well known URL that comprises plurality of fields. Therefore, a first field of the code (URL) could be used to access the database (col. 4 lines 31-37).

Claim 59. The system of claim 58 wherein a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

The '193 patent disclosed the use of standardized code (col. 2 line 53). Additionally it is well known that standardized code such as EAN/UPC[7] codes include multiple fields.

The '193 patent did not expressly disclose a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent to use only one field of the code such as the manufacturer identification number, for the lookup function disclosed in '193 patent (match text to keyword). Different products made by the same manufacturer would then return the same pointer, even if other fields of the index, such as the product identification number, were different.

Claim 60. The system of claim 59 wherein the first field is a manufacturer identification number and the second field is a product identification number.

The '193 patent disclosed the use of barcode[8] which inherently comprises plurality of fields where data is stored in the widths and spacings of printed parallel lines.

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[6] A barcode (also bar code) is a machine-readable representation of information (usually dark ink on a light background to create high and low reflectance which is converted to 1s and 0s). Originally, barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software (From Wikipedia, the free encyclopedia)

[7] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10 checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

The '193 patent did not expressly disclose wherein the first field is a manufacturer identification number and the second field is a product identification number.

A standardized code such as EAN/UPC[9] code by definition include first and second multiple fields wherein the first field is a manufacturer identification number and the second field is a product identification number.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including means for reading standard bar code such as EAN/UPC code comprising first and second fields wherein the first field is a manufacturer identification number and the second field is a product identification number for retrieving documents stored in database server.

Claim 61. The system of claim 36 wherein the means for using the pointer to establish communication with the remote computer identified thereby executes automatically by the user computing device without user intervention.

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[8] A barcode (also bar code) is a machine-readable representation of information (usually dark ink on a light background to create high and low reflectance which is converted to 1s and 0s). Originally, barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software (From Wikipedia, the free encyclopedia)

[9] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10 checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

The '193 patent explicitly disclosed automatic communication by the user computing device with the remote computer is executed by a web browser program ("Internet client access software for World Wide Web") running on the user computing device (col. 4 lines 34-37).

Claim 62. The system of claim 61 wherein the automatic communication by the user computing device with the remote computer is executed by a web browser program running on the user computing device.

The '193 patent explicitly disclosed automatic communication by the user computing device with the remote computer is executed by a web browser program ("Internet client access software for World Wide Web") running on the user computing device (col. 4 lines 34-37).

Claim 63. The system of claim 36 wherein the means for using the pointer to establish communication with the remote computer identified thereby executes by a user selecting hypertext link returned to the user computing device by the database.

The '193 patent disclosed means for using the pointer (matching text to keyword) to establish communication with the remote computer identified by the database 13,17 (server) for retrieving multimedia documents from the remote computer using well-known information retrieval techniques (col. 4 lines 45-56). Additionally the '193 patent disclosed the use of URL for locating documents in the internet which inherently includes hypertext links.

The '193 patent did not explicitly disclose that communication with the remote computer identified thereby is executed by a user selecting hypertext link returned to the user computing device by the database.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a hypertext link returned to the user computing device by the database to establish communication with the remote computer for retrieving multimedia documents therein as this is a well-known information retrieval technique[10].

Claim 64. The system of claim 36 wherein the network over which the user computing device establishes communication with the remote computer is a wide area network.

The '193 patent disclosed the network over which user computing device establishes communication with the remote computer is a wide area network (internet) (col. 10, lines 1-4).

Claim 65. The system of claim 64 wherein the wide area network is the Internet.

The '193 patent disclosed the user computing device establishes communication with the remote computer (multimedia server) located on the internet (col. 10, lines 1-4).

Claim 66. The system of claim 64 wherein the wide area network is a proprietary online service.

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[10] Hypertext and the World Wide Web: In the late 1980s, Berners-Lee, then a scientist at CERN, invented the World Wide Web to meet the demand for automatic information-sharing among scientists working in different universities and institutes all over the world. In 1992, Lynx was born as an early Internet web browser. Its ability to provide hypertext links within documents that could reach into documents anywhere on the Internet began the creation of the web on the Internet (From Wikipedia, the free encyclopedia)

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The '193 patent disclosed wherein the wide area network is a proprietary online service ("cable TV company", "telephone company") (col. 3 lines 35-36, col. 4 lines 7-25).

Claim 67. The system of claim 66 wherein the database is resident on an online service provider computer with which the user computing device has established direct communication.

The '193 patent disclosed that the database (a database is inherent for performing the lookup function for matching text to keywords) (col. 4 lines 46-57) is resident on an online service ("particular service", "services identified") (col. 3 lines 7, 12-13), provider residing in severs 13 and 17 with which the user computing device 15 (the user interface unit comprises multimedia computer) (col. 3 lines 40-45) has established direct communication. As shown in Fig. 1 the user 15 communicates directly with servers 13, 17 through the communication network 14.

Claim 68. The system of claim 67 wherein the online service provider computer additionally provides a gateway to the Internet.

The '193 patent disclosed that the online service provider computer 13, 17 (multimedia server) additionally provides a gateway to the Internet (col. 7 lines 11-12, col. 9 lines 3-5, col. 10 lines 1-4).

2. The apparatus of claim 1, wherein said multimedia server is on the Internet.

Claim 69. The system of claim 36 wherein access to the database requires entry of a password.

It was well-known in the art that electronic resources, such as databases, are commonly secured through a user name/password mechanism. Additionally the '193 patent disclosed comparing the scanner ID code to determine if the user's request is authorized (col. 3 lines 3-13). Entering the scanner ID code for authorization is broadly interpreted as the entry of a password.

Berners-Lee explicitly disclosed the use of password as part of the common internet scheme syntax for accessing internet resources (page 5: section 3.1).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the URL disclosed in the '193 patent a password disclosed by Berners-Lee for accessing internet based network resource.

Claim 71. A user computing device comprising:

The '193 patent disclosed user computing device ("multimedia system") (col. 3 lines 40-45) comprising:

a. an input device configured to read a data carrier modulated with an index; and

The '193 patent disclosed an input device 11 (scanner) to read a data carrier modulated with an index ("an object code representing the read mark") (col. 1 lines 36-39, col. 6 lines 60-61).

b. computer processing means for executing a software program adapted to:

The '193 patent disclosed computer processing means ("user's input selection is processed"), for executing a software program (software program is inherent to the multimedia server computer 13 as it is required for processing user input)(col. 4 lines 2-6).

utilize the index to access a database comprising a plurality of records that link an index to a pointer which identifies a remote computer;

The '193 patent disclosed that the user input is processed by the multimedia server and utilizes the index (marks, identifier, text) to access a database 13,17,18 ("database servers").

retrieve from the database a pointer as a function of the index; and

The '193 patent disclosed to retrieve from the database 13, 17 (servers) a pointer as a function of the index ("servers 13, 17 match this text to keywords that describe stored documents on the network using well-known information retrieval techniques").

use the pointer to establish communication with the remote computer identified thereby.

The '193 patent disclosed to use the pointer (the keyword matched to text) to establish communication with the remote computer identified ("This would enable the servers to select the multimedia document(s) that best match the keywords that the user scans, and offer them for viewing")(col. 4 lines 50-55).

In the alternative that the '193 patent fails to disclose extracting a pointer from the database as a function of the index and using the pointer to establish communication with the

remote computer identified thereby Berners-Lee et al. disclosed the use of pointers and URLs for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a standard internet protocol for extracting a pointer from the database as a function of the index disclosed by Berners-Lee et al. for accessing network resource.

Claim 72. The user computing device of claim 71 wherein the user input device comprises means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index.

The '193 patent disclosed user input device comprising scanner 11 (Fig. 1) for reading bar codes (col. 1 lines 36-39, col. 2 lines 22-25). The means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 73. The user computing device of claim 72 wherein the means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises means for scanning a bar code symbol encoded with the index.

The '193 patent disclosed user input device comprising scanner 11 (Fig. 1) for reading bar codes (col. 1 lines 36-39, col. 2 lines 22-25). The means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

Claim 75. The user computing device of claim 72 wherein the means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index comprises means for using optical character recognition techniques.

The '193 patent disclosed scanner for reading alphanumeric characters (col. 2, lines 22-25). The means for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device.

Claim 86. The user computing device of claim 71 wherein the software program is adapted to utilize the index to access a database located on a server computer remote from the user computing device.

The '193 patent disclosed in Fig. 1, disclosed the software program (inherent) is adapted to utilize the index (code) to access a database located on a server computer (13,17,18) are located remotely from the user computing device 15.

Claim 87. The user computing device of claim 71 wherein the software program is adapted to utilize the index to access a database distributed over more than one computer.

The '193 patent disclosed software (col. 4 line 34-37) program (inherent to the system shown in the flowchart of Fig. 3) is adapted to utilize the index (code) to access a database ("database servers") distributed over more than one computer 13, 17 (col. 5 lines 51-53).

Claim 88. The user computing device of claim 71 wherein the index is comprised of a first field and a second field, and wherein the software program is adapted to access a database with only the first field of the index.

The '193 patent disclosed the use of barcode[11] which inherently comprises plurality of fields where data is stored in the widths and spacings of parallel lines and could work in a similar manner as the well known URL that comprises plurality of fields. Therefore, a first field of the code (URL) could be used to access the database (col. 4 lines 31-37).

Claim 89. The user computing device of claim 88 wherein a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

The '193 patent disclosed the use of standardized code (col. 2 line 53). Additionally it is well known that standardized code such as EAN/UPC[12] codes include multiple fields.

The '193 patent did not expressly disclose a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent to use only one field of the code such as the manufacturer

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[11] A barcode (also bar code) is a machine-readable representation of information (usually dark ink on a light background to create high and low reflectance which is converted to 1s and 0s). Originally, barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software (From Wikipedia, the free encyclopedia)

[12] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10 checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

identification number, for the lookup function disclosed in '193 patent (match text to keyword). Different products made by the same manufacturer would then return the same pointer, even if other fields of the index, such as the product identification number, were different.

Claim 90. The user computing device of claim 71 wherein the software program is adapted to use the pointer to establish communication with the remote computer identified thereby automatically without user intervention.

The '193 patent disclosed automatic communication by the user computing device with the remote computer is executed by a web browser program ("Internet client access software for World Wide Web") running on the user computing device (col. 4 lines 34-37).

Claim 91. The user computing device of claim 90 wherein the automatic communication by the user computing device with the remote computer is executed by a web browser program running on the user computing device.

The '193 patent disclosed automatic communication by the user computing device with the remote computer is executed by a web browser program ("Internet client access software for World Wide Web") running on the user computing device (col. 4 lines 34-37).

Claim 92. The user computing device of claim 71 wherein the software program is adapted to use the pointer to establish communication with the remote computer identified thereby by using a user-selected hypertext link returned to the user computing device by the database.

The '193 patent disclosed wherein the software program is adapted to use the pointer (matching text to keyword) to establish communication with the remote computer identified by

the database 13,17 (server) for retrieving multimedia documents from the remote computer using well-known information retrieval techniques (col. 4 lines 45-56).

The '193 patent did not explicitly disclose that communication with the remote computer is established by selecting hypertext link returned to the user computing device by the database.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a hypertext link returned to the user computing device by the database to establish communication with the remote computer for retrieving multimedia documents therein as this is a well-known information retrieval technique[13].

Claim 93. The user computing device of claim 71, further adapted to establish communication with the remote computer over a wide area network.

The '193 patent disclosed the user computing device establishes communication with the remote computer is a wide area network (internet) (col. 10, lines 1-4).

Claim 94. The user computing device of claim 93 further adapted to establish communication with the remote computer over the Internet.

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[13] Hypertext and the World Wide Web: In the late 1980s, Berners-Lee, then a scientist at CERN, invented the World Wide Web to meet the demand for automatic information-sharing among scientists working in different universities and institutes all over the world. In 1992, Lynx was born as an early Internet web browser. Its ability to provide hypertext links within documents that could reach into documents anywhere on the Internet began the creation of the web on the Internet (From Wikipedia, the free encyclopedia)

The '193 patent disclosed the user computing device establishes communication with the remote computer over the internet (col. 10, lines 1-4).

Claim 95. The user computing device of claim 93 further adapted to establish communication with the remote computer over a proprietary online service.

The '193 patent disclosed wherein the wide area network is a proprietary online service ("cable TV company", "telephone company") (col. 3 lines 35-36, col. 4 lines 7-25).

4. Claims 4, 7-9, 39, 42-44, 74, 77-79 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Mak (US 5,420,943).

Claim 4. The method of claim 3 wherein the bar code symbol is encoded in accordance with an extrinsic standard.

The '193 patent and Berners-Lee et al. did not explicitly disclose the bar code symbol is encoded in accordance with an extrinsic standard.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code (Abstract: lines 5-6).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a bar code symbol encoded in accordance with an extrinsic standard (standardized bar code) disclosed by Mak for compatibility.

Claim 7. The method of claim 1 wherein the index is at least a portion of EAN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth above in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a EAN Code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of EAN code for providing a standardized bar code disclosed by Mak for compatibility.

Claim 8. The method of claim 1 wherein the index is at least a portion of an ISBN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of an ISBN code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of an ISBN code for providing a standardized bar code disclosed by Mak for compatibility.

Claim 9. The method of claim 1 wherein the index is at least a portion of an ISSN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a ISSN Code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of an ISSN code for providing standardized bar code disclosed by Mak for universal application.

Claim 39. The system of claim 38 wherein the means for scanning a bar code symbol is adapted to scan a bar code symbol encoded in accordance with an extrinsic standard.

The '193 patent and Berners-Lee et al. did not explicitly disclose the bar code symbol is encoded in accordance with an extrinsic standard.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a bar code symbol encoded in accordance with an extrinsic standard (standardized bar code) disclosed by Mak for compatibility.

Claim 42. The system of claim 36 wherein the input device is configured to read an index comprising at least a portion of an EAN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth above in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a EAN Code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of EAN code for providing a standardized bar code disclosed by Mak for compatibility.

Claim 43. The system of claim 36 wherein the input device is configured to read an index comprising at least a portion of an ISBN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of an ISBN code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of an ISBN code for providing a standardized bar code disclosed by Mak for compatibility.

Claim 44. The system of claim 36 wherein the input device is configured to read an index comprising at least a portion of an ISSN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a ISSN Code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the index is at least a portion of an ISSN code for providing standardized bar code disclosed by Mak for compatibility.

Claim 74. The user computing device of claim 73 wherein the means for scanning a bar code symbol is adapted to scan a bar code symbol encoded in accordance with an extrinsic standard.

The '193 patent and Berners-Lee et al. did not explicitly disclose the bar code symbol is encoded in accordance with an extrinsic standard.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent means for scanning a bar code symbol is adapted to scan a bar code symbol encoded in accordance with an extrinsic standard (standardized bar code) disclosed by Mak for compatibility.

Claim 77. The user computing device of claim 71 wherein the input device is configured to read an index comprising at least a portion of an EAN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth above in the rejection of claim 71 above with the exception of wherein the input device is configured to read an index comprising at least a portion of a EAN code.

. Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent an input device configured to read an index comprising at least a portion of a EAN code disclosed by Mak for providing a standardized bar code for compatibility.

Claim 78. The user computing device of claim 71 wherein the input device is configured to read an index comprising at least a portion of an ISBN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 71 above with the exception of wherein the input device is configured to read an index comprising at least a portion of an ISBN code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the input device is configured to read an index comprising at least a portion of an ISBN code disclosed by Mak for compatibility.

Claim 79. The user computing device of claim 71 wherein the input device is configured to read an index comprising at least a portion of an ISSN code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 71 above with the exception of wherein the input device is configured to read an index comprising at least a portion of an ISSN code.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent wherein the input device is configured to read an index comprising at least a portion of an ISSN code disclosed by Mak for compatibility.

5. **Claims 6, 41, 76 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Reed et al. (US 3,961,164).**

Claim 6. The method of claim 1 wherein the index is at least a portion of a Universal Product Code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a Universal Product Code.

Reed et al. disclosed bar code reader for reading UPC code which provides a standardized coding system to promote compatibility.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent an index with at least a portion of a Universal Product Code disclosed by Reed to provide a standardized coding system to promote compatibility.

Claim 41. The system of claim 36 wherein the input device is configured to read an index comprising at least a portion of a Universal Product Code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of wherein the index is at least a portion of a Universal Product Code.

Reed et al. disclosed bar code reader for reading UPC code which provides a standardized coding system to promote compatibility.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent an index with at least a portion of a Universal Product Code disclosed by Reed to provide a standardized coding system to promote compatibility.

Claim 76. The user computing device of claim 71 wherein the input device is configured to read an index comprising at least a portion of a Universal Product Code.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 71 above with the exception of wherein the input device is configured to read an index comprising at least a portion of a Universal Product Code.

Reed et al. disclosed bar code reader for reading UPC code which provides a standardized coding system to promote compatibility.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent an input device configured to read an index comprising at least a portion of a Universal Product Code disclosed by Reed to provide a standardized coding system to promote compatibility.

6. **Claims 10, 13, 45, 48, 80, 83 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Walton (US 4,384,288).**

Claim 10. The method of claim 1 wherein the step of reading a data carrier modulated with an index comprises receiving a signal emanating from an article of commerce, the signal being modulated with the index.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth above in the rejection of claim 1 above with the exception of the step of reading a data carrier modulated with an index comprises receiving a signal emanating from an article of commerce, the signal being modulated with the index.

Walton disclosed reading a data carrier (signal) modulated with an index ("identification code") by reader 49 (Fig. 4) comprises receiving a signal emanating from an article of

commerce (carton or other container), the signal being modulated ("signal modulation") (Fig. 3) with the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a step of reading a data carrier (signal) modulated with an index ("identification code") comprises receiving a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") with the index as disclosed by Walton for identification of objects.

Claim 13. The method of claim 1 wherein the step of reading a data carrier modulated with an index comprises inputting into the user computing device an RF signal modulated with information correlated to the index.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of inputting into the user computing device an RF signal modulated with information correlated to the index.

Walton disclosed inputting into the user computing device 77 (COMPUTER) an RF signal 50, 51 modulated with information correlated to the index (code signal) (Fig. 4).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent inputting into the user computing device (COMPUTER) an RF signal modulated with information correlated to the index disclosed by Walton for identification of objects.

Claim 45. The system of claim 36 wherein the input device is adapted to receive a signal emanating from an article of commerce, the signal being modulated with the index.

The '193 patent in combination with the Berners-Lee et al. article disclosed all of the claimed limitations as set forth above in the rejection of claim 35 above with the exception of the step of reading a data carrier modulated with an index comprises receiving a signal emanating from an article of commerce, the signal being modulated with the index.

Walton disclosed reading a data carrier (signal) modulated with an index ("identification code") by reader 49 (Fig. 4) comprises receiving a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") (Fig. 3) with the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a step of reading a data carrier (signal) modulated with an index ("identification code") comprises receiving a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") with the index as disclosed by Walton for identification of objects.

Claim 48. The system of claim 36 wherein the input device comprises means for inputting an RF signal modulated with information correlated to the index.

The '193 patent in combination with the Berners-Lee et al. article disclosed all of the claimed limitations as set forth above in the rejection of claim 35 above with the exception of a means for inputting an RF signal modulated with information correlated to the index.

Walton disclosed reading a data carrier (signal) modulated with an index ("identification code") by reader 49 (Fig. 4) comprises receiving a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") (Fig. 3) with the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a step of reading a data carrier (signal) modulated with an index ("identification code") comprises receiving a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") with the index as disclosed by Walton for identification of objects.

Claim 80. The user computing device of claim 71 wherein the input device is adapted to receive a signal emanating from an article of commerce, the signal being modulated with the index.

The '193 patent in combination with the Berners-Lee et al. article disclosed all of the claimed limitations as set forth above in the rejection of claim 71 above with the exception of wherein the input device is adapted to receive a signal emanating from an article of commerce, the signal being modulated with the index.

Walton disclosed reading a data carrier (signal) modulated with an index ("identification code") by reader 49 (Fig. 4) comprises receiving a signal emanating from an article of

commerce (carton or other container), the signal being modulated ("signal modulation") (Fig. 3) with the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent an input device for reading a data carrier (signal) modulated with an index ("identification code") from a signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") with the index as disclosed by Walton for identification of objects.

Claim 83. The user computing device of claim 71 wherein the input device comprises means for inputting an RF signal modulated with information correlated to the index.

The '193 patent in combination with the Berners-Lee et al. article disclosed all of the claimed limitations as set forth above in the rejection of claim 71 above with the exception of an input device comprises means for inputting an RF signal modulated with information correlated to the index.

Walton disclosed inputting into the user computing device 77 (COMPUTER) an RF signal 50, 51 modulated with information correlated to the index (code signal) (Fig. 4).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent a means for inputting into the user computing device (COMPUTER) an RF signal modulated with information correlated to the index disclosed by Walton for identification of objects.

7. **Claims 11, 12, 46, 47, 81, 82 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Firman (US 5,377,303).**

Claim 11. The method of claim 1 wherein the step of reading a data carrier modulated with an index comprises inputting into the user computing device an audible signal modulated with information correlated to the index.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of the step of reading a data carrier modulated with an index comprises inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index using voice recognition system.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

Claim 12. The method of claim 11 wherein the step of inputting into the user computing device an audible signal modulated with information correlated to the index comprises the use of voice recognition techniques.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of inputting into the

user computing device an audible signal modulated with information correlated to the index comprises the use of voice recognition techniques.

Firman disclosed inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index using voice recognition system.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

Claim 46. The system of claim 36 wherein the input device comprises means for inputting into the user computing device an audible signal modulated with information correlated to the index.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of means for inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed means for inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index using voice recognition system.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by

Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

Claim 47. The system of claim 46 wherein the means for inputting into the user computing device an audible signal modulated with information correlated to the index is configured to utilize voice recognition techniques.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above except the use of voice recognition techniques for inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed using voice recognition technique for inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

Claim 81. The user computing device of claim 71 wherein the input device comprises means for inputting into the user computing device an audible signal modulated with information correlated to the index.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 71 above with the exception of an input device

having means for inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed means for inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index using voice recognition system.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

Claim 82. The user computing device of claim 81 wherein the means for inputting into the user computing device an audible signal modulated with information correlated to the index is configured to utilize voice recognition techniques.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 71 above except the use of voice recognition techniques for inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed using voice recognition technique for inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the voice recognition system disclosed by

Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

8. **Claims 14, 49, 84 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Thomas (US 4,796,292).**

Claim 14. The method of claim 1 wherein the step of reading a data carrier modulated with an index comprises accessing a magnetic card with a magnetic card reader.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of step of reading a data carrier modulated with an index comprises accessing a magnetic card with a magnetic card reader.

Thomas discloses the step of reading a data carrier modulated with an index comprises accessing a magnetic card with a magnetic card reader (col. 1 lines 41-44).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '193 patent by including the step of reading a data carrier modulated with an index comprises accessing a magnetic card with a magnetic card reader disclosed by Thomas as an alternative method of inputting data to a computer.

Claim 49. The system of claim 36 wherein the input device comprises means for reading a magnetic stripe card.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 36 above with the exception of an input device for reading a magnetic stripe card.

Thomas discloses an input device for reading a magnetic stripe card (col. 1, lines 41-44).

At the time the invention was made it would have been obvious for one of ordinary skill to have included in the '193 patent an input device for reading a magnetic stripe card disclosed by Thomas as an alternative method of inputting data to a computer.

Claim 84. The user computing device of claim 71 wherein the input device comprises means for reading a magnetic stripe card.

The '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claim 36 above with the exception of an input device comprises means for reading a magnetic stripe card.

Thomas discloses an input device for reading a magnetic stripe card (col. 1, lines 41-44).

At the time the invention was made it would have been obvious for one of ordinary skill to have included in the '193 patent an input device having means for reading a magnetic stripe card disclosed by Thomas as an alternative method of inputting data to a computer.

9. **Claims 35 and 70 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Laszlo (US 5,331,547).**

Claim 35. The method of claim 1 wherein the database is associated with a search engine.

The '193 patent disclosed that the multimedia server location is accessed via the internet by matching text to keywords in a database (13, 17). While the '193 patent in combination with Berners-Lee et al. did not explicitly disclose the use of a search engine for retrieving documents the use of search engine is a well-known information retrieval technique and would have been used for searching multimedia documents stored in the network disclosed in the '193 patent (col. 4 lines 46-55).

Laszlo explicitly disclosed bar code reader and scanner for reading bar codes and a search engine for retrieving documents identified by the bar code (col. 1, lines 61-65).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have to have associated the database (server) disclosed in the '193 patent with a search engine disclosed by Laszlo for retrieving documents from the internet identified by the bar code.

Claim 70. The system of claim 36 wherein the database is associated with a search engine.

The '193 patent disclosed that the multimedia server location is accessed via the internet by matching text to keywords in a database (13, 17). While the '193 patent in combination with Berners-Lee et al. did not explicitly disclose the use of a search engine for retrieving documents the use of search engine is a well-known information retrieval technique and would have been

used for searching multimedia documents stored in the network disclosed in the '193 patent (col. 4 lines 46-55).

Laszlo explicitly disclosed bar code reader and scanner for reading bar codes and a search engine for retrieving documents identified by the bar code (col. 1, lines 61-65).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have to have associated the database (server) disclosed in the '193 patent with a search engine disclosed by Laszlo for retrieving documents from the internet identified by the bar code.

10. Claims 15, 50, 85 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Seiler et al. (US 4,907,264).

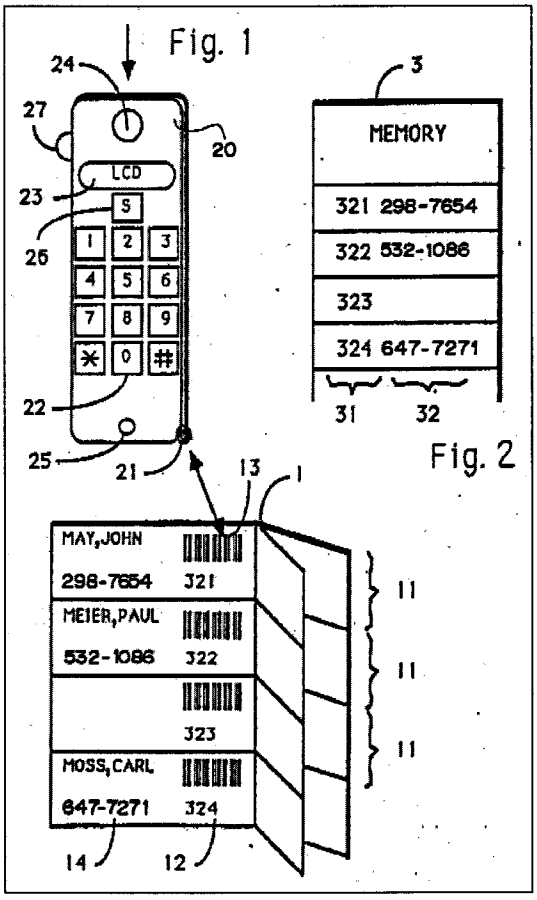
Claim 15. The method of claim 1 wherein the steps of accessing a database and extracting a pointer therefrom are carried out on the user computing device.

The '193 patent in combination with Berners Lee disclosed all of the claimed limitations as set forth in the rejection of claim 1 above with the exception of accessing a database and extracting a pointer therefrom are carried out on the user computing device.

Seilers et al disclosed accessing a database 3 (memory) and extracting a pointer (number) therefrom are carried on the user computing device (Fig. 1,2) (col. 2 lines 1-12).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the user computing device disclosed in the '193 patent a database

for extracting a pointer from the database disclosed by Seiler as such a system is beneficial to the user for providing easy access to the database.



Claim 50. The system of claim 36 wherein the means for storing a database is located on the user computing device.

The '193 patent in combination with Berners Lee disclosed all of the claimed limitations as set forth in the rejection of claim 36 above with the exception of the means for storing a database is located on the user computing device.

Seilers et al disclosed a database (memory) comprising a list of telephone numbers is located on the user computing device (Fig. 1) (col. 2 lines 1-12).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the user computing device disclosed in the '193 patent a database located disclosed by Seiler as such a system is beneficial to the user for providing easy access to the database.

Claim 85. The user computing device of claim 71 wherein the software program is adapted to utilize the index to access a database located on the user computing device.

The '193 patent in combination with Berners Lee disclosed all of the claimed limitations as set forth in the rejection of claim 71 above with the exception of wherein the software program is adapted to utilize the index to access a database located on the user computing device.

Seilers et al disclosed software program ("The program illustrated in Fig. 4") is adapted to utilize the index (bar code) to access a database 3 (memory) comprising a list of telephone numbers 32 located on the user computing device (Fig. 1, 2) (col. 2 lines 1-12).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the user computing device disclosed in the '193 patent a database disclosed by Seiler for extracting a pointer by using the index (barcode) read by bar code reader as such a system is beneficial to the user for providing easy access to the database.

11. Claims 1-4, 15-16, 18-27, 34, 36-39, 50, 53-62, 69, 71-74, 85, 91 are rejected under 35 U.S.C. 102(b) as being anticipated by Bauss (US 4,780,599) (hereinafter "the ''599 patent") or, in the alternative, under 35 U.S.C. 103(a) as obvious over Berners-Lee et al. (RFC 1738, Uniform Resource Locators (URL)) document.

Re claims 1, 36, 71 the '599 patent disclosed method and apparatus for connecting a user computing device (CONTROL COMPUTER/DATA PROCESSOR) (Fig. 1) to one of a plurality of remote computers (storage units) available for communication over a network ("wireless transmission system") comprising reading a data carrier (signal) modulated with an index (code) (col. 3 lines 7-15) accessing a database 64 (coding unit/memory) with the index, the database 64 (coding units/memory) comprising a plurality of records that link an index (code) to a pointer (address) which identifies a remote computer on the network, extracting a pointer (address) from the database as a function of the index (col. 4 lines 42-45).

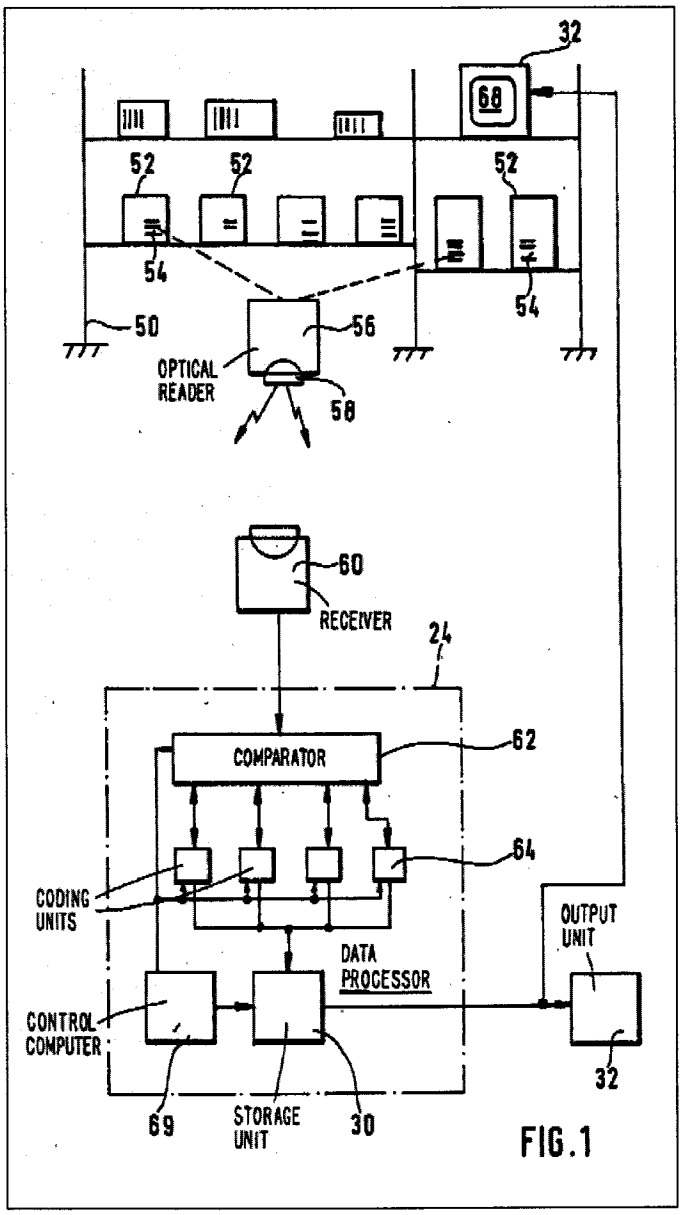


FIG.1

In the alternative that the storage units disclosed in the '599 patent are not plurality of remote computers, Berners-Lee et al. disclosed the use of pointers and URLs for connecting a user to plurality of remote computers for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent a connection to plurality of remote computers in a network disclosed by Berners-Lee et al and to used a pointer (URL) returned from a database for accessing information from the remote computers using standard internet protocol.

Re claims 2, 3, 37, 38, 72, 73 the '599 patent disclosed optical reading device for reading a light pattern emanating from an object and demodulating the light pattern to obtain the index wherein the index comprises scanning a bar code encoded with the index (col. 1 lines 57-68, col. 2 lines 1-2, col. 3 lines 7-15, 24-31).

Re claims 4, 39, 74 the '599 patent disclosed scanning a bar code encoded with extrinsic standard since existing codes are used ("existing codes are used") (col. 4 lines 39-42).

Re claims 15, 50 and 85, the '599 patent disclosed accessing a database and extracting a pointer therefrom are carried out on the user computing device since the reading device including data processing and storage unit are combined into one device (col. 4 lines 14-36).

Re claims 16, 51 the '599 patent disclosed accessing a database is carried out on a remote computer (storage units) ("data processing and storage units are arranged separately from the hand device") (col. 4 lines 30-34).

In the alternative that the storage unit disclosed in the '599 patent is not a remote computer, Berners-Lee et al. disclosed the use of pointers and URLs for connecting a user to

plurality of remote computers for locating resources in the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent a connection to a remote computer in a network disclosed by Berners-Lee et al. for accessing information from the remote computer using standard internet protocol.

Re claim 18, the '599 patent disclosed the database returns a pointer comprising a network address ("convert the information associated with the product into addresses") (col. 3 lines 24-31).

Re claims 19-21, the '599 patent did not explicitly disclose that the pointer (addresses) comprises a URL (Uniform Resource Locator), the name of a remote computer, and an IP address.

Berners-Lee et al. explicitly disclosed the use of URL to access remote computers connected to the internet ("URLs are used to locate resources that contain pointers to other resources") (Berners-Lee et al., page 4 section 2.3). Additionally, Berners-Lee et al. disclosed that the syntax of URL includes the name of a remote computer, and an IP address ("The fully qualified domain name of a network host, or its IP address as a set of four decimal digit groups separated by "."") (Berners-Lee et al.: RFC 1738, page 6 lines 8-10).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the database disclosed in the '599 patent a pointer (address)

associated with an index (code) comprising a URL including the name of a remote computer, and an IP address disclosed by Berners-Lee et al. for accessing internet based network resources.

Re claims 22-25, 57-60, 88-89 the '599 patent disclosed the use of existing codes for cost savings (col. 4 lines 39-41). Additionally it is well known that the existing standardized codes such as EAN/UPC[14] codes include multiple fields.

The '599 patent did not expressly disclose that the index (bar code) (col. 3 lines 7-14) is comprised of a first field and a second field, wherein the first field is a manufacturer identification number and the second field is a product identification number, and that a plurality of indexes having the same first field and different second fields will result in extraction of the same pointer.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '599 patent by using standardized codes such as the existing UPC codes for cost saving that comprise first field and second fields so that only one field of the code such as the manufacturer identification number may be used for calling up information regarding the group of products made by the same manufacturer (see '599 patent col. 4 lines 45-49).

Re claims 26, 61, 90 the '599 patent disclosed that communication with remote computer (storage units) is made automatically without user intervention (autonomous[15]) (col. 2 lines 67-68, col. 3 lines 1-3).

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[14] The actual UPC code is a 12-digit code. The first 6 digits represent the manufacturer of the labeled item. The next 5 digits identify a specific product assigned by the manufacturer who is responsible for maintaining the uniqueness of their product line. The twelfth digit is a Modulo 10

Re claim 27, 62, 91 the '599 patent did not explicitly disclose the automatic communication with remote computer is executed by a web browser program running on the user computing device.

Berners-Lee disclosed the use of URL for automatically locating resources connected to the internet World-Wide Web.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the user computing device disclosed in the '599 patent the use of URL disclosed by Berners-Lee in a web browser program for automatically locating resources connected to the internet World-Wide Web.

Re claims 34 and 69, the '599 patent did not explicitly disclose wherein access to the database requires entry of a password.

It was well-known in the art that electronic resources, such as databases, are commonly secured through a user name/password mechanism. Additionally, Berners-Lee explicitly disclosed the use of password as part of the common internet scheme syntax for accessing internet resources (page 5: section 3.1).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent the use of password in the URL disclosed by

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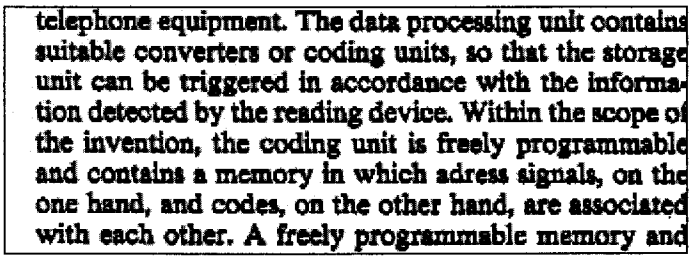
checksum, based on the previous 11 digits of data. UPC is a fixed length, numeric, continuous symbology using four element widths.

[15] Autonomous = undertaken or carried on without outside control (Merriam-Webster's collegiate dictionary, 10th edition).

Berners-Lee for accessing internet based network resources that require a password for access to the database.

Re claim 53, the '599 patent disclosed wherein the pointer comprises a network address ("address-signals") (col. 3 lines 24-31).


telephone equipment. The data processing unit contains suitable converters or coding units, so that the storage unit can be triggered in accordance with the information detected by the reading device. Within the scope of the invention, the coding unit is freely programmable and contains a memory in which adress signals, on the one hand, and codes, on the other hand, are associated with each other. A freely programmable memory and

Re claims 54-56, the '599 patent disclosed the use of pointers (address signals) to access remote computers (storage units) but did not explicitly disclose wherein the pointer ("address signals") comprises Uniform Resource Locator (URL), the name of remote computer, and an IP address.

Berners-Lee et al. disclosed the use of URL, the name of remote computer, and an IP address as part of Internet standard protocol for accessing remote computers ("access of resources via the internet" (see Berners-Lee RFC 1738 page 1 Abstract, page 5,6 Section 3.1: Common Internet Scheme Syntax).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have used in the '599 patent pointer comprising Uniform Resource Locator (URL),

the name of remote computer, and an IP address disclosed by Berners-Lee to access remote computers connected to the internet.

12. Claims 28, 63 and 92 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Bertrand (World-Wide algorithm animation: Computer Networks and ISDN Systems 27 1994).

Re claims 28, 63, 92 the '599 patent did not explicitly disclose that communication with the remote computer identified thereby is executed by a user selecting hypertext link returned to the user computing device by the database.

Berners-Lee disclosed the use of hypertext link (HTTP URL) for locating resources in the internet (Berners-Lee: RFC 1738, page 9, section 3.3).

Additionally, Bertrand disclosed communication with the remote computer is executed by a user (client) selecting hypertext link ("*rectangle-href* pairs") returned to the user computing device ("client side") by the database ("application server") that would allow the user to send a request for the document mentioned in the *href* part (Bertrand: page 264, section 6. Conclusion).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the user computing device disclosed in the '599 patent as modified by Berners-Lee an HTML viewer disclosed by Bertrand so that communication with the remote computer is executed by the user (client) selecting a hypertext link returned to the user

computing device ("client side") by the database (server) that would allow the user to send a request for the document mentioned in the *href* part disclosed by Bertrand as this is beneficial for viewing multi-part documents.

13. Claims 5, 40 and 75 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Wellner (US 5,640,193).

Re claims 5, 40 and 75 the '599 patent in combination with Berners-Lee did not expressly disclose optical character recognition techniques to obtain the index.

The '193 patent disclosed scanner for reading alphanumeric characters (col. 2, lines 22-25) as an alternative to reading bar-codes. Demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device. Additionally, the '193 patent disclosed decoding ("decodes") scanner output which is broadly interpreted as demodulating for obtaining the index (code).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent an optical reading device with optical character recognition disclosed in the '193 patent for reading alphanumeric characters.

14. Claims 6-9, 41-44, 76-79 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Reed et al. (US 3,961,164).

Re claims 6, 41, 76 the '599 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claims 1, 36 and 71 above with the exception of wherein the index is at least a portion of a Universal Product Code.

Reed et al. disclosed bar code reader for reading UPC code which provides a standardized coding system to promote compatibility.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent as modified by Berners-Lee an index with at least a portion of a Universal Product Code disclosed by Reed to provide a standardized coding system so as to promote compatibility.

Re claims 7-9, 42-44, 77-79 the '599 patent in combination with Berners-Lee et al. and Reed et al. did not explicitly disclose an input device for reading other alternative types of standard product codes comprising EAN, ISBN and ISSS codes but would have obvious for doing so for providing compatibility with existing coding system.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent as modified by Berners-Lee and Reed an index with at least a portion of EAN/ISBN/ISSS product code to provide compatibility with existing coding system.

15. Claims 10, 13, 45, 48, 80, 83 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Walton (US 4,384,288).

Re claims 10, 13, 45, 48, 80, 83 the '599 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth above in the rejection of claim 1, 36 and 71 above with the exception of reading a data carrier modulated with an index comprises receiving an RF signal emanating from an article of commerce, the signal being modulated with the index.

Walton disclosed reading a data carrier (signal) modulated with an index ("identification code") by reader 49 (Fig. 4) comprises receiving an RF signal emanating from an article of commerce (carton or other container), the signal being modulated ("signal modulation") (Fig. 3) with the index.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent reading a data carrier (signal) modulated with an index comprises receiving an RF signal emanating from an article of commerce the signal being modulated with information correlated with the index as disclosed by Walton for identification of objects.

16. Claims 11-12, 46, 47, 81, 82 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Firman (US 5,377,303).

Re claims 11-12, 46, 47, 81, 82 the '599 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claims 1, 37, 71 above with the exception of reading a data carrier modulated with an index comprises inputting into the user computing device an audible signal modulated with information correlated to the index.

Firman disclosed voice controlled computer interface for inputting into the user computing device (controlled computer interface) an audible signal (voice) modulated with information correlated to the index using voice recognition system (col. 1 lines 15-26).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '599 patent by including the voice recognition system disclosed by Firmin so that an audible signal (voice) modulated with information correlated to the index can be input into the user computing device.

17. Claims 14, 49, 84 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Thomas (US 4,796,292).

The '599 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of claims 1, 36, 71 above with the exception of reading a

data carrier modulated with an index comprises accessing a magnetic card with a magnetic card reader.

Thomas discloses reading a data carrier modulated with an index by accessing a magnetic card with a magnetic card reader (col. 1, lines 41-44).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '599 patent by including a magnetic card reader disclosed by Thomas for reading a data carrier modulated with an index by accessing a magnetic card as an alternative method of inputting data to a computer.

18. **Claims 29-33, 64-68, 93-95 are rejected under 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Burgess (US 5,115,326).**

Re claims 29, 64, 93 the '599 patent in combination with Berners-Lee disclosed all of the claimed limitations as set forth in the rejection of claim 1 above except that the user computer is adapted to establish communication with the remote computer over a wide area network.

Burgess et al. disclosed a prior art system of encoding an e-mail address in a fax message and routing the fax message to a destination on a network (see Title) by scanning a bar code on the incoming fax and forwarding the fax to an e-mail address represented by the bar code to a remote computer over a wide area network (col. 1, lines 28-37).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '599 patent by adapting the user computer to establish communication

with the remote computer over a wide area network disclosed by Burgess et al. for sending electronic messages to remote computers.

Re claims 30-33, 65-68, 94-95 the '599 patent in combination with Burgess did not explicitly disclose the wide area network is the internet wherein the database is resident on an online service provider computer with which the user computing device has established direct communication.

Berners-Lee et al. discloses the use of URL in user computer device for communicating with remote computer over the wide area network comprising the internet. Additionally, it is well known that proprietary online service providers provide a gateway (connection) to the internet that allows users to make direct connection to the proprietary online service.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify the '599 patent by making use of URL disclosed by Berners-Lee et al. for communicating with a remote computer over the wide area network comprising the internet including online service providers connected to the internet.

19. **Claims 35 and 70 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Laszlo (US 5,331,547).**

Re claims 35 and 70, the '599 patent in combination with Berners-Lee did not explicitly disclose that the database is associated with a search engine.

Laszlo explicitly disclosed bar code reader and scanner for reading bar codes and a search engine for retrieving documents identified by the bar code (col. 1, lines 61-65).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have to have associated the database 64 (coding unit/memory) disclosed in the '599 patent with a search engine disclosed by Laszlo for retrieving documents identified by the bar code from the internet.

20. **Claims 5, 40, 75 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Wellner (US 5,640,193).**

Re claims 5, 40, 75 the '599 patent in combination with Berners-Lee did not explicitly disclose to obtain the index using optical character recognition techniques.

The '193 patent disclosed scanner for reading alphanumeric characters (col. 2, lines 22-25). The means for demodulating the light pattern to obtain the index is inherently disclosed as these are inherent functions of a scanning device used for reading bar codes.

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have used optical character recognition techniques in the '599 patent combined with Berners-Lee for reading alpha numeric characters disclosed in the '193 patent as an alternative to scanning bar codes.

21. **Claims 17, 52, 87 are rejected under as 35 U.S.C. 103(a) as being obvious over Bauss (US 4,780,599) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Tantry et al. (US 5,398,336).**

Re claims 17, 52, 87 the '599 patent in combination with Berners-Lee did not explicitly disclose that the database is distributed over more than one computer.

Tantry et al. disclosed software system wherein a database is distributed across several database servers 65 ("It is appreciated that in the embodiment of FIG. 6, all of the objects (including the Database Servers) may be distributed across networked computer resources.") and a database is accessed by scanning bar codes 57 to retrieve, manipulate and update data stored within the database (col. 9 lines 63-65, col. 10 lines 6-10) (Fig. 6).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '599 patent as combined with Berners- Lee a database that is distributed over more than one computer as disclosed by Tantry et al. so that programs may run concurrently in the different computers (see Tantry et al. col. 4 lines 38-44).

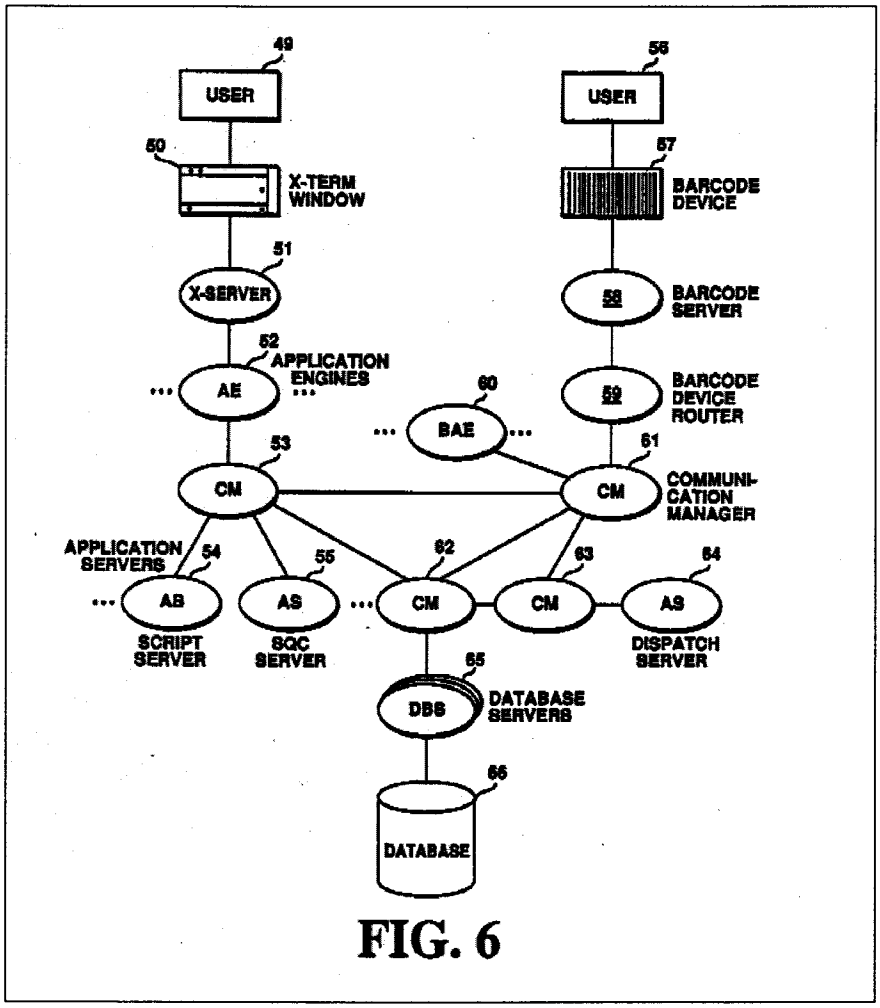

49
USER
50
X-TERM WINDOW
51
X-SERVER
52
APPLICATION ENGINES
AE
53
CM
APPLICATION SERVERS
54
AB
SCRIPT SERVER
55
AS
SQC SERVER
62
CM
65
DBS
DATABASE SERVERS
66
DATABASE
56
USER
57
BARCODE DEVICE
58
BARCODE SERVER
59
BARCODE DEVICE ROUTER
60
BAE
61
CM
COMMUNI-CATION MANAGER
63
CM
64
AS
DISPATCH SERVER

FIG. 6

22. Claims 2, 3, 5, 37, 38, 40, 72, 73, 75 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document in view of Bauss (US 4,780,599).

Re claims 2, 3, 5, 37, 38, 40, 72, 73, 75 the '193 patent in combination with Berners-Lee et al. disclosed all of the claimed limitations as set forth in the rejection of independent claims 1, 36 and 71 above including a scanner 11 for reading bar code and decoding ("decodes") scanner output signal for obtaining the index code.

The '193 patent in combination with Berners-Lee et al. did not explicitly disclose reading a light pattern emanating from an object and demodulating the light pattern to obtain the index but these are inherent features of an optical scanning device used for reading bar codes as evidenced by the prior art disclosed in the '599 patent.

The '599 patent disclosed a prior art optical scanning device 56 (OPTICAL READER) for reading bar code comprising a light-source and an optical scanning system that directs the light source to bar code and the reflected light from bar code is used to detect the coding (col. 1 line 58 to col. 2 line 2) (Fig. 1).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the scanner disclosed in the '193 patent as combined with Berners-Lee a light source for directing the light to bar code disclosed in the '599 patent so that the light pattern (reflected light) emanating from the bar code is demodulated in a transducer disclosed in the '599 patent for obtaining the code index.

23. Claims 4, 39 and 74 are rejected under as 35 U.S.C. 103(a) as being obvious over Wellner (US 5,640,193) and Berners-Lee et al. (Uniform Resource Locators (URL)) document and Bauss (US 4,780,599) in view of Mak (US 5,420,943)

Re claims 4, 39 and 74 Wellner in combination with Berners-Lee et al. and Bauss disclosed all of the claimed limitations as set forth in the rejection of claims 3, 38 and 72 respectively with the exception of explicitly disclosing that the bar code symbol is encoded in accordance with an extrinsic standard.

Mak disclosed bar code reader that can be used to read user defined bar code or standardized bar code (Abstract: lines 5-6).

At the time the invention was made it would have been obvious for one of ordinary skill in the art to have included in the '193 patent in combination with Berners-Lee et al. and Bauss a bar code symbol encoded in accordance with an extrinsic standard (standardized bar code) disclosed by Mak for compatibility.

Pertinent Art

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Katoh et al. (US 5,268,565) disclosed scanning device used for reading bar codes comprising reading light patterns and circuit for demodulating the light pattern (Fig. 21).

Shimano et al. (US 4,835,730) discloses database driven robot programming system wherein a pointer is extracted from one database for obtaining information in another database.

Dobras (US 4,074,114) discloses optical scanner for reading bar code and human readable characters across a label comprising photoelectric cell matrix for sensing the light pattern emanating from the label (Fig. 1,3).

Conclusion

1. Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c).

2. Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR § 1.52(a) and (b), and must contain any fees required by 37 CFR § 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

3. Submissions

If the patent owner fails to file a timely and appropriate response to any Office action or any written statement of an interview required under 37 CFR § 1.560(b), the *ex parte* reexamination proceeding will be terminated, and the Director will proceed to issue a certificate under 37 CFR §1.570 in accordance with the last Office action.

4. Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

5. Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. US 6,199,048 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

All correspondence relating to this ex parte reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Anjan K Deb

Anjan K. Deb
Primary Patent Examiner
Art Unit: 3992
6/30/08

Conferees
ESK
AK

Notice of References Cited	Application/Control No. 90/008,779	Applicant(s)/Patent Under Reexamination 6199048	
	Examiner Anjan K. Deb	Art Unit 3992	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,384,288	05-1983	Walton, Charles A.	340/5.8
*	B	US-5,268,565	12-1993	Katoh et al.	235/462.31
*	C	US-4,835,730	05-1989	Shimano et al.	700/257
*	D	US-4,074,114	02-1978	Dobras, Bruce W.	235/462.07
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
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	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Pointer (computing): definition from Wikipedia the free encyclopedia article, pages 1-14.
	V	Barcode reader: definition from Wikipedia the free encyclopedia article, pages 1-4.
	W	Barcode: definition from Wikipedia the free encyclopedia article, pages 1-10
	X	Hypertext: definition from Wikipedia the free encyclopedia article, pages 1-7

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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Pointer (computing)

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From Wikipedia, the free encyclopedia
(Redirected from Pointer)

In computer science, a **pointer** is a programming language data type whose value refers directly to (or "points to") another value stored elsewhere in the computer memory using its address. Obtaining the value to which a pointer refers is called **dereferencing** the pointer. A pointer is a simple implementation of the general reference data type (although it is quite different from the facility referred to as a *reference* in C++). Pointers to data improve performance for repetitive operations such as traversing string and tree structures, and pointers to functions are used for binding methods in Object-oriented programming and run-time linking to Dynamic Link Libraries (DLLs).

While "pointer" has been used to refer to references in general, it more properly applies to data structures whose interface explicitly allows the pointer to be manipulated as a memory address. Because pointers allow largely unprotected access to memory addresses, there are risks associated with using them. For general information about references, see reference (computer science).

Contents

Pointers in data structures

When setting up data structures like lists, queues and trees, it is necessary to have pointers to help manage the way in which the structure is implemented and controlled. Typical examples of pointers would be start pointers, end pointers, or stack pointers.

Architectural roots

Pointers are a very thin abstraction on top of the addressing capabilities provided by most modern architectures. In the simplest scheme, an *address*, or a numeric index, is assigned to each unit of memory in the system, where the unit is typically either a byte or a word, effectively transforming all of memory into a very large array. Then, if we have an address, the system provides an operation to retrieve the value stored in the memory unit at that address.

In the usual case, a pointer is large enough to hold more addresses than there are units of memory in the system. This introduces the possibility that a program may attempt to access an address which corresponds to no unit of memory, either because not enough memory is installed or the architecture does not support such addresses. The first case may, in certain platforms as the Intel x86 architecture, be called a segmentation fault (segfault). The second case is possible in the current implementation of AMD64, where pointers are 64 bit long and addresses only extend to 48 bits. There, pointers must conform to certain rules (canonical addresses), so if a noncanonical pointer is dereferenced, the processor raises a general protection fault.

On the other hand, some systems have more units of memory than there are addresses. In this case, a more complex scheme such as memory segmentation or paging is employed to use different parts of the memory at different times. The last incarnations of the x86 architecture support up to 36 bits of physical memory addresses, which were mapped to the 32-bit linear address space through the PAE paging mechanism. Thus, only 1/16 of the possible total memory may be accessed at a time. Another example in the same computer family was the 16-bit protected mode of the 80286 processor, which, though supporting only 16 MiB of physical memory, could access up to 1 GiB of virtual memory, but the combination of 16-bit address and segment registers made accessing more than 64 KiB in one data structure cumbersome. Some restrictions of ANSI pointer arithmetic may have been due to the segmented memory models of this processor family.

In order to provide a consistent interface, some architectures provide memory-mapped I/O, which allows some addresses to refer to units of memory while others refer to device registers of other devices in the computer. There are analogous concepts such as file offsets, array indices, and remote object references that serve some of the same purposes as addresses for other types of objects.

Uses

Pointers are directly supported without restrictions in languages such as C, C++, Pascal and most assembly languages. They are primarily used for constructing references, which in turn are fundamental to constructing nearly all data structures, as well as in passing data between different parts of a program.

In functional programming languages that rely heavily on lists, pointers and references are managed abstractly by the language using internal constructs like cons.

When dealing with arrays, the critical lookup operation typically involves a stage called *address*

calculation which involves constructing a pointer to the desired data element in the array. In other data structures, such as linked lists, pointers are used as references to explicitly tie one piece of the structure to another.

Pointers are used to pass parameters by reference. This is useful if we want a function's modifications to a parameter to be visible to the function's caller. This is also useful for returning multiple values from a function.

C pointers

The basic syntax to define a pointer is

```
int *money;
```

This declares `money` as a pointer to an integer. Since the contents of memory are not guaranteed to be of any specific value in C, care must be taken to ensure that the address that `money` points to is valid. This is why it is suggested to initialize the pointer to NULL

```
int *money = NULL;
```

If a NULL pointer is dereferenced then a runtime error will occur and execution will stop likely with a segmentation fault.

Once a pointer has been declared then, perhaps, the next logical step is to point it at something

```
int a = 5;
int *money = NULL;

money = &a;
```

This assigns the value of `money` to be the address of `a`. For example, if `a` is stored at memory location of 0x8130 then the value of `money` will be 0x8130 after the assignment. To dereference the pointer, an asterisk is used again

```
*money = 8;
```

This says to take the contents of `money` (which is 0x8130), go to that address in memory and set its value to 8. If `a` were then accessed then its value will be 8.

This example may be more clear if memory were examined directly. Assume that `a` is located at address 0x8130 in memory and `money` at 0x8134; also assume this is a 32-bit machine such that an int is 32-bits wide. The following is what would be in memory after the following code snippet were executed

```
int a = 5;
int *money = NULL;
```

Address	Contents
0x8130	0x00000005
0x8134	0x00000000

(The NULL pointer shown here is 0x00000000.) By assigning the address of `a` to `money`

```
money = &a;
```

yields the following memory values

Address	Contents
0x8130	0x00000005
0x8134	0x00008130

Then by dereferencing `money` by doing

```
*money = 8;
```

the computer will take the contents of `money` (which is 0x8130), go to that address, and assign 8 to that location yielding the following memory.

Address	Contents
0x8130	0x00000008
0x8134	0x00008130

Clearly, accessing `a` will yield the value of 8 because the previous instruction modified the contents of `a` by way of the pointer `money`.

C arrays

Taking C pointers to the next step is the array.

In C, array indexing is formally defined in terms of pointer arithmetic; that is, the language specification requires that `array[i]` be equivalent to `*(array + i)`. Thus in C, arrays can be thought of as pointers to consecutive areas of memory, and the syntax for accessing arrays is identical for that which can be used to dereference pointers. For example, an array `array` can be declared and used in the following manner:

```
int array[5];      /* Declares 5 contiguous integers */
int *ptr = array;  /* Arrays can be used as pointers */
ptr[0] = 1;        /* Pointers can be indexed with array syntax */
*(array + 1) = 2;  /* Arrays can be dereferenced with pointer syntax */
```

This allocates a block of five integers and declares `array` as a pointer to this block. Another common use of pointers is to point to dynamically allocated memory from malloc which returns a consecutive block of memory of no less than the requested size that can be used as an array.

While most operators on arrays and pointers are equivalent, it is important to note that the `sizeof` operator will differ. In this example, `sizeof(array)` will evaluate to `5*sizeof(int)` (the size of the array), while `sizeof(ptr)` will evaluate to `sizeof(int*)`, the size of the pointer itself.

Default values of an array can be declared like:

```
int array[5] = {2,4,3,1,5};
```

If you assume that `array` is located in memory starting at address 0x1000 on a 32-bit little-endian machine then memory will contain the following:

	0	**1**	**2**	**3**
1000	02	00	00	00
1004	04	00	00	00
1008	03	00	00	00
100C	01	00	00	00
1010	05	00	00	00

Represented here are five integers: 2, 4, 3, 1, and 5. These five integers occupy 32 bits (4 bytes) each with the least-significant byte stored first (this is a little-endian architecture) and are stored consecutively starting at address 0x1000.

The syntax for C with pointers is:

- `array` means 0x1000
- `array+1` means 0x1004 (note that the "+1" really means to add one times the size of an `int` (4 bytes) not literally "plus one")
- `*array` means to dereference the contents of `array` which means to consider the contents as a memory address (0x1000) and to go look up the value at that memory location (0x1000)
- `array[i]` means the i^{th} index of `array` which is translated into `*(array + i)`

The last example is how to access the contents of `array`. Breaking it down:

- `array + i` is the memory location of the i^{th} element of `array`
- `*(array + i)` takes that memory address and dereferences it to access the value.

E.g. `array[3]` is synonymous with `*(array+3)`, meaning `*(0x1000 + 3*sizeof(int))`, which says "dereference the value stored at `0x100C`", in this case `0x0001`.

C linked list

Below is an example of the definition of a linked list in C.

```
/* the empty linked list is
 * represented by NULL or some
 * other signal value */
#define EMPTY_LIST NULL

struct link {
    /* the data of this link */
    void *data;
    /* the next link; EMPTY_LIST if this is the last link */
    struct link *next;
};
```

Note that this pointer-recursive definition is essentially the same as the reference-recursive definition from the Haskell programming language:

```
data Link a = Nil
            | Cons a (Link a)
```

`Nil` is the empty list, and `Cons a (Link a)` is a cons cell of type `a` with another link also of type `a`.

The definition with references, however, is type-checked and doesn't use potentially confusing signal values. For this reason, data structures in C are usually dealt with via wrapper functions, which are carefully checked for correctness.

Pass by reference

Pointers can be used to pass variables by reference, allowing their value to be changed. For example:

```
void not_alter(int n) {
    n = 360;
}

void alter(int *n) {
    *n = 120;
}

void func(void) {
    int x = 24;

    not_alter(x);

    /* x still equal to 24 */

    alter(&x);

    /* x now equal to 120 */
}
```

Memory-mapped hardware

On some computing architectures, pointers can be used to directly manipulate memory or memory-mapped devices.

Assigning addresses to pointers is an invaluable tool when programming microcontrollers. Below is a simple example declaring a pointer of type int and initialising it to a hexadecimal address in this example the constant `0x7FFF`:

```
int *hardware_address = (int *)0x7FFF;
```

In the mid 80s, using the BIOS to access the video capabilities of PCs was slow. Applications that were display-intensive typically used to access CGA video memory directly by casting the hexadecimal constant `0xB8000000` to a pointer to an array of 80 unsigned 16-bit int values. Each value consisted of an ASCII code in the low byte, and a colour in the high byte. Thus, to put the letter 'A' at row 5, column 2 in bright white on blue, one would write code like the following:

```
#define VID ((unsigned (*)[80])0xB8000000)

void foo() {
    VID[4][1] = 0x1F00 | 'A';
}
```

Typed pointers and casting

In many languages, pointers have the additional restriction that the object they point to has a specific type. For example, a pointer may be declared to point to an integer; the language will then attempt to prevent the programmer from pointing it to objects which are not integers, such as floating-point numbers, eliminating some errors.

For example, in C

```
int *money;
char *bags;
```

`money` would be an integer pointer and `bags` would be a char pointer. The following would yield a compiler warning of "assignment from incompatible pointer type" under GCC

```
bags = money;
```

because `money` and `bags` were declared with different types. To suppress the compiler warning, it must be made explicit that you do indeed wish to make the assignment by typecasting it

```
bags = (char *)money;
```

which says to cast the integer pointer of `money` to a char pointer and assign to `bags`.

In languages that allow pointer arithmetic, arithmetic on pointers takes into account the size of the type. For example, adding an integer number to a pointer produces another pointer that points to an address

that is higher by that number times the size of the type. This allows us to easily compute the address of elements of an array of a given type, as was shown in the C arrays example above. When a pointer of one type is cast to another type of a different size, the programmer should expect that pointer arithmetic will be calculated differently. In C, for example, if the `money` array starts at 0x2000 and `sizeof(int)` is 4 bytes whereas `sizeof(char)` is 2 bytes, then `(money+1)` will point to 0x2004 but `(bags+1)` will point to 0x2002. Other risks of casting include loss of data when "wide" data is written to "narrow" locations (e.g. `bags[0]=65537;`), unexpected results when bit-shifting values, and comparison problems, especially with signed vs unsigned values.

Although it's impossible in general to determine at compile-time which casts are safe, some languages store run-time type information which can be used to confirm that these dangerous casts are valid at runtime. Other languages merely accept a conservative approximation of safe casts, or none at all.

Making pointers safer

Because pointers allow a program to access objects that are not explicitly declared beforehand, they enable a variety of programming errors. However, the power they provide is so great that it can be difficult to do some programming tasks without them. To help deal with their problems, many languages have created objects that have some of the useful features of pointers, while avoiding some of their pitfalls.

One major problem with pointers is that as long as they can be directly manipulated as a number, they can be made to point to unused addresses or to data which is being used for other purposes. Many languages, including most functional programming languages and recent imperative languages like Java, replace pointers with a more opaque type of reference, typically referred to as simply a *reference*, which can only be used to refer to objects and not manipulated as numbers, preventing this type of error. Array indexing is handled as a special case.

A pointer which does not have any address assigned to it is called a wild pointer. Any attempt to use such uninitialized pointers can cause unexpected behaviour, either because the initial value is not a valid address, or because using it may damage the runtime system and other unrelated parts of the program.

In systems with explicit memory allocation, it's possible to create a dangling pointer by deallocating the memory region it points into. This type of pointer is dangerous and subtle because a deallocated memory region may contain the same data as it did before it was deallocated but may be then reallocated and overwritten by unrelated code, unknown to the earlier code. Languages with garbage collection prevent this type of error.

Some languages, like C++, support smart pointers, which use a simple form of reference counting to help track allocation of dynamic memory in addition to acting as a reference. In the absence of reference cycles, where an object refers to itself indirectly through a sequence of smart pointers, these eliminate the possibility of dangling pointers and memory leaks. Delphi strings support reference counting natively.

The *null* pointer

A null pointer has a reserved value, often but not necessarily the value zero, indicating that it refers to no

object. Null pointers are used routinely, particularly in C and C++ where the compile-time constant NULL is used, to represent conditions such as the lack of a successor to the last element of a linked list, while maintaining a consistent structure for the list nodes. This use of null pointers can be compared to the use of null values in relational databases and to the "Nothing" value in the "Maybe" monad.

Because it does not refer to a meaningful object, an attempt to dereference a null pointer usually causes a run-time error that, if unhandled, terminates the program immediately. In the case of C, execution halts with a segmentation fault because the literal address of NULL is never allocated to a running program. In Java, access to a null reference triggers a NullPointerException, which can be caught by error handling code, but the preferred practice is to ensure that such exceptions never occur. In safe languages a possibly-null pointer can be replaced with a tagged union which enforces explicit handling of the exceptional case; in fact, a possibly-null pointer can be seen as a tagged union with a computed tag.

In C and C++ programming, two null pointers are guaranteed to compare equal; ANSI C guarantees that any NULL pointer will be equal to 0 in a comparison with an integer type.

A null pointer should not be confused with an uninitialized pointer: a null pointer is guaranteed to compare unequal to any valid pointer, whereas depending on the language and implementation an uninitialized pointer might have either an indeterminate (random or meaningless) value or might be initialised to an initial constant (possibly but not necessarily NULL).

In most C programming environments malloc returns a NULL pointer if it is unable to allocate the memory region requested, which notifies the caller that there is insufficient memory available. However, some implementations of malloc allow `malloc(0)` with the return of a NULL pointer and instead indicate failure by both returning NULL and setting errno to an appropriate value.

Computer systems based on a tagged architecture are able to distinguish in hardware between a NULL dereference and a legitimate attempt to access a word or structure at address zero.

In some programming language environments (at least one proprietary Lisp implementation, for example) the value used as the null pointer (called *nil* in Lisp) may actually be a pointer to a block of internal data useful to the implementation (but not explicitly reachable from user programs), thus allowing the same register to be used as a useful constant and a quick way of accessing implementation internals. This is known as the *nil vector*.

Double indirection

In C, it is possible to have a pointer point at another pointer. Although a higher number of pointer dereferences will add a performance penalty, this can make manipulating certain data structures particularly neat and elegant. For instance, consider this code to insert an item into a simple linked list:

```
struct element {
        struct element *next;
        int value;
};

struct element *head = NULL;

void insert(struct element *item) {
        struct element **p;
        for(p = &head; *p != NULL; p = &(*p)->next) {
```

```
            if(item->value <= (*p)->value) {
                    break;
            }
    }
    item->next = *p;
    *p = item;
}
```

Wild pointers

Wild pointers are pointers that have not been initialized (that is, set to point to a valid address) and may make a program crash or behave oddly. In the Pascal or C programming languages, pointers that are not specifically initialized may point to unpredictable addresses in memory.

The following example code shows a wild pointer:

```
int func(void)
{
    char *p1 = malloc(sizeof(char)); /* (undefined) value of some place on the heap */
    char *p2;       /* wild (uninitialized) pointer */
    *p1 = 'a';      /* This is OK */
    *p2 = 'b';      /* ERROR: the result is undefined, and may lead to program crash */
}
```

Here, `p2` may point to anywhere in memory, so performing the assignment `*p2 = 'b'` will corrupt an unknown area of memory that may contain sensitive data.

Note that in C and derived languages `static` variables without an initializer is initialized to zero on the program's start. Thus, the example above will dereference a NULL pointer which will lead to a segmentation fault.

Support in various programming languages

A number of languages support some type of pointer, although some are more restricted than others. If a pointer is significantly abstracted, such that it can no longer be manipulated as an address, the resulting data structure is no longer a pointer; see the more general reference article for more discussion of these.

Ada

Ada is a strongly typed language where all pointers are typed and only safe type conversions are permitted. All pointers are by default initialized to *null*, and any attempt to access data through a *null* pointer causes an exception to be raised. Pointers in Ada are called *access types*. Ada 83 did not permit arithmetic on access types (although many compiler vendors provided for it as a non-standard feature), but Ada 95 supports "safe" arithmetic on access types via the package `System.Storage_Elements`.

BASIC

BASIC does not support pointers. Some dialects of BASIC, including FreeBASIC, have exhaustive pointer implementations, however.

In FreeBASIC, maths on ANY pointers (equivalent to C's void*) are treated as though the ANY pointer was a byte width. ANY pointers cannot be dereferenced, as in C. Also, casting between ANY and any other type's pointers will not generate any warnings.

```
dim as integer f = 257
dim as any ptr g = @f
dim as integer ptr i = g
assert(*i = 257)
assert( (g + 4) = (@f + 1) )
```

C and C++

In C and C++ pointers are variables that store addresses and can be *null*. Each pointer has a type it points to, but one can freely cast between pointer types. A special pointer type called the "void pointer" points to an object of unspecified type and cannot be dereferenced. The address can be directly manipulated by casting a pointer to and from an integral type of sufficient size (not defined in the language itself, but possibly in standard headers).

C++ fully supports C pointers and C typecasting. It also supports a new group of typecasting operators to help catch some unintended dangerous casts at compile-time. The C++ standard library also provides `auto_ptr`, a sort of smart pointer which can be used in some situations as a safe alternative to primitive C pointers. C++ also supports another form of reference, quite different from a pointer, called simply a *reference* or *reference type*.

Pointer arithmetic, that is, the ability to modify a pointer's target address with arithmetic operations (as well as magnitude comparisons), is restricted by the language standard to remain within the bounds of a single array object (or just after it), though many non-segmented architectures will allow for more lenient arithmetic. Adding or subtracting from a pointer moves it by a multiple of the size of the datatype it points to. For example, adding 1 to a pointer to 4-byte integer values will increment the pointer by 4. This has the effect of incrementing the pointer to point at the next element in a contiguous array of integers -- which is often the intended result. Pointer arithmetic *cannot be performed on* `void` *pointers* because the void type has no size, and thus the pointed address can not be added to. For working 'directly' with bytes they usually cast pointers to `BYTE*`, or `unsigned char*` if `BYTE` isn't defined in the standard library used.

Pointer arithmetic provides the programmer with a single way of dealing with different types: adding and subtracting the number of elements required instead of the actual offset in bytes. (though the `char` *pointer*, `char` being defined as always having a size of one byte, allows the element offset of pointer arithmetic to in practice be equal to a byte offset) In particular, the C definition explicitly declares that the syntax `a[n]`, which is the *n-th* element of the array `a`, is equivalent to `*(a+n)`, which is the content of the element pointed by `a+n`. This implies that `n[a]` is equivalent to `a[n]`.

While powerful, pointer arithmetic can be a source of computer bugs. It tends to confuse novice programmers, forcing them into different contexts: an expression can be an ordinary arithmetic one or a pointer arithmetic one, and sometimes it is easy to mistake one for the other. In response to this, many modern high level computer languages (for example Java) do not permit direct access to memory using addresses. Also, the safe C dialect Cyclone addresses many of the issues with pointers. See C programming language for more criticism.

The `void` pointer, or `void*`, is supported in ANSI C and C++ as a generic pointer type. A pointer to `void` can store an address to any data type, and, in C, is automatically cast to any other pointer type on assignment, but it must be explicitly cast if dereferenced inline. K&R C used `char*` for the "type-agnostic pointer" purpose.

```
int x = 4;
void* q = &x;
int* p = q;  /* void* automatically cast to int*: valid C, but not C++ */
int i = *p;
int j = *((int*)q); /* when dereferencing inline, there is no automatic casting */
```

C++ does not allow the automatic casting of `void*` to other pointer types, not even in assignments. This was a design decision to avoid careless and even unintended casts, though most compilers only output warnings, not errors, when encountering other ill casts.

```
int x = 4;
void* q = &x;
// int* p = q; // This fails in C++: there is no autocast from void*
int* a = (int*)q; // C-style cast
int* b = static_cast<int*>(q); // C++ cast
```

In C++, there is no `void&` (reference to void) to complement `void*` (pointer to void), because references behave like aliases to the variables they point to, and there can never be a variable whose type is `void`.

C#

In the C# programming language, pointers are supported only under certain conditions: any block of code including pointers must be marked with the `unsafe` keyword. Such blocks usually require higher security permissions than pointerless code to be allowed to run. The syntax is essentially the same as in C++, and the address pointed can be either managed or unmanaged memory. However, pointers to managed memory (any pointer to a managed object) must be declared using the `fixed` keyword, which prevents the garbage collector from moving the pointed object as part of memory management while the pointer is in scope, thus keeping the pointer address valid.

The .NET framework includes many classes and methods in the `System` and `System.Runtime.InteropServices` namespaces (such as the `Marshal` class) which convert .NET types (for example, `System.String`) to and from many unmanaged types and pointers (for example, `LPWSTR` or `void *`) to allow communication with unmanaged code.

D

The D programming language is a derivative of C and C++ which fully supports C pointers and C typecasting. However D also offers numerous constructs such as foreach loops, out function parameters, reference types, and advanced array handling which replace pointers for most routine programming tasks.

Fortran

Fortran-90 introduced a strongly-typed pointer capability. Fortran pointers contain more than just a simple memory address. They also encapsulate the lower and upper bounds of array dimensions, strides (for example, to support arbitrary array sections), and other metadata. An *association operator*, => is used to associate a POINTER to a variable which has a TARGET attribute. The Fortran-90 ALLOCATE statement may also be used to associate a pointer to a block of memory. For example, the following code might be used to define and create a linked list structure:

```
type real_list_t
  real :: sample_data(100)
  type (real_list_t), pointer :: next => null ()
end type

type (real_list_t), target :: my_real_list
type (real_list_t), pointer :: real_list_temp

real_list_temp => my_real_list
do
  read (1,iostat=ioerr) real_list_temp%sample_data
  if (ioerr /= 0) exit
  allocate (real_list_temp%next)
  real_list_temp => real_list_temp%next
end do
```

Fortran-2003 adds support for procedure pointers. Also, as part of the *C Interoperability* feature, Fortran-2003 supports intrinsic functions for converting C-style pointers into Fortran pointers and back.

Modula-2

Pointers are implemented very much as in Pascal, as are VAR parameters in procedure calls. Modula 2 is even more strongly typed than Pascal, with fewer ways to escape the type system. Some of the variants of Modula 2 (such as Modula-3) include garbage collection.

Oberon

Much as with Modula-2, pointers are available. There are still fewer ways to evade the type system and so Oberon and its variants are still safer with respect to pointers than Modula-2 or its variants. As with Modula-3, garbage collection is a part of the language specification.

Pascal

Pascal implements pointers in a straightforward, limited, and relatively safe way. It helps catch mistakes made by people who are new to programming, like dereferencing a pointer into the wrong datatype; however, a pointer can be cast from one pointer type to another. Pointer arithmetic is unrestricted; adding or subtracting from a pointer moves it by that number of bytes in either direction, but using the Inc or Dec standard procedures on it moves it by the size of the datatype it is *declared* to point to. Trying to dereference a null pointer, named **nil** in Pascal, or a pointer referencing unallocated memory, raises an exception in protected mode. Parameters may be passed using pointers (as **var** parameters) but are automatically handled by the static compilation system.

See also

- Buffer overflow
- Hazard pointer
- Opaque pointer
- Pointer swizzling
- Reference (computer science)
- Static code analysis
- Bounded pointer

External links

- Pointers and Memory (http://cslibrary.stanford.edu/) Introduction to pointers - Stanford Computer Science Education Library
- 0pointer.de (http://0pointer.de/) A terse list of minimum length source codes that dereference a null pointer in several different programming languages
- A tutorial in C (http://home.netcom.com/~tjensen/ptr/pointers.htm) Pointers and Arrays by Ted Jensen
- Pointers | Resourceful Idiot (http://www.resourcefulidiot.com/2008/04/a-few-pointers-for-using-pointers/) Brief Overview of Pointers and Why they are important

Retrieved from "http://en.wikipedia.org/wiki/Pointer_%28computing%29"
Categories: Data types | Programming constructs

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Barcode reader

From Wikipedia, the free encyclopedia

A **barcode reader** (or **barcode scanner**) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a photo conductor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain *decoder* circuitry analyzing the barcode's image data provided by the photo conductor and sending the barcode's content to the scanner's output port.

A typical handheld barcode scanner

Contents

Types of barcode readers

Methods

Barcode Readers are usually offered from three lines of heritage:

- Handheld readers for semi-automatic reading: The operator need not write, but must at least position the reader near the label
- Fix-mount readers for automatic reading: The reading is performed laterally passing the label over the reader. No operator is required, but the position of the code target must coincide with the imaging capability of the reader
- Reader gates for automatic scanning: The position of the code must be just under the gate for short time, enabling the scanner sweep to capture the code target successfully.

This leads to the segregation of in-line reading, semi-automatic reading, and automatic scanning.

Types of technology

The reader types can be distinguished as follows:

- **Pen type readers**

  Pen type readers consist of a light source and a photodiode that are placed next to each other in the tip of a pen or wand. To read a bar code, the tip of the pen moves across the bars in a steady

motion. The photodiode measures the intensity of the light reflected back from the light source and generates a waveform that is used to measure the widths of the bars and spaces in the bar code. Dark bars in the bar code absorb light and white spaces reflect light so that the voltage waveform generated by the photo diode is a representation of the bar and space pattern in the bar code. This waveform is decoded by the scanner in a manner similar to the way Morse code dots and dashes are decoded.

- **Laser scanners**

  Laser scanners work the same way as pen type readers except that they use a laser beam as the light source and typically employ either a reciprocating mirror or a rotating prism to scan the laser beam back and forth across the bar code. As with the pen type reader, a photodiode is used to measure the intensity of the light reflected back from the bar code. In both pen readers and laser scanners, the light emitted by the reader is tuned to a specific frequency and the photodiode is designed to detect only this modulated light of the same frequency.

- **CCD Readers**

  CCD readers (also referred to as **LED scanner**) use an array of hundreds of tiny light sensors lined up in a row in the head of the reader. Each sensor can be thought of as a single photodiode that measures the intensity of the light immediately in front of it. Each individual light sensor in the CCD reader is extremely small and because there are hundreds of sensors lined up in a row, a voltage pattern identical to the pattern in a bar code is generated in the reader by sequentially measuring the voltages across each sensor in the row. The important difference between a CCD reader and a pen or laser scanner is that the CCD reader is measuring emitted ambient light from the bar code whereas pen or laser scanners are measuring reflected light of a specific frequency originating from the scanner itself.

- **Camera-Based Readers**

  2D imaging scanners are the fourth and newest type of bar code reader currently available. They use a small video camera to capture an image of a bar code. The reader then uses sophisticated digital image processing techniques to decode the bar code. Video cameras use the same CCD technology as in a CCD bar code reader except that instead of having a single row of sensors, a video camera has hundreds of rows of sensors arranged in a two dimensional array so that they can generate an image.

Housing Types

The reader packaging can be distinguished as follows:

- **Handheld scanner** : with a handle and typically a trigger button for switching on the light source.
- **Pen scanner** (or **wand scanner**) : a pen-shaped scanner that is swiped.
- **Stationary scanner** : wall- or table-mounted scanners that the barcode is passed under or beside. These are commonly found at the checkout counters of supermarkets and other retailers.
- **Fixed position scanner** : an industrial barcode reader used to identify products during manufacture or logistics. Most often used on conveyor tracks to identify cartons or pallets which need to be routed to another process or shipping location.
- **PDA scanner** : a PDA with a built-in barcode reader or attached barcode scanner e.g. Grabba.
- **Automatic reader** : a back office equipment to read barcoded documents at high speed

(50,000/hour) e.g. Multiscan MT31

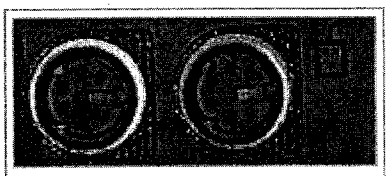
Methods of networking

Wireless networking

Modern handheld barcode readers are operated in wireless networks according to IEEE 802.11g (WLAN) or IEEE 802.15.3 (Bluetooth). However, such configuration limits the time of operation from battery or rechargeable battery and required recharging at least after a shift of operation.

Types of connectors

Most barcode readers use a PS/2 or USB cable for output: PS/2 cables are connected to the host computer in a Y formation, the PS/2 keyboard port with its first end, to the keyboard with its second, and to the barcode reader with its third end. The barcode characters are then received by the host computer as if they came from its keyboard decoded and converted to keyboard input within the scanner housing. This makes it easy to interface the bar code reader to any application that is written to accept keyboard input.



PS/2 port

Many readers can also be equipped with an RS-232 output port so that the decoded characters arrive at the computer via one of its RS-232 connectors. A program called a "Software Wedge" takes the data from the bar code reader and feeds it to the application where the data has to go.

USB is supported by many newer scanners. In many cases a choice of USB interface types (HID, CDC) are provided.

There are a few other less common interfaces. Wand emulation is another output type that takes the raw wave and decodes it, normalizing the output so it can be easily decoded by the host device. Wand emulation can also convert symbologies that may not be recognized by the host device into another symbology (typically Code 39) that can be easily decoded.

Resolution

The scanner resolution is measured by the size of the dot of light emitted by the reader. If this dot of light is wider than any bar or space in the bar code, then it will overlap two elements (two spaces or two bars) and it may produce wrong output. On the other hand, if a too small dot of light is used, then it can misinterpret any spot on the bar code making the final output wrong.

The most commonly used dimension is 13 mils (0.3302 mm). As it is a very high resolution, it is extremely important to have bar codes created with a high resolution graphic application.

While cell phone cameras are not suitable for many traditional barcodes, there are 2D barcodes (such as Semacode) which are optimized for cell phones. These open up a number of applications for consumers:

- Movies: DVD/VHS movie catalogs
- Music: CD catalogs, play MP3 when scanned

- Book catalogs
- Groceries, nutrition information, making shopping lists when the last of an item is used, etc.
- Personal Property inventory (for insurance and other purposes)
- Calling cards: 2D barcodes can store contact information for importing.
- Brick and mortar shopping: Portable scanners can be used to record items of interest for looking up online at home.
- Coupon management: weeding expired coupons.
- Personal finance. Receipts can be tagged with a barcode label and the barcode scanned into personal finance software when entering. Later, scanned receipt images can then be automatically associated with the appropriate entries. Later, the bar codes can be used to rapidly weed out paper copies not required to be retained for tax or asset inventory purposes.
- If retailers put barcodes on receipts that allowed downloading an electronic copy or encoded the entire receipt in a 2D barcode, consumers could easily import data into personal finance, property inventory, and grocery management software. Receipts scanned on a scanner could be automatically identified and associated with the appropriate entries in finance and property inventory software.

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Categories: Automatic identification and data capture | Embedded systems | Barcodes

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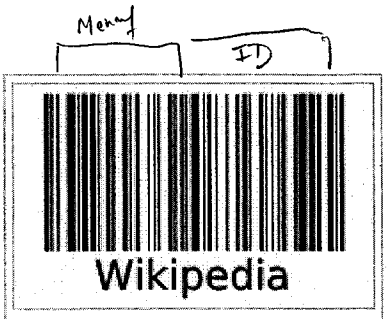
Barcode

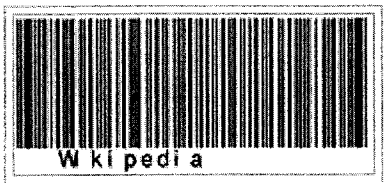
Ten things you may not know about Wikipedia.

From Wikipedia, the free encyclopedia

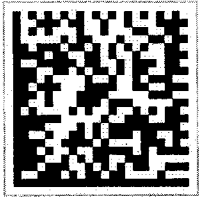
A **barcode** (also **bar code**) is a machine-readable representation of information (usually dark ink on a light background to create high and low reflectance which is converted to 1s and 0s). Originally, barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and text codes hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software. Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry. An advantage over other methods of AIDC is that it is less expensive to implement. It will cost about US$0.005 to implement a barcode compared to passive RFID which still costs about US$0.07 to US$0.30 per tag.[1]



"*Wikipedia*" encoded in Code 128



"*Wikipedia*" encoded in Code 93


"*Wikipedia, the free encyclopedia*" encoded in the DataMatrix 2D barcode

Contents

History

The first patent for a bar code type product (US Patent #2,612,994) was issued to inventors Joseph Woodland and Bernard Silver on October 7, 1952. Its implementation was made possible through the work of Raymond Alexander and Frank Stietz, two engineers with Sylvania (who were also granted a patent), as a result of their work on a system to identify railroad cars. It was not until 1966 that barcodes were put to commercial use and they were not commercially successful until the 1980s. [1] (http://www.adams1.com/pub/russadam/history.html)

While traditionally barcode encoding schemes represented only numbers, newer symbologies add new characters such as uppercase letters, or even the complete ASCII character set. The drive to encode more

information in combination with the space requirements of simple barcodes led to the development of matrix codes (a type of **2D barcode**), which do not consist of bars but rather a grid of square cells. **Stacked barcodes** are a compromise between true 2D barcodes and linear codes (also known as 1D barcodes), and are formed by taking a traditional linear symbology and placing it in an envelope that allows multiple rows.

Use

Since their invention in the 20th century, barcodes — especially the UPC — have slowly become an essential part of modern civilization. Their use is widespread, and the technology behind barcodes is constantly improving. Some modern applications of barcodes include:

- Practically every item purchased from a grocery store, department store, and mass merchandiser has a barcode on it. This greatly helps in keeping track of the large number of items in a store and also reduces instances of shoplifting (since shoplifters could no longer easily switch price tags from a lower-cost item to a higher-priced one). Since the adoption of barcodes, both consumers and retailers have benefited from the savings generated.
- Document Management tools often allow for barcoded sheets to facilitate the separation and indexing of documents that have been imaged in batch scanning applications.
- The tracking of item movement, including rental cars, airline luggage, nuclear waste, mail and parcels.
- Recently, researchers have placed tiny barcodes on individual bees to track the insects' mating habits.
- Many tickets now have barcodes that need to be validated before allowing the holder to enter sports arenas, cinemas, theatres, fairgrounds, transportation etc.
- Used on automobiles, can be located on front or back.

Universal Product Code (UPC)

The best-known and most widespread use of barcodes has been on consumer products. The UPC symbol is a response to a business need first identified by the US grocery industry in the early 1970s.

Believing that automating the grocery checkout process could reduce labor costs, improve inventory control, speed up the process, and improve customer service, six industry associations, representing both product manufacturers and supermarkets, created an industry wide committee of industry leaders. Their two-year effort resulted in the announcement of the Universal Product Code and the U.P.C. barcode symbol on April 1, 1973. The UPC Symbol that was chosen by the committee was a modified version of a symbol design that was submitted by IBM. IBM also designed five versions of the UPC symbology for future industry requirements — UPC A, B, C, D, and E. [2] The U.P.C. made its first commercial appearance at the Marsh Supermarket in Troy, Ohio in June 1974.[3]

Originally, the modern day bar code was developed to identify railroad cars. However, a toll bridge in New Jersey requested that a similar system be developed so that it could quickly scan for cars that had paid for a monthly pass. Then the U.S. Post Office requested that a similar system be developed so that it could keep track of which trucks had entered the yard and when. These applications required special retroreflective labels. Finally, KalKan dog food asked the Sylvania team to develop a simpler (and cheaper) version which they could put on cases of dog food for inventory control. This, in turn, led to the grocery industry's interest.

Economic studies conducted for the grocery industry committee projected over $40 million in savings to the industry from scanning by the mid-1970s. Those numbers were not achieved in that time frame and there were those who predicted the demise of barcode scanning. The usefulness of the barcode required the adoption of expensive scanners by a critical mass of retailers while manufacturers simultaneously adopted barcode labels. Neither wanted to move first and results weren't promising for the first couple of years, with Business Week proclaiming "The Supermarket Scanner That Failed."[3]

Symbologies

The mapping between messages and barcodes is called a **symbology**. The specification of a symbology includes the encoding of the single digits/characters of the message as well as the start and stop markers into bars and space, the size of the quiet zone required to be before and after the barcode as well as the computation of a checksum.

Linear symbologies can be classified mainly by two properties:

- Continuous vs. discrete: Characters in continuous symbologies usually abut, with one character ending with a space and the next beginning with a bar, or vice versa. Characters in discrete symbologies begin and end with bars; the intercharacter space is ignored, as long as it is not wide enough to look like the code ends.
- Two-width vs. many-width: Bars and spaces in two-width symbologies are wide or narrow; how wide a wide bar is exactly has no significance as long as the symbology requirements for wide bars are adhered to (usually two to three times more wide than a narrow bar). Bars and spaces in many-width symbologies are all multiples of a basic width called the **module**; most such codes use four widths of 1, 2, 3 and 4 modules.

Some symbologies use interleaving. The first character is encoded using black bars of varying width. The second character is then encoded, by varying the width of the white spaces between these bars. Thus characters are encoded in pairs over the same section of the barcode. Interleaved 2 of 5 is an example of this.

Stacked symbologies consist of a given linear symbology repeated vertically in multiple.

There is a large variety of 2-D symbologies. The most common are matrix codes, which feature square or dot-shaped modules arranged on a grid pattern. 2-D symbologies also come in a variety of other visual formats. Aside from circular patterns, there are several 2-D symbologies which employ steganography by hiding an array of different-sized or -shaped modules within a user-specified image (for example, DataGlyphs).

Scanner/symbology interaction

Linear symbologies are optimized to be read by a laser scanner, which sweeps a beam of light across the barcode in a straight line, reading a **slice** of the bar code light-dark patterns. In the 1990s development of CCD imagers to read bar codes was pioneered by Welch Allyn. Imaging does not require moving parts, like a laser scanner does. In 2007, linear imaging is surpassing laser scanning as the preferred scan engine for its performance and durability.

Stacked symbologies are also optimized for laser scanning, with the laser making multiple passes across the barcode.

2-D symbologies cannot be read by a laser as there is typically no sweep pattern that can encompass the entire symbol. They must be scanned by a camera capture device.

Scanners (barcode readers)

The earliest, and still the cheapest, barcode scanners are built from a fixed light and a single photosensor that is manually "scrubbed" across the barcode.

Verifier (Pika inspection)

Barcode verifiers are primarily used by businesses that print barcodes, but any trading partner in the supply chain could test barcode quality. It is important to "grade" a barcode to ensure that any scanner in the supply chain can read the barcode. Retailers levy large fines and penalties for non-compliant barcodes.

Barcode verifiers work in a way similar to a scanner but instead of simply decoding a barcode, a verifier performs a series of eight tests. Each test is given a grade from 0.0 to 4.0 (F to A) and the lowest of any of the tests is the scan grade. For most applications a 2.5 (C) grade is the minimum acceptable grade.

Barcode Verifier Standards

- The original U.S. barcode quality specification was ANSI X3.182. UPC Codes used in the US ANSI/UCC5.
- The current international barcode quality specification is ISO/IEC 15416 (linear bar codes) and ISO/IEC 15415 (2D barcodes)
- The European Standard EN 1635 has been withdrawn and replaced by ISO/IEC 15416
- Barcode verifiers should comply with the ISO 15426-1 (linear barcode verifier compliance standard) or ISO 15426-2 (2d barcode verifier compliance standard)

Barcode Verifier Manufacturers (partial list)

- Code Corporation (linear and 2D)
- RJS/Printronix (linear)
- Hand Held Products (linear)
- Webscan (linear and 2D)
- Auto ID Solutions (2D)
- Stratix (linear)
- Axicon (linear)
- REA Elektronik GmbH (linear)
- Siemens (UID, Data Matrix(2D), linear)

Barcode Verifier Test Code Manufacturers ((traceable reflectance and linear measure) used to check proper function of verifiers)

- Applied Image Inc. (Rochester, NY, USA)

Benefits

In point-of-sale management, the use of barcodes can provide very detailed up-to-date information on key aspects of the business, enabling decisions to be made much more quickly and with more confidence. For example:

- Fast-selling items can be identified quickly and automatically reordered to meet consumer demand,
- Slow-selling items can be identified, preventing a build-up of unwanted stock,
- The effects of repositioning a given product within a store can be monitored, allowing fast-moving more profitable items to occupy the best space,
- Historical data can be used to predict seasonal fluctuations very accurately.
- Items may be repriced on the shelf to reflect both sale prices and price increases.

Besides sales and inventory tracking, barcodes are very useful in shipping/receiving/tracking.

- When a manufacturer packs a box with any given item, a Unique Identifying Number (UID) can be assigned to the box.
- A relational database can be created to relate the UID to relevant information about the box; such as order number, items packed, qty packed, final destination, etc...
- The information can be transmitted through a communication system such as Electronic Data Interchange (EDI) so the retailer has the information about a shipment before it arrives.
- Tracking results when shipments are sent to a Distribution Center (DC) before being forwarded to the final destination.
- When the shipment gets to the final destination, the UID gets scanned, and the store knows where the order came from, what's inside the box, and how much to pay the manufacturer.

The reason bar codes are business friendly is that bar code scanners are relatively low cost and extremely accurate – only about 1/100,000 entries will be wrong.

Types of barcodes

Linear barcodes

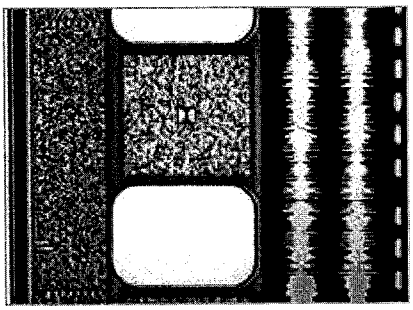
Symbology	Cont/Disc	Two/Many	Uses
Plessey	Continuous	Two	Catalogs, store shelves, inventory
U.P.C.	Continuous	Many	Worldwide retail, GS1 approved
Codabar	Discrete	Two	Old format used in libraries, blood banks, airbills
Code 25 – Non-interleaved 2 of 5	Continuous	Two	Industrial (NO)
Code 25 – Interleaved 2 of 5	Continuous	Two	Wholesale, Libraries (NO)
Code 39	Discrete	Two	Various
Code 93	Continuous	Many	Various

Code 128	Continuous	Many	Various
Code 128A	Continuous	Many	Various
Code 128B	Continuous	Many	Various
Code 128C	Continuous	Many	Various
Code 11	Discrete	Two	Telephones
CPC Binary	Discrete	Two	Post office
DUN 14	Continuous	Many	Various
EAN 2		Many	Addon code (Magazines), GS1 approved
EAN 5	Continuous	Many	Addon code (Books), GS1 approved
EAN 8, EAN 13	Continuous	Many	Worldwide retail, GS1 approved
GS1-128 (formerly known as UCC/EAN-128), incorrectly referenced as EAN 128 and UCC 128	Continuous	Many	Various, GS1 approved
GS1 DataBar formerly Reduced Space Symbology (RSS)	Continuous	Many	Various, GS1 approved
ITF-14	Continuous	Many	Non-retail packaging levels, GS1 approved
Latent image barcode	Neither	Tall/short	Color print film
Pharmacode	Neither	Two	Pharmaceutical Packaging
PLANET	Continuous	Tall/short	United States Postal Service
POSTNET	Continuous	Tall/short	United States Postal Service
OneCode	Continuous	Tall/short	United States Postal Service, replaces POSTNET and PLANET symbols
MSI	Continuous	Two	Used for warehouse shelves and inventory
PostBar	Discrete	Many	Post office
RM4SCC / KIX	Continuous	Tall/short	Royal Mail / Royal TPG Post
Telepen	Continuous	Two	Libraries, etc (UK)

2D barcodes

A **matrix code**, also known as a **2D barcode** or simply a **2D code**, is a two-dimensional way of representing information. It is similar to a linear (1-dimensional) barcode, but has more data representation capability.

Symbology	Notes
3-DI	Developed by Lynn Ltd.



This piece of 35mm film shows two different 2D barcodes used in film: Dolby Digital (between the sprocket holes with the "Double-D" logo in the middle) and Sony Dynamic Digital Sound (in the blue area to the left of the sprocket holes). Embedded digital audio is but one use of 2D barcodes.

PDMark	Developer by Ardaco.
PaperDisk	High density code — used both for data heavy applications (10K-1 MB) and camera phones (50+ bits). Developed and patented by Cobblestone Software
Optar	Developed by Twibright Labs and published as free software. Aims at maximum data storage density, for storing data on paper. 200kB per A4 page with laser printer.
QR Code	Developed, patented and owned by TOYOTA subsidiary Denso Wave initially for car parts management. Now public domain. Can encode Japanese Kanji and Kana characters, music, images, URLs, emails. De-facto standard for Japanese cell phones.
Semacode	A Data Matrix code used to encode URLs for applications using cellular phones with cameras.
SmartCode	From InfoImaging Technologies.
Snowflake Code	From Marconi Data Systems, Inc.
ShotCode	Circular barcodes for camera phones by OP3. Originally from High Energy Magic Ltd in name Spotcode. Before that probably known as TRIPCode.
SuperCode	Public domain.
Trillcode	From Lark Computers. Designed to work with mobile devices camera or webcam PC. Can encode a variety of "actions".
UltraCode	Black-and-white & colour versions. Public domain. Invented by Jeffrey Kaufman and Clive Hohberger.
UnisCode	also called "Beijing U Code"; a colour 2D barcode developed by Chinese company UNIS
VeriCode, VSCode	From Veritec, Inc.
WaterCode	High-density 2D Barcode(440 Bytes/cm^2) From MarkAny Inc.

See also

- Automated identification and data capture (AIDC)
- Barcode printer
- Barcode scanner
- Data Matrix
- Global Trade Item Number
- Inventory control system
- ISBN
- Physical world hyperlinks
- RFID
- Semacode
- Sms barcode
- Supply Chain Management
- Universal Product Code (UPC)

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2. ^ Nelson, Benjamin (1997). "From Punched Cards To Bar Codes".
3. ^ *a b* Varchaver, Nicholas (2004-05-31). "Scanning the Globe (http://money.cnn.com/magazines/fortune/fortune_archive/2004/05/31/370719/index.htm)". *Fortune*.
4. ^ Chromatic Alphabet (http://www.ccelian.com/chromalpha.html) by C.C. Elian
5. ^ "Chromocode ... Multicolor / Polychromatic Barcode Symbology (http://www.inventerprise.com/chromocode-very-high-density/very-high-density-polychromatic-barcode.htm)
6. ^ "Barcodes for TV Commercials" (http://adverlab.blogspot.com/2006/01/barcodes-for-tv-commercials.html)
7. ^ d-touch topological fiducial recognition (http://web.media.mit.edu/~enrico/research/research.php?projectTitle=d-touch); "d-touch markers are applied to deformable gloves" (http://web.media.mit.edu/~enrico/research/research.php?projectTitle=Sleight%20of%20Hands)
8. ^ BarCode-1 2-Dimensional Bar Code Page (http://www.adams1.com/pub/russadam/stack.html)

Further reading

- *Automating Management Information Systems: Barcode Engineering and Implementation* – Harry E. Burke, Thomson Learning, ISBN 0-442-20712-3
- *Automating Management Information Systems: Principles of Barcode Applications* – Harry E. Burke, Thomson Learning, ISBN 0-442-20667-4
- *The Bar Code Book* – Roger C. Palmer, Helmers Publishing, ISBN 0-911261-09-5, 386 pages
- *The Bar Code Manual* – Eugene F. Brighan, Thompson Learning, ISBN 0-03-016173-8
- *Handbook of Bar Coding Systems* – Harry E. Burke, Van Nostrand Reinhold Company, ISBN 978-0-442-21430-2, 219 pages
- *Lines of Communication* – Craig K. Harmon, Helmers Publishing, ISBN 0-911261-07-9, 425 pages
- *Punched Cards to Bar Codes* – Benjamin Nelson, Helmers Publishing, ISBN 0-911261-12-5, 434 pages
- *Revolution at the Checkout Counter: The Explosion of the Bar Code* – Stephen A. Brown, Harvard Univ Press, ISBN 0-674-76720-9

External links

- Barcode (http://www.dmoz.org/Computers/Software/Bar_Code//) at the Open Directory Project

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Hypertext

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Hypertext most often refers to text on a computer that will lead the user to other, related information on demand. Hypertext represents a relatively recent innovation to user interfaces, which overcomes some of the limitations of written text. Rather than remaining static like traditional text, hypertext makes possible a dynamic organization of information through links and connections (called hyperlinks). Hypertext can be designed to perform various tasks; for instance when a user "clicks" on it or "hovers" over it, a bubble with a word definition may appear, a web page on a related subject may load, a video clip may run, or an application may open.

Contents

Etymology

The prefix **hyper-** (comes from the Greek prefix "υπερ-" and means "over" or "beyond") signifies the overcoming of the old linear constraints of written text. The term "hypertext" is often used where the term hypermedia might seem appropriate. In 1992 Ted Nelson - who coined both terms in 1965 - wrote:

> By now the word "hypertext" has become generally accepted for branching and responding text, but the corresponding word "hypermedia," meaning complexes of branching and responding graphics, movies and sound - as well as text - is much less used. Instead they use the strange term "interactive multimedia" - four syllables longer, and not expressing the idea that it extends hypertext. - Nelson, Literary Machines 1992

Types and uses of hypertext

Hypertext documents can either be static (prepared and stored in advance) or dynamic (continually changing in response to user input). Static hypertext can be used to cross-reference collections of data in documents, software applications, or books on CDs. A well-constructed system can also incorporate

other user-interface conventions, such as menus and command lines. Hypertext can develop very complex and dynamic systems of linking and cross-referencing. The most famous implementation of hypertext is the World Wide Web.

History

Early precursors to hypertext

Recorders of information have long looked for ways to categorize and compile it. Early on, experiments existed with various methods for arranging layers of annotations around a document. The most famous example of this is the Talmud. Various other reference works (for example dictionaries, encyclopedias, etc.) also developed a precursor to hypertext, consisting of setting certain words in small capital letters, indicating that an entry existed for that term within the same reference work. Sometimes the term would be preceded by a pointing hand dingbat, ☞LIKE THIS, or an arrow, □LIKE THIS.

Later, several scholars entered the scene who believed that humanity was drowning in information, causing foolish decisions and duplicating efforts among scientists. These scholars proposed or developed proto-hypertext systems predating electronic computer technology. For example, in the early 20th century, two visionaries attacked the cross-referencing problem through proposals based on labor-intensive, brute force methods. Paul Otlet proposed a proto-hypertext concept based on his monographic principle, in which all documents would be decomposed down to unique phrases stored on index cards. In the 1930s, H.G. Wells proposed the creation of a World Brain.

Michael Buckland summarized the very advanced pre-World War II development of microfilm based on rapid retrieval devices, specifically the microfilm based workstation proposed by Leonard Townsend in 1938 and the microfilm and photoelectronic based selector, patented by Emmanuel Goldberg in 1931.[1] Buckland concluded: "The pre-war information retrieval specialists of continental Europe, the 'documentalists,' largely disregarded by post-war information retrieval specialists, had ideas that were considerably more advanced than is now generally realized." But, like the manual index card model, these microfilm devices provided rapid retrieval based on pre-coded indices and classification schemes published as part of the microfilm record without including the link model which distinguishes the modern concept of hypertext from content or category based information retrieval.

The Memex

All major histories of what we now call hypertext start in 1945, when Vannevar Bush wrote an article in *The Atlantic Monthly* called "As We May Think," about a futuristic device he called a Memex. He described the device as a mechanical desk linked to an extensive archive of microfilms, able to display books, writings, or any document from a library. The Memex would also be able to create 'trails' of linked and branching sets of pages, combining pages from the published microfilm library with personal annotations or additions captured on a microfilm recorder. Bush's vision was based on extensions of 1945 technology - microfilm recording and retrieval in this case. However, the modern story of hypertext starts with the Memex because "As We May Think" directly influenced and inspired the two American men generally credited with the invention of hypertext, Ted Nelson and Douglas Engelbart.

The invention of hypertext

Ted Nelson coined the words "hypertext" and "hypermedia" in 1965 and worked with Andries van Dam to develop the Hypertext Editing System in 1968 at Brown University. Engelbart had begun working on his NLS system in 1962 at Stanford Research Institute, although delays in obtaining funding, personnel, and equipment meant that its key features were not completed until 1968. In December of that year, Engelbart demonstrated a hypertext interface to the public for the first time, in what has come to be known as "The Mother of All Demos".

Funding for NLS slowed after 1974. Influential work in the following decade included NoteCards at Xerox PARC and ZOG at Carnegie Mellon. ZOG started in 1972 as an artificial intelligence research project under the supervision of Allen Newell, and pioneered the "frame" or "card" model of hypertext. ZOG was deployed in 1982 on the U.S.S. Carl Vinson and later commercialized as Knowledge Management System. Two other influential hypertext projects from the early 1980s were Ben Shneiderman's The Interactive Encyclopedia System (TIES) at the University of Maryland (1983) and Intermedia at Brown University (1984).

Applications

The first hypermedia application was the Aspen Movie Map in 1977. In 1980, Tim Berners-Lee created ENQUIRE, an early hypertext database system somewhat like a wiki. The early 1980s also saw a number of experimental hypertext and hypermedia programs, many of whose features and terminology were later integrated into the Web. Guide was the first hypertext system for personal computers.

In August 1987, Apple Computer released HyperCard for the Macintosh line at the MacWorld convention. Its impact, combined with interest in Peter J. Brown's GUIDE (marketed by OWL and released earlier that year) and Brown University's Intermedia, led to broad interest in and enthusiasm for hypertext and new media. The first ACM Hypertext academic conference took place in November 1987, in Chapel Hill NC.

Meanwhile Nelson, who had been working on and advocating his Xanadu system for over two decades, along with the commercial success of HyperCard, stirred Autodesk to invest in Nelson's revolutionary ideas. The project continued at Autodesk for four years, but no product was released.

Hypertext and the World Wide Web

In the late 1980s, Berners-Lee, then a scientist at CERN, invented the World Wide Web to meet the demand for automatic information-sharing among scientists working in different universities and institutes all over the world. In 1992, Lynx was born as an early Internet web browser. Its ability to provide hypertext links within documents that could reach into documents anywhere on the Internet began the creation of the web on the Internet.

Early in 1993, the National Center for Supercomputing Applications (NCSA) at the University of Illinois released the first version of their Mosaic web browser to supplement the two existing web browsers: one that ran only on NeXTSTEP and one that was only minimally user-friendly. Because it could display and link graphics as well as text, Mosaic quickly became the replacement for Lynx. Mosaic ran in the X Window System environment, which was then popular in the research community, and offered usable window-based interactions. It allowed images[2] as well as text to anchor hypertext links. It also incorporated other protocols intended to coordinate information across the Internet, such as

Gopher.[3]

After the release of web browsers for both the PC and Macintosh environments, traffic on the World Wide Web quickly exploded from only 500 known web servers in 1993 to over 10,000 in 1994. Thus, all earlier hypertext systems were overshadowed by the success of the web, even though it originally lacked many features of those earlier systems, such as an easy way to edit what you were reading, typed links, backlinks, transclusion, and source tracking.

In 1995, Ward Cunningham made the first wiki available, which built on the web by adding easy editing, and (within a single wiki) backlinks and limited source tracking. Wikis continue to be a medium where features are implemented, which were developed or imagined in the early explorations of hypertext.

Implementations

Besides the already mentioned Project Xanadu, Hypertext Editing System, NLS, HyperCard, and World Wide Web, there are other noteworthy early implementations of hypertext, with different feature sets:

- FRESS — A 1970s multi-user successor to the Hypertext Editing System.
- Electronic Document System — An early 1980s text and graphic editor for interactive hypertexts such as equipment repair manuals and computer-aided instruction.
- Information Presentation Facility — Used to display online help in IBM operating systems.
- Intermedia — A mid-1980s program for group web-authoring and information sharing.
- Storyspace — A mid-1980s program for hypertext narrative.
- Texinfo — The GNU help system.
- XML with the XLink extension — A newer hypertext markup language that extends and expands capabilities introduced by HTML.
- MediaWiki, the system that powers Wikipedia, and other wiki implementations — Relatively recent programs aiming to compensate for the lack of integrated editors in most Web browsers.
- Adobe's Portable Document Format — A widely used publication format for electronic documents including links.
- Windows Help
- PaperKiller - A document editor specifically designed for hypertext. Started in 1996 as IPer (educational project for ED-Media 1997).
- Amigaguide - released on Amiga Workbench 1990.

Academic conferences

Among the top academic conferences for new research in hypertext is the annual ACM Conference on Hypertext and Hypermedia (HT 2006 (http://www.ht06.org/)). Although not exclusively about hypertext, the World Wide Web series of conferences, organized by IW3C2 (http://www.iw3c2.org/), include many papers of interest. There is a list (http://www.iw3c2.org/conferences/) on the web with links to all conferences in the series.

Hypertext fiction

See main article Hypertext fiction

Hypertext writing has developed its own style of fiction, coinciding with the growth and proliferation of hypertext development software and the emergence of electronic networks. Two software programs specifically designed for literary hypertext, *Storyspace* and Intermedia became available in the 1990s.

Storyspace 2.0, a professional level hypertext development tool, is available from Eastgate Systems, which has also published many notable works of electronic literature, including Michael Joyce's *afternoon, a story*, Shelley Jackson's *Patchwork Girl*, Stuart Moulthrop's *Victory Garden*, and Judy Malloy's *its name was Penelope*. Other works include Julio Cortazar's *Rayuela* and Milorad Pavić's *Dictionary of the Khazars*.

An advantage of writing a narrative using hypertext technology is that the meaning of the story can be conveyed through a sense of spatiality and perspective that is arguably unique to digitally-networked environments. An author's creative use of nodes, the self-contained units of meaning in a hypertextual narrative, can play with the reader's orientation and add meaning to the text.

Critics of hypertext claim that it inhibits the old, linear, reader experience by creating several different tracks to read on, and that this in turn contributes to a postmodernist fragmentation of worlds. However, they do see its value in its ability to present several different views on the same subject in a simple way. [4]

Critics and theorists

- Jay David Bolter
- Robert Coover
- J. Yellowlees Douglas
- N. Katherine Hayles
- Michael Joyce
- George Landow
- Lev Manovich
- Stuart Moulthrop
- Ted Nelson

See also

- Timeline of hypertext technology
- HTML (HyperText Markup Language)

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3. ^ WWW-Talk Jan-Mar 1993: Support for CSO and gopher type 2 (http://1997.webhistory.org/www.lists/www-talk.1993q1/0261.html)
4. ^ The Game of Reading an Electronic Sir Gawain and the Green Knight (http://www.acs.ucalgary.ca/~scriptor/papers/arthur.html)

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External links

- Hypertext: Behind the Hype (http://www.ericdigests.org/pre-9212/hype.htm)
- Reviving Advanced Hypertext (http://www.useit.com/alertbox/20050103.html) (whether and how concepts from hypertext research can be used on the Web)

History

- Historical Overview of Hypertext (http://www.mprove.de/diplom/text/2_hypertext.html)
- The first use of *hypertext* (?) - TIFF image (http://xanadu.com/XUarchive/ccnwwt65.tif)
- A Brief History of Human Computer Interaction Technology (http://www-2.cs.cmu.edu/~amulet/papers/uihistory.tr.html)

Hypertext Conferences

- Ed-Media World Conference on Educational Multimedia, Hypermedia, and Telecommunications (http://www.aace.org/conf/edmedia/)
- The ACM Conference on Hypertext and Hypermedia (http://www.interaction-design.org/references/conferences/series/acm_conference_on_hypertext_and_hypermedia.html)

Hypertext Fiction

- The Shaping of Hypertextual Narrative (http://www.cisenet.com/cisenet/writing/essays/hypernarrative.htm) (by Sergio Cicconi)
- Electronic Literature Organization (http://www.eliterature.org/) (for more on hypertext literature)
- Dichtung Digital. Journal for Digital Aesthetics. (http://www.dichtung-digital.com/) (Texts in English and German). Editor Roberto Simanowski.
- Eastgate catalog (http://www.eastgate.com/catalog/Fiction.html) (catalog of historically significant Hypertext fiction, nonfiction and poetry)

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