# EXHIBIT B

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NOV 07 1996
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

RITCHIE

Serial No. 08/647,769 Art Unit: 2307

Filed: May 15, 1996 Examiner:

For: SERVING SIGNALS

RECEIVED
NOV 13 1996
GROUP 2300

INFORMATION DISCLOSURE STATEMENT

To the Commissioner of Patents and Trademarks

Sir:

Pursuant to 37 C.F.R. 1.56, 1.97 and 1.98, applicant hereby brings to the attention of the Examiner the following references:

Agosti et al., Automatic Authoring and Construction of Hypermedia for Information Retrieval, **Multimedia Systems**, vol. 3, no. 1, pages 15-24 (February 1995);

Handley et al., The World-Wide Web: How Servers Work, **ConneXions**, vol. 9, no. 2, pages 12-24 (February 1995);

Vetter et al., Mosaic and the World-Wide Web, **Computer**, vol. 27, no. 10, pages 49-57 (October 1994);

Francis Heylighen, World-Wide Web: A Distributed Hypermedia Paradigm for Global Networking, Proceedings of SHARE Europe Spring

Conference, pages 355-68 (Spring 1994);

Gee et al., Novel Approaches to Automating the Gathering of Intelligence from the Online Community Through the Internet, Proceedings of Eighteenth International Online Information Meeting, pages 501-11 (1994);

A Medium in the Making, **EXE: The Software Developers' Magazine**, vol. 9, issue 12 (May 1995);

What is Versatile Virtual Vending? article;

Mary Ann Pike, How the World-Wide Web Works, **The World-Wide Web**, Chapter 30, pages 677-690; and

In the Stores, In the Online Stores, **Personal Computer Magazine**, page 44 (July 1994).

The Agosti article describes the complete process and a tool for the automatic construction of a multimedia hypertext starting from a large collection of multimedia documents. Automatic authoring is discussed in the left hand column of page 16. The automatic authoring process is schematically represented on page 19.

The Handley article describes how servers for the World-Wide Web work. Beginning on page 16, the authors discuss proxy servers.

The Vetter article discusses the Mosaic browser. Page 51 of the article discusses writing HTML documents. On page 52, the article states that existing files can be converted to HTML automatically using special software tools. Figure 3 on page 56

shows a Mosaic extension model.

The Heylighen article reviews browsers, servers and editors for use on the World-Wide Web. Pages 362 and 363 discuss the interactive World-Wide Web.

The Gee article describes a server that automatically constructs and HTML document and captures responses.

The EXE article discusses tools for creating HTML pages.

The VVV article describes the VVV virtual store software system.

The Pike article discusses the history of the World-Wide Web and important World-Wide Web concepts and provides instruction on how to access the World-Wide Web.

The Personal Computer Magazine article discusses the projected future for interactive shopping.

Applicant has provided copies of the references in compliance with the Rules.

In addition, applicant has prepared an Information Disclosure Citation, Form PTO-1449, and has included this with the Information Disclosure Statement.

Respectfully,

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November 7, 1996

(2-92)

Sheet 1 of 2

Form PTO-1449

**INFORMATION DISCLOSURE CITATION IN AN APPLICATION**

*(Use several sheets if necessary)*

| Docket Number (Optional) | Application Number |
|---|---|
| 1561-27 | 08/647,769 |
| **Applicant** | |
| Ritchie et al | |
| **Filing Date** | **Group Art Unit** |
| May 15, 1996 | 2171 |

**U. S. PATENT DOCUMENTS**

| EXAMINER INITIAL | DOCUMENT NUMBER | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|
| | | | None | | | |

**FOREIGN PATENT DOCUMENTS**

| | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUBCLASS | Translation YES | Translation NO |
|---|---|---|---|---|---|---|---|
| | | | None | | | | |

**OTHER DOCUMENTS** *(Including Author, Title, Date, Pertinent Pages, Etc.)*

| | | |
|---|---|---|
| DDM | 1. | Agosti et al., "Automatic Authoring...", MULTIMEDIA SYSTEMS, Vol. 3, No. 1, pp 15-24 (February 1995). |
| | 2. | Handley et al., "The World-Wide Web...", CONNEXIONS, Vol. 9, No. 2, pp 12-24 (February 1995). |
| DDM | 3. | Vetter et al., "Mosaic and the World-Wide Web", COMPUTER, Vol. 27, No. 10, pp 49-57 (October 1994). |
| | 4. | Francis Heylighen, "World-Wide Web...", Proceedings of SHARE Europe Spring Conference, pp. 355-368 (Spring 1994). |
| DDM | 5. | Gee et al., "Novel Approaches to Automating...", Proceedings of 18th Int'l Online Information Meeting, pp. 501-511 (1994). |
| | 6. | "A Medium in the Making", EXE: THE SOFTWARE DEVELOPERS' MAGAZINE, Vol. 9, Issue 12 (May 1995). |

| EXAMINER | DATE CONSIDERED |
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| Dod Mi | 9/27/97 |

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.

(2-92) Patent and Trademark Office; U.S.DEPARTMENT OF COMMERCE

(2-92)

Sheet 2 of 2

Form PTO-1449

**INFORMATION DISCLOSURE CITATION IN AN APPLICATION**

*(Use several sheets if necessary)*

| Docket Number (Optional) | Application Number |
|---|---|
| ATKINSON | 08/647,769 |
| **Applicant** Ritchie et al. | |
| **Filing Date** 5-15-96 | **Group Art Unit** ~~2307~~ 2171 |

**U. S. PATENT DOCUMENTS**

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**OTHER DOCUMENTS** *(Including Author, Title, Date, Pertinent Pages, Etc.)*

| | | |
|---|---|---|
| DOM | 7. | "What is Versatile Virtual Vending?" Article no date. |
| | 8. | Mary Ann Pike, "How the World-Wide Web Works", THE WORLD-WIDE WEB, Chapter 30, pp. 677-690 no date |
| DOM | 9. | "In the Stores, In the Online Stores", PERSONAL COMPUTER MAGAZINE, page 44 (July 1994). |
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| EXAMINER | DATE CONSIDERED |
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# Novel approaches to automating the gathering of intelligence from the online community through the Internet

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Abstract: *The basic capability of any online service is of course to provide responses to user queries. The problem for the service provider is to identify the potential market for such services and then to offer access to the targeted audience. Such fundamental market research information is usually based on environmental scanning, monitoring industry trends and costly market analysis.*

*Amongst the evolving capabilities and services available across the Internet is a relatively new resource originally designed as a navigator to provide access to the features of the Internet. World Wide Web, with its HTTP servers and Mosaic viewers, replaces any concept of a structured menu or CLIA standard interface by a multimedia hypertext document. Thus any application or service can appear as an interactive document with contextualised explanatory text offering a wealth of services through hot-spots, hot-images or traditional form filling.*

*Deriving from our research, we have developed a new and novel use to which these resources can be applied. The concept involves reversing the role of the system provider and user by providing a server that automatically constructs an HTML (hypertext mark-up language) document and captures responses.*

*Thus an information provider could prepare a market research survey or evaluation questionnaire. The HTML server which we have configured offers this document on the Internet, automatically serves the pages (including the questions) to the user, and collects and analyses the responses. User interest is stimulated, heightened and motivated because of the novel approach, the inherent intuitivity and general usability. Unlike conventional requests for information from users (which often tend to produce a low response rate), users immediately obtain feedback in return for their efforts.*

*Whilst the Internet is offering a wealth of opportunity for data exchange, the real challenge is to find new ways of using the system to share knowledge across cultures.*

Keywords: *Market research questionnaires, Internet, World Wide Web, Mosaic, HTML, HTTPD, URL*

## 1. Obtaining market research data for information service providers

Designing market research questionnaires has of course been researched extensively over many years. Guidelines for the construction of questionnaires are available for most fields. (Shneiderman gives a good set of guidelines for HCI in *Designing the User Interface* (Ref 4).) However, there are still many problems with response rates and administration (Ref 1).

### 1.1. *Computer-based questionnaires*

Since the 60s, electronic surveys have changed the process of design and administration of questionnaires (Ref 3). Using intelligent computer programs, complex context sensitive questionnaires can be produced. With direct-to-disk answers, transposition from paper to disk is not required, thus increasing the speed and accuracy of data capture. Shneiderman noted that online surveys remove printing costs and reduce administration (Ref 4). Other writers found that responses to these computerised methods are comparable to the traditional paper surveys (Ref 7). With the increasing pervasion of information technology, it is possible to extend data capture and perform analysis instantly. This instantaneous response can be used as a motivator for respondents to answer the questionnaire. It is also found that when users are asked to complete a questionnaire, increasingly their expectation is that the questionnaire will be provided in the form of an interactive program. A wide range of users with a diverse range of skills and cultures is now observed to complete a computer-based questionnaire naturally, accurately and enthusiastically (Ref 6).

Response rates are enhanced by producing online questionnaires. Sproull used electronic mail for data collection (Ref 5). This raised many issues on the appropriateness of this media for confidential surveys. The Quest system (Ref 2) was developed to address these issues by presenting the respondent with an online questionnaire-based system. The aim was to increase confidence in confidentiality and also to produce an interface which looks as close as possible to a conventional paper questionnaire. The Quest systems used many clever interface components such as sliding range bars and check boxes. The major failing of this system was its reliance on respondents to have particular computer hardware and the specific Quest software.

Further enhancement of questionnaire systems may combine the accessibility of an e-mail system with the usability of the Quest system. The obvious solution is to use the same infrastructure as e-mail and to combine this with a useable interface. Global e-mail uses the Internet, which has 25 000+ interconnected networks in over 150 countries. Currently there are 35 million Internet users worldwide and if the present growth rate continues, by 1995 there will be 200 million users. With the increasing numbers of connections in Eastern Europe and Africa this statistic may be an underestimate. All these Internet users provide a large potential group of respondents.

## 2. A novel system to capture market research data from Internet users

The conventional approach would be to develop a bespoke application program (either by direct coding or using an authoring system such as Quest). However, data can only be captured if users can be persuaded to install and execute the application.

Our new approach lies in seducing users into providing responses during their normal navigation through the Internet. We achieve this by exploiting World Wide Web.

World Wide Web is a wide area hypermedia information retrieval initiative conceived to give universal access to the enormous universe of documents and information across the Internet. It was started by Tim Berners-Lee and others at CERN in Geneva, Switzerland as a means of organising documents and access to documents in a standard way through a standard vehicle. It uses the well known concept of hyperlinks, whereby references in one document or list become jumping-off points to other documents, lists, resources or actions. The aim was to merge the techniques of information retrieval and hypertext to produce an intuitive and powerful global information system.

Most users treat World Wide Web as an Internet navigator in the same way that gophers and other such tools enable users to explore the Internet universe. It can be used to link to and from anything — gopher menu items, WAIS databases, ftp directories, Usenet news articles or newsgroups — because all these objects are made to look just like hypertext.

WWW, like other client-server-based Internet tools, permits the user to search and traverse the Internet and use many types of information at different sites in different forms from a common interface, rather than having to know or learn how to access different objects directly. There are several WWW clients to support both VT100/ASCII telnet sessions and full GUI oriented versions for Mac, NeXt, X-Windows/Motif and MS Windows. One such client, which acts as a WWW viewer, is called Mosaic (Figure 1) and it is rapidly becoming the *de facto* standard front-end. Mosaic makes all WWW sessions appear in the same standard form by acting as a viewer of HTML (hypertext mark-up language) documents. An HTML document displayed by Mosaic appears as an attractive combination of objects including, of course, text (formatted with the full range of fonts and typographical features), bitmaps, vector drawings, sound files and full interleaved audio-video files. Users would normally be interested in viewing the document (to read and absorb the information being displayed), to view pictures (bitmaps and vector drawings), to listen (to sound bites) and to view video sequences — and where appropriate to capture, copy or download what they required. As explained above, each object can be hypertext, giving links to other resources or other documents. Every document has a unique URL (Universal Resource Locator) by virtue of its name which defines where it is and what service is provided by the document. Typical syntax for a URL is:

rotocol://host/pathname/filename

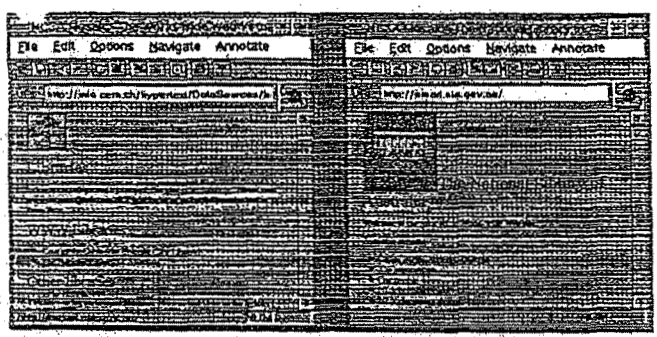



*Figure 1: The before and after view of a Mosaic hypertext jump from the World Library catalogue in Switzerland to the National library in Australia: after clicking on the text 'The National Library of Australia' (shown on the left), Mosaic calls the National Library of Australia which sends the required page (shown on the right).*

In normal use, the WWW client such as Mosaic captures the response or event triggered by the user's response. Thus a user might edit a text box, click a button, click a hyper-sensitive hot-spot and so forth, causing an event (Figure 1b). The coding in the HTML document describes the action to be performed when the event occurs. Again, this is normally to implement the appropriate hyperlink. We have been successful in using the standard features offered by WWW HTML/Mosaic in a novel way — that is to extend the functionality to capture the responses made by the user as a means of collecting/capturing responses (data) from the user. Capturing data as responses to questionnaires is the model example. Thus we are using the standard features of the system in a way for which they were not originally designed or conceived. The advantage of this approach is that it requires

no additional resources or software (it uses what already exists in all versions of the system) and it uses the same standard HTML coding. Users might not even be aware that they were responding to a structured monitored request for information — as far as they are concerned their perception is that they are just using a navigator and making responses in order to navigate to the next point of their choice. There are obvious similarities to systems that monitor and capture keyboard responses to track user behaviour. Thus, whilst the users perceive they are in control of their navigation (as in any normal Mosaic session), in fact control has been taken over by the author of the HTML document that the user is viewing.

We have developed a set of modules for the NSCA's HTTPD server to allow the server to be a questionnaire server. These modules use the Common Gateway Interface (CGI) feature of NSCA's HTTPD. This allows programmes to be used to construct replies to Mosaic requests dynamically. We initially developed CGI programs to allow users to access the International Organisation of Palaeobiology's Oracle Plant Fossil database (http://sunrae.uel.ac.uk/palaeo/index.html) via the Internet.

## 3. Exploiting HTML for capturing user responses

HTML is a specific implementation of the Standard Generalised Mark-Up Language. Simple documents can be produced by using any wordprocessor or editor with the knowledge of only a few of these commands and rules. The most important rules are that filenames should end in .html (or .htm in DOS) and they should be saved as ASCII text.

All the HTML commands are embedded in ASCII text by being surrounded by 'less than' (<) and 'greater than' (>) signs.

Example commonly used commands are:

| | |
|---|---|
| <title> Name </title> | Places Name as the page title. |
| <h1>Heading one </h1> | Heading one is written in the style of defined by heading one. |
|  BOLD  | BOLD is written in bold. |
| <p> | End of paragraph marker. (Inserts a return) |
| <img src="online.gif"> | Include the picture online.gif |
| <a href ="page2.html"> Page two</a> | This is a hypertext jump to page2.html |

Thus a sample HTML page would be coded as:

```
<title> Online HTML page </title>
<img src="online.gif">
<h1> A simple HTML page </a>
<p>
This is a <b> simple </b> demonstration on how to write an HTML page.
<p>
Press <a href="page2.html">here</a> to continue
or <a href="home.html"> here</a> to return to the home page.
```

This will be translated into a more user friendly form by a WWW client (e.g. Mosaic) (Figure 2).

This page has two links, one to page2.html and a second to home.html. These further files should be in the same directory as the current page, unless the full URL is used. To give the file path: for instance, page2.html's URL may be http://www.uel.ac.uk/online/page2.html. The URL is one of the most important ideas on the Internet as it provides a unique mechanism for referring to any document or service on the Internet.

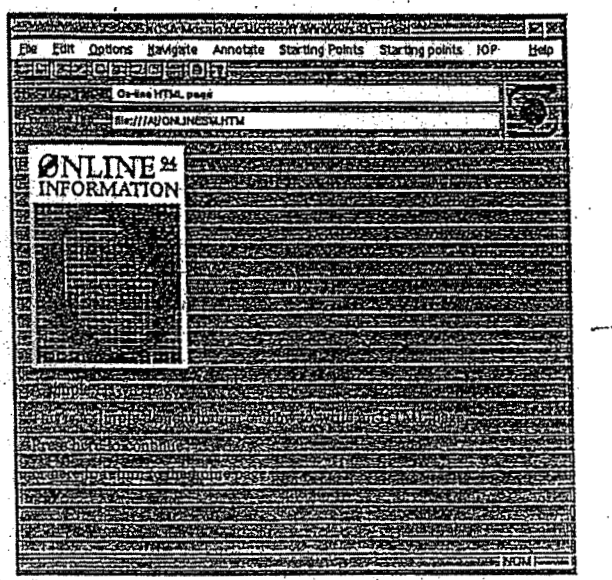



*Figure 2: The Mosaic interpretation of the sample HTML.*

HTML provides no *a priori* support for questionnaires, but it does provide the perfect infrastructure. To produce an HTML questionnaire service, the control of the server has to be changed so that the server takes the role of the master.

In navigator use, the WWW service works on the familiar concept of a client (e.g. Mosaic) requesting a server for a particular page, and the server's only function is to execute this service. The client in this (normal) scenario can be seen as the instigator and controller of the process. With our innovative approach, in order to direct that the user completes our questionnaire, the roles are reversed as the server must effectively take over control.

The WWW is currently designed to support a flow of control from the client to the server. Therefore, to operate in a questionnaire-like mode can only be achieved by monitoring the client's requests and manipulating the replies back to the client. This is done in such a way to force the client only to be able to answer the questions. The options available to the client have to be embedded in to the reply to the last question.

We have implemented this by using a simple file naming system, and an additional program to the HTTPD server which can deal with these changes. In normal use, Mosaic processes the event triggered by the user to call a new HTML document by virtue of its URL. When the user gives a response to a question on one of our questionnaire documents, Mosaic then responds to the event by calling our bespoke program together with a context control variable. The function of this bespoke program is to:

- save the response to a particular datafile;

- deduce the branching required to further questions or instructions.

The initial URL is http://www.uel.ac.uk/cgi-bin/question. This has no variable and thus the program deduces that the respondent has just started, and therefore sends the first question. This process also creates and opens the destination datafile for the user responses.

Thus, if the first question is:

Question 1

Are you planning to attend Online 1994?

Yes
No

then the following will be the source of the HTML page sent back to the client:

```
<title> Online 1994</title>
<h1> Question 1 </h1>
<p>
Are you planning to attend Online 1994?
<p>
<a href="http://www.uel.ac.uk/cgi-bin/question?TZ12121344001002001">Yes </a>
<p>
<a href="http://www.uel.ac.uk/cgi-bin/question?TZ12121344001002002">No</a>
<p>
```

If the response is Yes, the URL http://www.uel.ac.uk/cgi-bin/question?TZ12121344001002001 is called by the Mosaic client. In calling this URL the question program is executed together with the context variable TZ12121344001002001. The variable can be broken down into five major components:

| Example | Length | Name |
|---|---|---|
| TZ | 2 | Internal control used for complex Context dependent questions. |
| 12121344 | 8 | The filename for saving the answers of this particular respondent is generated automatically once the questionnaire has been started and is appended dynamically to each question at runtime. |
| 001 | 3 | The question number of the current answer. If this is set to TTT then the reply is not stored. |
| 002 | 3 | The next question number. |
| 001 | 3 | The answer to the last question, i.e. would have been set to 002 if female. |

When the program receives a valid context variable it appends the current question number (001) and the answer (001) to the file indicated by the filename (12121344). If the current question number is set to TTT then the program assumes that the current page is a text page and that it requires no information to be stored. The program then infers which question should be asked next. In simple systems, this will be the next question number in sequence. (For more complex questionnaires a look-up table, algorithm or chaining algorithm or net may be used) The program then changes the URLs in the file containing the next question to match the filename of the current client. This page is then posted by the server to client. Thus the user now sees the next question displayed by Mosaic, with new links already embedded which have been determined by the user's responses.

Producing these pages and links by hand can be very tedious and time consuming. One of the major problems is dealing with the links and the server's requirement that each page should be in a single file. To simplify this operation we have adapted our file-based questionnaire language (co-developed with the Centre for International Business Studies, Amsterdam) to administer all of the links and to construct multiple HTML pages from a single input file.

The major commands are:

| | |
|---|---|
| *Header*: | The text at the top of all of the pages (Optional) |
| *Footer*: | The text at the foot of all of the pages (Optional) |
| *Text* | A text page. The first line is considered to be a heading unless it is left blank. |
| *Ques* | A Question. The first line is considered to be a heading unless it is left blank. |
| *Ans* | A single answer which should follow a question |

The difference between *Text* and *Ques* is that the server will only record the reply from a *Ques* page. Other commands are provided to construct context-dependent questionnaires with complex orders or optional sections:

| | |
|---|---|
| *link*PP:NNN | PP is a context, NNN is the number of the next page to jump to. If this is omitted then the system will assume that the next page in the file is the next page. |

Raw HTML can also be embedded into the document: for instance, *Header* <img src="online94.html"> would place the Online Information 94 logo at the top of each page, as shown in our example (Figure 2).

The questionnaire can be typed into any wordprocessor or text editor which can produce ASCII text files. An example file is shown below:

```
*Header* Online Demonstration
*Footer* by David Gee and Peter Woolliams

*Text*
A two question questionnaire to demonstrate this questionnaire system. I hope you
enjoy using this system
*Ques*
What gender you ?
        *Ans* Male
        *Ans* Female
*Ques*
How old are you ?
        *Ans* less than 25
        *Ans* 26 to 35
        *Ans*36 to 45
        *Ans* 46 to 55
        *Ans* 56 to 60
        *Ans* Over 60
```

All the files and links are generated from this file. The respondent's output filename is set to %@ so that the server program can replace this with an automatically generated value or a passed value. Once the questionnaire designer has generated the HTML version the

questionnaire can be used. The designer should not have to see the HTML version and it is only provided here to indicate how the system works:

File one:

```
<title> Online Demonstration </title>
<h1> Online Demonstration </h1>
<p>
A two question questionnaire to demonstrate this questionnaire system. I hope you enjoy using this system
<p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@001002000">Next Page
</a>
<p>by David Gee and Peter Woolliams
```

File two:

```
<title> Online Demonstration </title>
<h1> Online Demonstration </h1>
<p> What gender you ?<p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@002003001">Male</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-in/question?AA%@002003002">Female
</a><p>
<p>by David Gee and Peter Woolliams
```

File three:

```
<title> Online Demonstration </title>
<h1> Online Demonstration </h1>
<p>How old are you ? <p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004001">less than
25</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004002"> 26 to
35</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004003">36 to
45</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004004">46 to
55</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004005"> 56 to
60</a><p>
<a href="http://sunrae.uel.ac.uk/cgi-bin/question?AA%@003004006">Over
60</a><p>
<p>by David Gee and Peter Woolliams
```

When the respondents call the Questionnaire they will be presented with the first page, and on answering a question or selecting a new page the server will deduce which page should be sent next and record any answers. The respondents only ever see the hypertext view of the example (Figure 3).

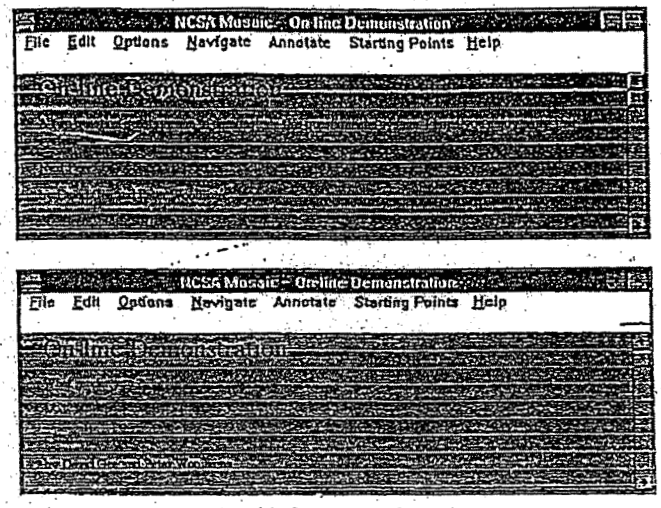



*Figure 3: The respondents' view of the first two example questions.*

## 4. Question formats and user interfaces

As stated above, the WWW servers can be read by various clients, Mosaic is currently the most popular graphical-based client and is currently the only one to support HTML forms. It requires some form of graphical user interface, e.g. X-Windows, MS Windows, Amiga or Mac OS. Other clients such as Lynx and CERNS WWW can use character-based systems such as VT100 terminals and MS-DOS. This produces two types of systems: Type 1, the character-based; and Type 2, GUI-based. The Type 2 GUI systems can read all of the text-based Type1 pages.

Questionnaire systems on Type 1 systems allow for text-based multi-choice questions, with only a single question per page. Due to the finite nature of multi-choice questions, they are very simple to analyse using computerised techniques. This finite limitation complicates general questions which establish the background of a respondent. We have now produced a general set of questions which allow the user to select their background via a set of hierarchical menus. One of these sets contains a structured list of every county and parish of every country in the world; this allows respondents accurately to pinpoint their place of birth or current location. As a location code is produced, autonomous computerised statistical analysis is made available. To produce a fast system there should be only one question per page, and the number of answers should be minimised as each answer requires more processing of the Mosaic client.

Most of the newer Type 2 systems have the abilities of a Type 1 system with the additional features of multiple questions per page, imagemaps, and the inclusion of the special toolsets contained in HTML forms (Figure 4). These allow the construction of graphical lists,

multiple selection boxes and buttons, which can be used for scalar questions, multiple selection boxes or to enhance multi-choice questions. One of the most important tools of HTML forms is the text box which supports the ability to ask open-ended questions. Text boxes do not currently assist in autonomous computerised analysis, as the system has to be able to parse and understand the entry typed to the text box. Even in a specific context this is very complex and further research needs to be undertaken in this field.

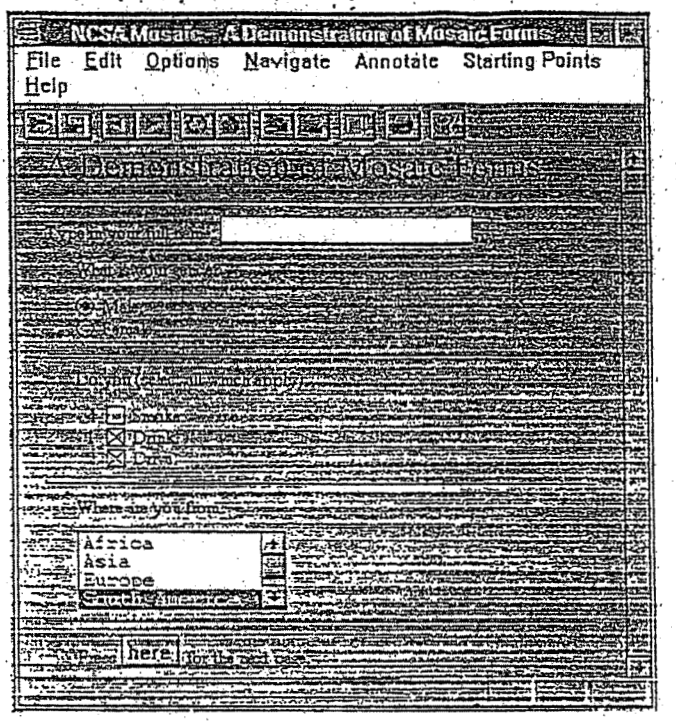



*Figure 4: A Type 2 questionnaire showing the various toolsets provided by Mosaic Forms.*

One of the more visually appealing elements of a Type 2 system is the imagemap. This allows respondents to select an area of a picture. A simple example would be to display a picture of an office and to ask respondents to select where they would like to sit. Respondents can then answer the question by moving the mouse and clicking on the picture in the required location. This sends the server the x,y coordinate on the picture and the location can be deduced. Unfortunately, imagemaps place a heavy networking load on the system

compared to text-based multiple choice questions, and should only be used where really necessary.

## 5. Conclusions

The Internet continues to enjoy an explosive growth in interest and new users. The innovative approach described herein provides a powerful low-cost method of acquiring market research data from a potential of 25 (plus) million users. It requires the respondents to have no special software. These days virtually all machines connected to the Internet have Mosaic. The very few that do not have some form of text-based viewer. Casual respondents can be attracted. As Mosaic/WWW is an Internet browser it is highly likely that with the correct signposts, questionnaire response rate would be high. The flexibility of using the in-built HTML form tools can produce an intuitive and aesthetically pleasing interface with colour and multimedia objects. The actual questionnaire can be made to look like a standard Mosaic page and thus exploit the advantages of the respondents' pre-understanding of Mosaic. As suggested, the questionnaire server can be adapted to use various algorithms or artificial intelligence programs to construct a respondent driven contextualised questionnaire dynamically. Immediate feedback to the respondent once the questionnaire has been completed could also be offered. This can be used as the motivator for the respondent to answer the questionnaire. Administration is very low as the system is automatic. Our current system can generate graphs and perform statistical analysis automatically on the data. Using Microsoft's OLE technology, it is possible to produce living papers which update their statistics and graphs dynamically.

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