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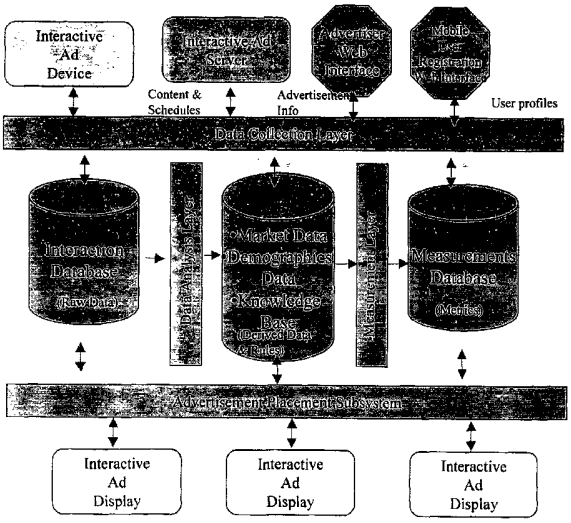
(54) Title: METHOD AND SYSTEM FOR PLACEMENT, MONITORING AND MEASUREMENT OF INTERACTIVE ADVERTISING



(57) Abstract: A decision support system for an interactive advertising system, the decision support system being for collecting and analysing data obtained through interaction by at least one user with the interactive advertising system, the user using a user's machine for the interaction, and measuring the effectiveness of the advertisement. Also disclosed is a method for placement, monitoring and measurement of an interactive advertising system having an interactive advertising device for displaying at least one advertisement, the method including the steps of specifying the goals of the at least one advertisement; placing the at least one advertisement using data obtained from previous advertising using the interactive advertising system; monitoring user interactivity with the interactive advertising system as a result of the at least one advertisement so as to collect data; and using the data to determine the effectiveness of the at least one advertisement.

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Method and System for Placement, Monitoring and Measurement of Interactive Advertising

Field of the Invention

This invention relates to a method and system for the placement, measurement and monitoring of interactive advertisements and refers particularly, though not exclusively, to such a method and system having a decision support system and method.

Reference to earlier Application

The present invention is particularly useful with the invention disclosed and claimed in our earlier patent application PCT/SG00/00165, the contents of which are hereby incorporated by reference (our "earlier application"). The definitions used in our earlier application are used and followed in this application.

Background to the Invention

Interactive advertisements, especially of the out-of-home and out doors billboard kind, have emerged as a new genre of advertising. In this type of advertising, the targeted audience is enticed to interact with the advertisement to request for more information about the advertisement; to answer surveys and endorse products; to download discount coupons and tickets; and even to buy advertised products or services using their mobile devices such as cell phones, mobile telephones, and/or personal digital assistants. In our earlier application we describe a system, method and device, including the ingredients of a comprehensive platform, for enabling interactive advertising.

Outdoor and out-of-home advertisements are relatively expensive so it is important to place the advertisement at the right location, for the right type of display, at the right time, targeted to the right people, with the most suitable incentives and promotions. In such a platform, there is also a need for a decision

support system that can help advertisers and advertisement service providers in the effective placement of new advertisements; monitoring the advertisements by collecting and analysing data available through user interaction, and finally measuring the effectiveness of the advertisement by domain specific metrics. Hence, the interactive advertisement decision support system ("DSS") should be able to address the following questions before an advertisement is placed:

What is the targeted audience? For the product, service or event to be advertised, which is the most suitable class of people that is likely to view and respond to the advertisement? Will they be, for example, housewives, teenagers or technology professionals? What are the target demographics? Where to advertise? Which is the best: road, shopping centre, cinema hall or any other location? Outside or inside the building? How to advertise? For example, with or without outdoor or out-of-home display such as, for example, wireless messaging directly to mobile devices.

The DSS system will preferably be able to decide on the type of data to collect during audience interaction, so that this data may be used in monitoring and measurement.

After an interactive advertisement campaign is completed, the advertiser will probably need to receive answers to a different set of questions, with help from the DSS: How many "impressions" were created? How many interactions happened? How many discount coupons and vouchers were downloaded? And so forth.

Consideration of the Prior Art

US patent 6,006,197 discloses a system and method for assessing effectiveness of internet marketing campaign that is limited to Web based advertising. The present invention is applicable to interactive advertisements involving wireless devices. With the prior art the advertisement ID, user ID and the subsequent transactions are correlated to measure the effectiveness of the advertisement. The present invention is a

comprehensive method and system for collecting user profile information, interaction information and transaction information; analysing the obtained information to develop user demographics and psychographic rules and information; and using the information and rules to place new advertisements.

US patent 5,974,398 is for a method and apparatus enabling valuation of user access to advertising carried by interactive information and entertainment services where interested users see advertiser's bids for their attention which are displayed on their computer screens, and then choose which advertisements to view. For each advertisement viewed, the advertisers' bid amount would pay for a portion of the user's service or usage charge. The database marketing-portion uses customer interest profiles and on-line service usage data to identify to advertisers particular user characteristics. Advertisers define user characteristics of particular desirability and place a dollar value on having messages viewed by individual users based on the desirability of the user.

The auction portion includes a display on the user's display device of the advertisers most willing to pay for the user's attention and the dollar amount bid. If the user chooses to view a particular advertiser's message, the user is reimbursed, or a credit is applied to the user's on-line account for the amount of the bid promised by the advertiser whose message was viewed. Other types of reward can also be provided to the user, such as, merchandise or services. The objective is to provide a means for reducing network access charges to the user and increasing advertising effectiveness to the advertiser.

The present invention is for providing a system and method for collecting user interaction data, analysing the data to develop user demographics and pyschographics information, and using the information to place new advertisements.

US 5,948,061 is directed at a method of delivery, targeting, and measuring advertising over networks such as the Internet. Statistics are compiled on individual users and networks and the use of advertisements is tracked to permit targeting of

advertisements to individual users. In response to requests from affiliated sites, an advertising server transmits to people accessing the page of a site an appropriate one of the advertisement based upon profiling of users and networks. This is limited to Web advertisements, unlike the present invention, which is suited for interactive wireless out doors or out-of-home advertisements.

In US 6,119,098 there is disclosed a system and method for targeting and distributing advertisements over a distributed network, and which includes a client application that displays targeted advertisements on a subscriber's computer and a server that manages an advertisement database and provides advertisements to the subscriber's computer. Advertisements are specifically targeted to the subscriber based on a personal profile provided by the subscriber. The client application periodically accesses the server over a distributed information network to download the targeted advertisements. The client application preferably displays the downloaded advertisements in an advertising window that is continuously displayed on the subscriber's computer and that is sensitive to mouse and/or keyboard activity, even if other applications are running concurrently on the subscriber's computer. Thus, the probability that a subscriber will view an advertisement that is specifically for the subscriber is relatively high.

Similarly, this is limited to Web advertisements unlike the present invention, which is suited for interactive wireless out doors or out-of-home advertisements.

The disclosure of US 6,134,532 is to a system and method for optimal adaptive matching of users to most relevant entity and information in real-time which is limited to Web advertising and applications. It does not consider interactive advertising for out doors and out-of-home environments.

US 6,119,101 is directed to intelligent agents for electronic commerce that represent consumers and providers in a virtual marketplace. Consumer personal agents conceal the identity of the consumer and are capable of creating decision agents that shop for products and assist consumers in comparing and ranking products. Provider personal agents are capable of creating demand agents that quantify demand and target specific

consumers without learning the identity of the consumers. Based on data generated by the activities of the decision agents and on preference data maintained by consumer personal agents, provider personal agents can quantify current, historical, and future demand, simulate demand, and target specific consumers for advertising and other messages. Provider personal agents can cooperate with consumer personal agents to collect data about reasons for sales and lost sales and to offer consideration payments to consumers. Consumer personal agents can automatically reject unsolicited messages that do not satisfy the consumer's preferences.

This relates to the application of intelligent agents technology to electronic commerce in general whereas the present invention is specific to interactive advertisements of the out-of-home or out doors kind, and which is not limited to implementation by intelligent agents.

There are a number of non-patent prior art systems including an apparatus for capturing, storing and processing co-marketing information associated with a user of an on-line computer service using the world-wide-web, the apparatus capturing and storing a co-marketer identification symbol representing an identity of an entity that has referred a user on a user station to a computer service, wherein the user station is coupled to the computer service by a communications path. A database is provided for storing a plurality of user records. Each of the user records includes a user identification field for storing information uniquely associating each of the user records with a user, and a co-marketer identification field for storing identity information representing the identity of an entity that directed the user to the computer service. An enrolment means is coupled to the communications path and the database, and is provided for enrolling a user on the computer service. The enrolment means includes means for determining a co-marketer that directed the user to the computer service, and means for assigning a unique user identification number to the user. The enrolment means further includes means for storing a co-marketer identification symbol representative of a co-marketer and the unique user identification number of a user in the co-marketer identification and user identification fields, respectively, of one of the

user records.

Also, the advertiser-supported Web site is one of several business models vying for legitimacy in the emerging medium of the World Wide Web on the Internet (Hoffman, Novak, and Chatterjee 1995). Currently, there are three major types of advertiser-supported sites:

1) sponsored content sites such as Hotwired, ESPNET Sportszone, and ZD Net;
2) sponsored search agents and directories such as InfoSeek, Excite, and Yahoo; and
3) entry portal sites such as Netscape.

At present, these three classes of sites are split at about 55 percent, 36 percent and 19 percent, respectively, in terms of advertising revenue (Jupiter Communications 1996).

The sponsorship model is attracting increasing management attention because advertising is expected to be an increasingly significant source of revenue (Rebello 1996). Sponsored sites are attractive because they are well suited to the Web environment (Hoffman & Novak 1996) yet retain important parallels to existing media in the physical world. In theory, institutional advertising practices and metaphors can be borrowed from traditional media environments to assist initial commercial efforts. Additionally, as it becomes apparent that commercial viability of the online storefront model is years away (MIT Faculty/Industry Workshop 1996), many Web managers are beginning to place more importance on advertising revenue streams as a source of profitability for online ventures (Rebello 1996).

It is therefore the principal object of the present invention to provide a decision support system for interactive advertising so that user interaction can be monitored to collect data, the data being used to determine how to use and/or place the advertisement more effectively.

Summary of the Invention

With the above and other objects in mind, the present invention provides a decision support system for an interactive advertising system, the decision support system being for collecting and analysing data obtained through interaction by at least one user with the interactive advertising system, the user using a user's machine for the interaction, and measuring the effectiveness of the advertisement.

In another form, the present invention provides a method for placement, monitoring and measurement of an interactive advertising system having an interactive advertising device for displaying at least one advertisement, the method including the steps of specifying the goals of the at least one advertisement; placing the at least one advertisement using data obtained from previous advertising using the interactive advertising system; monitoring user interactivity with the interactive advertising system as a result of the at least one advertisement so as to collect data; and using the data to determine the effectiveness of the at least one advertisement.

In both forms the data may be stored in a database that includes an interaction database, a market database and a demographic database.

The interaction database preferably contains fields for one or more of: a number for the user's machine, make and category for the user's machine, identity of an interactive device forming part of the interactive advertising system, user's name, user's sex, user's age, user's occupation, a location of the interactive device, time and duration of the user's interaction, a category for the interaction, and an identifier for an advertisement.

The market database may also contain a summary of data collected for each user, the summary of data including one or more of: user's tenure with the user's machine, impressions created on the user by the interactive advertising system, the nature of any coupons redeemed by the user, purchases made by the user, and details of that in which the user has an interest. Preferably, the impressions are

measured by determining the extent of user interaction with the interactive advertising system.

The user's interaction may be by use of the user's machine to perform one or more of: browse through at least one advertisement, send at least one message to the interactive advertising system, download advertisement information, download coupons, and effect a purchase.

The demographics database may be a summary of the data in the interaction database and the market database with respect to the user's lifestyle, interests, habits and behaviour, and may also include a plurality of rules developed by data mining tools.

The effectiveness is preferably determined by measuring each of: the minutes of interaction, sphere of influence, ratio of purchase to impression, and roaming, the minutes of interaction being the duration of interaction by each user; the sphere of influence being the number of different interactive advertisements with which the user has interacted; the ratio of purchase to impression is the total number of purchases made by the user divided by the total number of impressions created by the advertisement; and roaming is a radius of a roaming area of the user.

An advertisement placement system may be provided for determining the most effective location, channel and time for an advertisement.

Description of the Drawings

In order that the present invention may be readily understood and put into practical effect, there shall now be described by way of non-limitative example only a preferred embodiment of the present invention, the description being with reference to the accompanying illustrative drawings in which:

Figure 1 is a an illustration of the cycle with a decision support system in interactive advertising;

Figure 2 is an illustration of the process for the placement of an advertisement;

Figure 3 is an illustration showing data collected for an interactive advertising system;

Figure 4 shows the implementation of an interaction database;

Figure 5 is an illustration of the steps involved in a data analysis sub-system; and

Figure 6 is the system architecture for a system according to the present invention.

Description of the Preferred Embodiment

The decision support system for interactive advertisements follows a cycle that is shown in Figure 1. The four stages of the interactive advertisement DSS Cycle are:

1. specify the goals and requirements for the advertising campaign;
2. place the advertising using information and knowledge derived from past interaction data;
3. monitor the advertising by collecting interaction data and analysing the data; and
4. measure the results of the advertising campaign using defined metrics.

The four stages are highly interdependent as the result from one stage is the input into the next stage, and the nett effect is a system that is driven by results. Being a cycle there is constant consideration and review of the effectiveness of the advertising thus ensuring the maximum effectiveness of the advertising. Each stage depends on the result of the previous stage. Each stage will now be separately considered.

<u>Stage 1 – specify the goals and requirements.</u>

In the first stage, the goals and requirements of the interactive advertising campaign are to be clearly laid out. Some of the questions that need to be answered by the advertiser are:

1. what is the product or service or event to be advertised?
2. what is the purpose of the advertising campaign:

- to bring the item to public's attention?
- to educate the public about the item?
- selling a non-durable item before it perishes (yield management)? and
- to effect a speedy sale of the item?

3. optionally, what is the target audience?

   For example, is the campaign targeted at teenagers, housewives or businessmen? Sometimes, this might not be clear to the advertiser. In such a situation, the question is passed to Stage 2, the placement process, which will use the knowledge in the form of domain rules derived from past interaction data to arrive at a suitable target audience. Various existing data mining techniques can be used for this purpose. Some of the techniques are provided below.

4. optionally, what form of interactive advertising is preferred by the advertiser?

   The advertiser may have their preference for the form of advertisement to be developed. This may depend on the advertising budget available. The advertiser may decide on a multimedia advertisement, a short text-based advertisement, an advertisement with discount coupons, a large LCD display advertisement, a mobile variable location advertisement, and so forth. If there are such preferences, they have to be noted. In case the advertiser cannot make a decision, the advertisement placement process of stage 2 can address the issues.

The answers to these questions become the inputs to the next stage of the cycle, the advertisement placement system of stage 2.

Stage 2 – advertisement placement.

As shown in figure 2, this system is a knowledge-based system, or an expert system, that assists in finding answers to the following questions, based on the goals and requirements from the stage 1, and the knowledge derived in stage 3:

1. what is the target audience? For the product, service or event to be advertised, which is the most suitable class of people likely to view and respond to the advertisement? Are they, for example, housewives, teenagers or technology professionals? What are the target demographics in relation to:
   - sex;
   - age group;
   - profession;
   - educational qualification;
   - race and culture; and
   - family type and size.

2. Where to advertise? Which is the best road, shopping centre, cinema hall or any other location? Outside or inside the building? If it is a mobile advertisement, such as those placed on top of taxis or inside buses and trains, what is the best travelling route on which to advertise? If it is a changing or variable advertisement on a mobile display, what are the locations in which the advertisement should be shown?

3. How to advertise?

Will it be with or without outdoor or out-of-home display or using other delivery means such as, for example, wireless messaging directly to mobile devices?

- If on a display, what type of display (passive or active), how big, to display multimedia or still pictures, and so forth?
- How many spots in a day and what duration for each spot?
- On what media channels (for example television or radio channels) and during which programs should the advertisement be placed? and
- What type of promotion is most suitable? For example, discount coupons or vouchers?

The advertisement placement system contains rules in its knowledge base and which are developed in stage 3 - the data collection and analysis stage. An example of such a rule is:

> "Females aged between 18 and 25 are likely to respond to the Advertisement for product of type X placed on bus route 71 during the time period 2-4 PM".

Stage 3 – data collection and analysis.

Stage 3 includes various techniques tuned to interactive advertisement needs and which are based on existing data mining methodology. They can be used to derive the rules. Some of the techniques used are: interactive advertisement respondent (user) prediction, respondent affinity grouping, and respondent clustering.

It is possible to more accurately monitor interactive advertisements than in the past with non-interactive advertisements because of the message(s) exchanged between the advertising system and the respondent, the respondent being the audience that responds to the advertisement.

Figure 3 shows an example implementation of a digital video broadcast (DVB) based interactive advertising inside buses.

In an interactive advertisement system such as that shown in Figure 3, users can interact with the advertising system using their mobile devices by sending messages over wireless media, be it infrared, Bluetooth or a cellular network short message service (SMS). The user may interact to download more information about the advertisement such as, for example, telephone number, product price, URL of the company, and so forth. This is disclosed in our earlier application. Users may also obtain discount coupons for any specified purpose, make purchases, arrange for concert tickets, and so forth. When such transactions occur, data is exchanged between the user's mobile device and the interactive advertising

system. Further, the interactive advertising system may have relevant information such as, for example, its ID, current location (which may be obtained using some form of global positioning system (GPS) or by direct data entry), and so forth. The interactive advertising system may have a server that may also keep track of the current program or advertisement being shown on the display. All of this data can be collected and culled for analysis using existing data mining or statistical techniques. The data is obtained for the purpose of measurement of the performance of the advertisement, as is described below in relation to stage 4, and also for generating new rules and patterns of how users respond to advertisements.

The collected data is stored in an interactive advertising database as shown in Figure 3. The database has at least three parts, including an interaction database, market database, and demographics database.

The interactive database may contain fields for one or more of each of:

- cellphone number or PDA device ID;
- maker and general category of the device (for example, "Nokia" cellphone, "Handspring" visor, and so forth);
- interactive advertisement device ID;
- user's name;
- user's sex;
- user's age;
- the location of the interactive advertising device (for example, a bus device) during interaction;
- time and duration of interaction;
- type of interaction. This may be one or more of: browse, send message/email, download information/coupon/voucher/ticket, buy, answer survey, endorse a product, and so forth; and
- advertisement or program ID.

The marketing database may contain a summary of data collected over a period of time for each user or respondent, the data including one or more of:

- tenure (how long has the user been using the device);
- impressions created on the user by the various advertisements;
- types of discount coupons and vouchers redeemed by the user;
- purchases made by the user either directly at the advertising location, or subsequently using the advertisement data downloaded to the user's device; and
- advertisements/products/services in which the user is interested.

The impression created in a user in an interactive advertisement may be defined as user initiated interaction with the advertising system for the following purposes:

1. browse through an advertisement on a display device of the interactive advertising system, such as an electronic billboard, by using the user's mobile device for control, such as a remote computer mouse. Browsing is executed by the software in the mobile device sending messages to the advertising system to provide more information, the user controlling their device and the browsing by scrolling, clicking, and so forth;
2. send at least one email or message with advertisement information embedded in it, using the advertising system as a wireless access point;
3. download advertisement information to the user's mobile device. This may include, for example, the telephone number or URL of the company, product code, product price, and so forth;
4. download coupons and vouchers such as discount coupons; and
5. purchase of an item advertised directly by the advertising system or at any other location using the advertisement information, coupons or vouchers downloaded.

Unlike traditional, passive advertisements, the impression is as a user responds to the advertisement in one or more of the specific ways listed above. This is necessary to differentiate from passive impression which is the normal result of a user considering a non-interactive advertisement. It is also possible because of the data collection and analysis systems and methods described and claimed herein.

The demographics database is a summary of the above two databases with respect to the lifestyles, interests, habits, and behaviour of the users/respondents. This data may also contain certain estimates, predictions and rules developed by a variety of data mining tools acting on the interaction data.

Figure 4 shows the database schemes for the interaction database given an interactive advertisement in a bus. The database is implemented as a relational database so that it may be easily queried, and made accessible for subsequent analysis and measurement. The marketing and demographics databases are mainly derived from the interaction database using existing data mining techniques and tools. Some methods that are specific to interactive advertisement are described below.

Interaction data and other data that is collected and stored as described above is analysed using the following methods to arrive at more useful information, and knowledge, that can be used in determining the placement of interactive advertisements (as in stage 2) or in the measurement of the effectiveness of the interactive advertisement (as in stage 4). This is illustrated in Figure 5.

Stage 4 – measurement.

Classification consists of examining the features of a newly presented set of objects and assigning it to one of a predefined set of classes. For the purpose of the present invention, the objects to be classified are generally represented by records in a database, and the act of classification consists of updating each record by completing a field with a class name or code. The classification task is characterized by a defined class, and a training set consists of pre-classified examples. The task is to build a model that can be applied to unclassified data to be able to classify the data.

There are a limited number of classes, and any record may be applied to any one of them. Decision trees and memory-based reasoning are techniques well suited

for classification; and link analysis may, in certain circumstances, also be useful for classification.

With interactive advertisements, respondents can be classified using the above techniques based on their age, sex, occupation, and so forth.

Classification deals with discrete outcomes. Estimation deals with continuously valued outcomes. Given some input data, estimation is used to give a value for an unknown, continuous variable such as, for example, age, income, height, and so forth. The estimation approach has the advantage that the individual records can be ordered based on their estimates. Statistical techniques and neural networks are well suited for performing estimation.

Prediction is similar to classification and/or estimation with the main difference being that the records are classified according to a predicted future behaviour or estimated future value rather than known current behaviour or value. In a prediction task, the only way to check the accuracy of the classification is to await the actual outcome and compare it with the estimate. Any of the techniques used for classification and estimation can be adapted for use in prediction by using training examples where the value of the variable to be predicted is already known, along with the historical data for those examples. The historical data is used to build a model that explains currently observed behaviour. When the model is applied to current inputs, the result is a prediction of future behaviour.

In the past, the most likely reason for collecting information on who has responded to what advertisements was to predict which of those responding are likely to positively react to a new advertisement. By using the data collected using the present invention, it is possible to form clusters of both advertisements and respondents. For each cluster of respondents, it is possible to establish rules that explain their interest in an advertisement. For each cluster of advertisements, rules can be established that describe the best target audience or respondents. When a new advertisement is to be placed, it is assigned to one of the clusters based on the

rules. The advertisement is then targeted to the population segments that have responded to similar advertisements in that cluster in the past.

Market basket analysis, memory-based reasoning, decision trees, and artificial neural networks are suitable for use in prediction. The choice of the technique depends on the nature of the input data, the type of value to be predicted, and the importance of explaining the prediction in terms of rules.

The task of affinity grouping is to determine which things go together. Affinity grouping is one approach to generating rules from data. If two items such as, for example, the ESPN Channel and football jersey advertisement go together, it is possible to generate an association rule:

> People who watch the ESPN Channel respond to football jersey interactive advertisements.

To perform this analysis, all the data is grouped into market baskets including all the advertisements to which each viewer has responded. Based on these baskets, one can then calculate the probability that any given advertisement will be found in a basket containing a known combination of advertisements.

Clustering is the task of segmenting a heterogeneous population into a number of more homogeneous subgroups or clusters. What distinguishes clustering from classification is that clustering does not rely on predefined classes.

Certain interactive advertisements can be clustered or grouped together because responses to the interactive advertisement are received from the same cluster of people. Similarly, certain respondents can be grouped together because they respond to the same advertisement. Furthermore, certain television programs can be clustered or grouped together because during these programs a certain advertisement will achieve its highest level of response.

Four metrics can be used for measuring the effectiveness of an interactive advertisement, and the responses to that advertisement:

1. minutes of interaction (MOI);
2. sphere of influence (SOI);
3. ratio of purchase to impression (RPI); and
4. roaming.

The measurements resulting from the four metrics may be stored in the measurement database.

The minutes of interaction is calculated for each respondent, by summing the duration of interaction of the respondent for period of the advertisement, or for a specific period of time. The MOI can be calculated for one interactive advertisement, or for a specific set of advertisements. Either way the MOI provides data which can be used to determine:

- the amount of interest an advertisement has created in the respondent; and
- the amount of interest a respondent has for a particular type of advertisement, or advertised product.

The more the minutes of interaction, the better the customer. However, the MOI may mask many discrepancies. For example, two long interactions totalling twenty minutes, and twenty short interactions also totalling twenty minutes give the same MOI. Similarly, some respondents may only be browsing and others are downloading. All interactions may be for the same product, or may be for a range of different products.

The sphere of influence is the number of different interactive advertising installations with which the user interacted. The greater the number of different installations, the greater is the sphere of influence of the user. High SOI users behave differently from low SOI users.

The ratio of purchases to impressions (RPI) can be calculated for an interactive advertisement. When this is done, the RPI is denoted by RPI_a where:

RPI_a = {Total number purchases made resulting from advertisement / Total number of Impressions created by the advertisement}.

RPI_a denotes the success, or effectiveness, of the interactive advertisement.

RPI can also be calculated for a single respondent or a group of similar respondents. When this is done, RPI is denoted by RPI_r.

RPI_r = {Total number of purchases made by the respondent / Total number of impressions created by various advertisements on the respondent}

RPI_r denotes how interested or responsive the user is for the advertisements. It may also denote the user's purchasing power.

Impressions and purchases can also be graded based on their importance or value in order to arrive at a more accurate measurement.

Roaming denotes the "geographical presence" of the respondent in terms of their interactions with different interactive advertising installations in a city or region. Roaming can be defined as the square root of the sum of the squares of the distances from the centre of the city or the region to all the installations with which the respondent interacted. This metric denotes the radius of the roaming area of the respondent.

As is shown in Figure 6 the top boxes are the hardware device and software applications that interact with the mobile user and the advertiser. These include the interactive advertising device, the interactive advertising server, the web interface for the advertiser, and the user web registration interface. These all communicate with the data collection layer, in which various types of raw data such as user interaction with the advertising device, content and schedule from the television

program or other multimedia system, advertisement information and user profile, are captured and stored in the relevant database.

The data collection layer therefore communicates with the interaction database, the market demographics database, and the knowledge base. These in turn communicate with the data analysis layer and the measurement layer.

The data analysis layer and the measurement layer derive new information from the data as described above, and their results are stored in the relevant databases. Finally, the advertisement placement subsystem communicates with the databases, uses the derived information to assist in the placement of the advertisement, and communicates with the interactive advertisement displays to achieve this, thus completing the cycle.

If desired, extra data may also be collected. For example, the number of user's machines within range and turned ON but which did not respond or interact may be recorded for the duration of a particular advertisement. This may be a simple numerical count, or may include basic and/or other details of each user. This may be subject to security protocols and procedures for the various standards that may be in effect – for example, the security in the "Bluetooth" protocol may prevent the collection of data of users without their consent.

By collecting the extra data the advertiser will know the number of responses from a potential total number of users. This is a first indicator of effectiveness. For those responding, the advertiser will have demographic information in real time to be able to assess the effectiveness of each advertisement, its placement and/or timing, whether or not the advertisement is reaching its target group, and other necessary data for the advertiser to be able to determine the effectiveness of the advertisement. This will avoid the delay and cost of surveys for advertisers to be able to make that assessment and determination.

Whilst there has been described in the foregoing description a preferred embodiment of the present invention, it will be understood by those skilled in the

technology that many variations or modifications in detail of design or operation may be made without departing from the present invention.

The present invention extends to all features disclosed both individually, and in all possible permutations and combinations.

The Claims:

1. A decision support system for an interactive advertising system, the decision support system being for collecting and analysing data obtained through interaction by at least one user with the interactive advertising system, the user using a user's machine for the interaction, and measuring the effectiveness of the advertisement.

2. A decision support system as claimed in claim 1, wherein the data is stored in an interaction database, a market database and a demographic database.

3. A decision support system as claimed in claim 2, wherein the interaction database contains fields for at least one selected from the group consisting of: a number for the user's machine, make and category for the user's machine, identity of an interactive device forming part of the interactive advertising system, user's name, user's sex, user's age, user's occupation, a location of the interactive device, time and duration of the user's interaction, a category for the interaction, and an identifier for an advertisement.

4. A decision support system as claimed in claim 2, wherein the market database contains a summary of data collected for each user.

5. A decision support system as claimed in claim 4, wherein the summary of data includes at least one selected from the group consisting of: user's tenure with the user's machine, impressions created on the user by the interactive advertising system, the nature of any coupons redeemed by the user, purchases made by the user, and details of that in which the user has an interest.

6. A decision support system as claimed in claim 5, wherein the impressions are measures by determining the extent of user interaction with the interactive advertising system.

7. A decision support system as claimed in claim 6, wherein the user's interaction is by use of the user's machine to perform at least one selected from the group consisting of: browse through at least one advertisement, send at least one message to the interactive advertising system, download advertisement information, download coupons, and effect a purchase.

8. A decision support system as claimed in claim 2, wherein the demographics database is a summary of the data in the interaction database and the market database with respect to the user's lifestyle, interests, habits and behaviour.

9. A decision support system as claimed in claim 8, wherein the demographics database also includes a plurality of rules developed by data mining tools.

10. A decision support system as claimed in claim 1, wherein the effectiveness is determined by measuring each of: the minutes of interaction, sphere of influence, ratio of purchase to impression, and roaming.

11. A decision support system as claimed in claim 10, wherein the minutes of interaction is the duration of interaction by each user.

12. A decision support system as claimed in claim 10, wherein the sphere of influence is the number of different interactive advertisements with which the user has interacted.

13. A decision support system as claimed in claim 10, wherein the ratio of purchase to impression is the total number of purchases made by the user divided by the total number of impressions created by the advertisement.

14. A decision support system as claimed in claim 10, wherein roaming is a radius of a roaming area of the user.

15. A decision support system as claimed in claim 1, wherein an advertisement placement system is provided for determining the most effective location, channel and time for an advertisement.

16. A method for placement, monitoring and measurement of an interactive advertising system having an interactive advertising device for displaying at least one advertisement, the method including the steps of:
    (a) specifying the goals of the at least one advertisement;
    (b) placing the at least one advertisement using data obtained from previous advertising using the interactive advertising system;
    (c) monitoring user interactivity with the interactive advertising system as a result of the at least one advertisement so as to collect data; and
    (d) using the data to determine the effectiveness of the at least one advertisement.

17. A method as claimed in claim 16, wherein the data is stored in an interaction database, a market database and a demographic database.

18. A method as claimed in claim 17, wherein the interaction database contains fields for at least one selected from the group consisting of: a number for the user's machine, make and category for the user's machine, identity of an interactive device forming part of the interactive advertising system, user's name, user's sex, user's age, user's occupation, a location of the interactive device, time and duration of the user's interaction, a category for the interaction, and an identifier for an advertisement.

19. A method as claimed in claim 17, wherein the market database contains a summary of data collected for each user.

20. A method as claimed in claim 19, wherein the summary of data includes at least one selected from the group consisting of: user's tenure with the user's machine, impressions created on the user by the interactive advertising

system, the nature of any coupons redeemed by the user, purchases made by the user, and details of that in which the user has an interest.

21. A method as claimed in claim 20, wherein the impressions are measured by determining the extent of user interaction with the interactive advertising system.

22. A method as claimed in claim 21, wherein the user's interaction is by use of the user's machine to perform at least one selected from the group consisting of: browse through at least one advertisement, send at least one message to the interactive advertising system, download advertisement information, download coupons, and effect a purchase.

23. A method as claimed in claim 17, wherein the demographics database is a summary of the data in the interaction database and the market database with respect to the user's lifestyle, interests, habits and behaviour.

24. A method as claimed in claim 23, wherein the demographics database also includes a plurality of rules developed by data mining tools.

25. A method as claimed in claim 16, wherein the effectiveness is determined by measuring each of: the minutes of interaction, sphere of influence, ratio of purchase to impression, and roaming.

26. A method as claimed in claim 25, wherein the minutes of interaction is the duration of interaction by each user.

27. A method as claimed in claim 25, wherein the sphere of influence is the number of different interactive advertisements with which the user has interacted.

28. A method as claimed in claim 25, wherein the ratio of purchase to impression is the total number of purchases made by the user divided by the total number of impressions created by the advertisement.

29. A method as claimed in claim 25, wherein roaming is a radius of a roaming area of the user.

30. A method as claimed in claim 16, wherein an advertisement placement system is provided for determining the most effective location, channel and time for an advertisement.

31. A method as claimed in claim 30, wherein the data is subjected to affinity grouping to determine those fields in the data that go together.

32. A method as claimed in claim 24, wherein the rules are derived by using interactive advertisement user prediction, user affinity grouping, and user clustering.

33. A method as claimed in claim 16, wherein extra data is collected of potential users within an operating range of the interactive advertising system and with the potential user's machine turned ON but who do not respond.

34. A method as claimed in claim 33, wherein the extra data is a numerical count of the number of potential users.

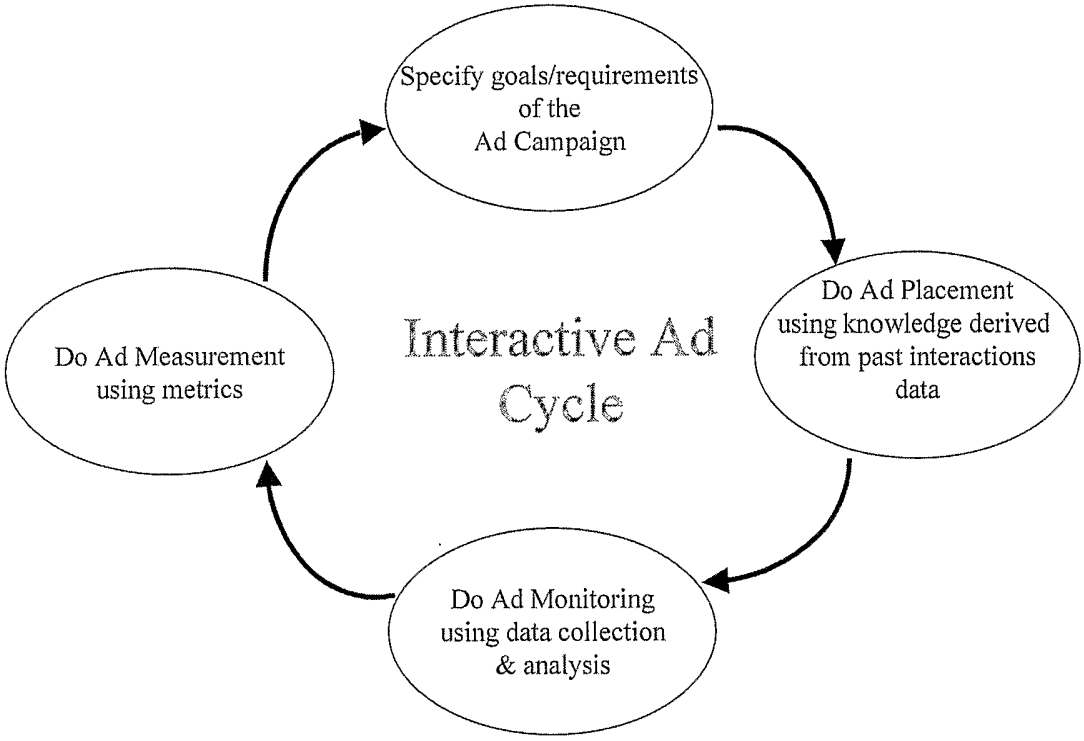


Figure 1

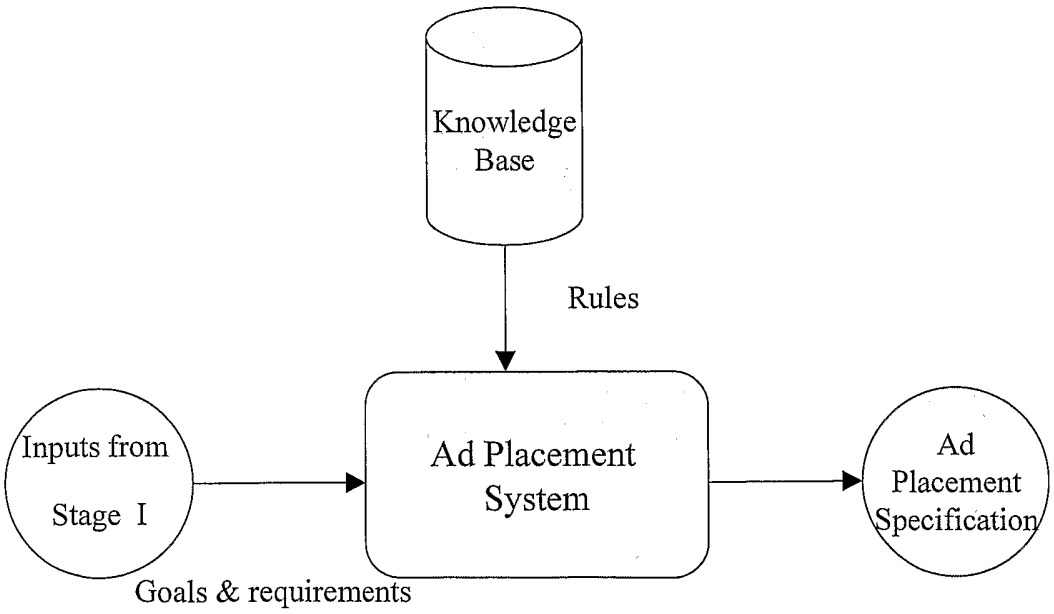


Figure 2

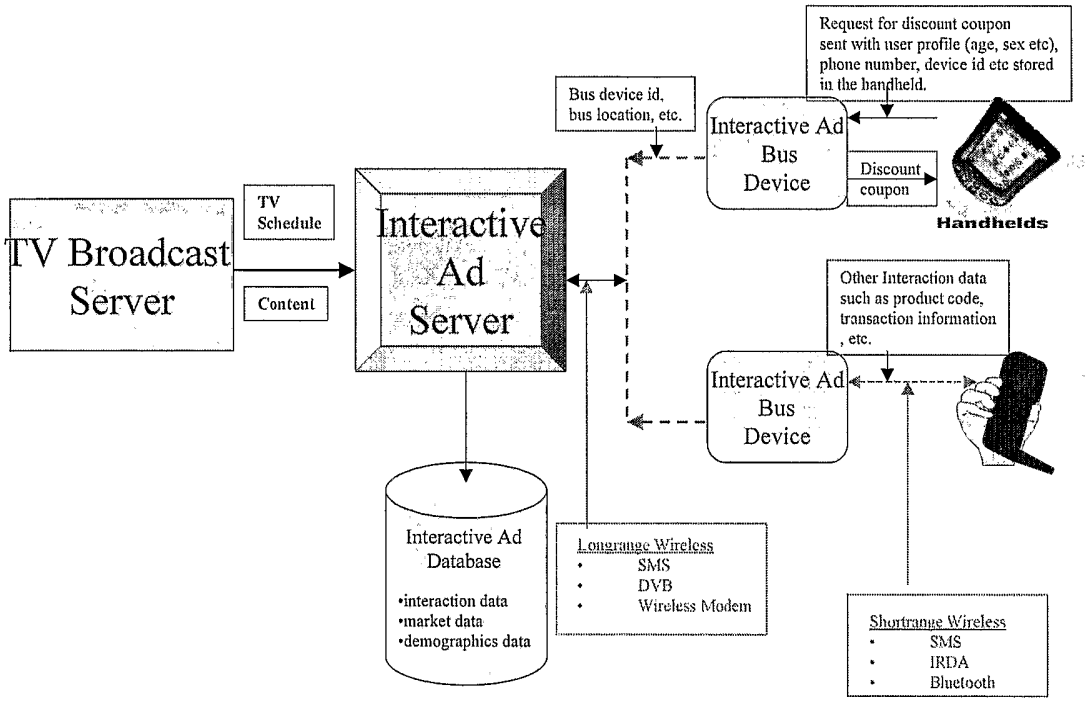
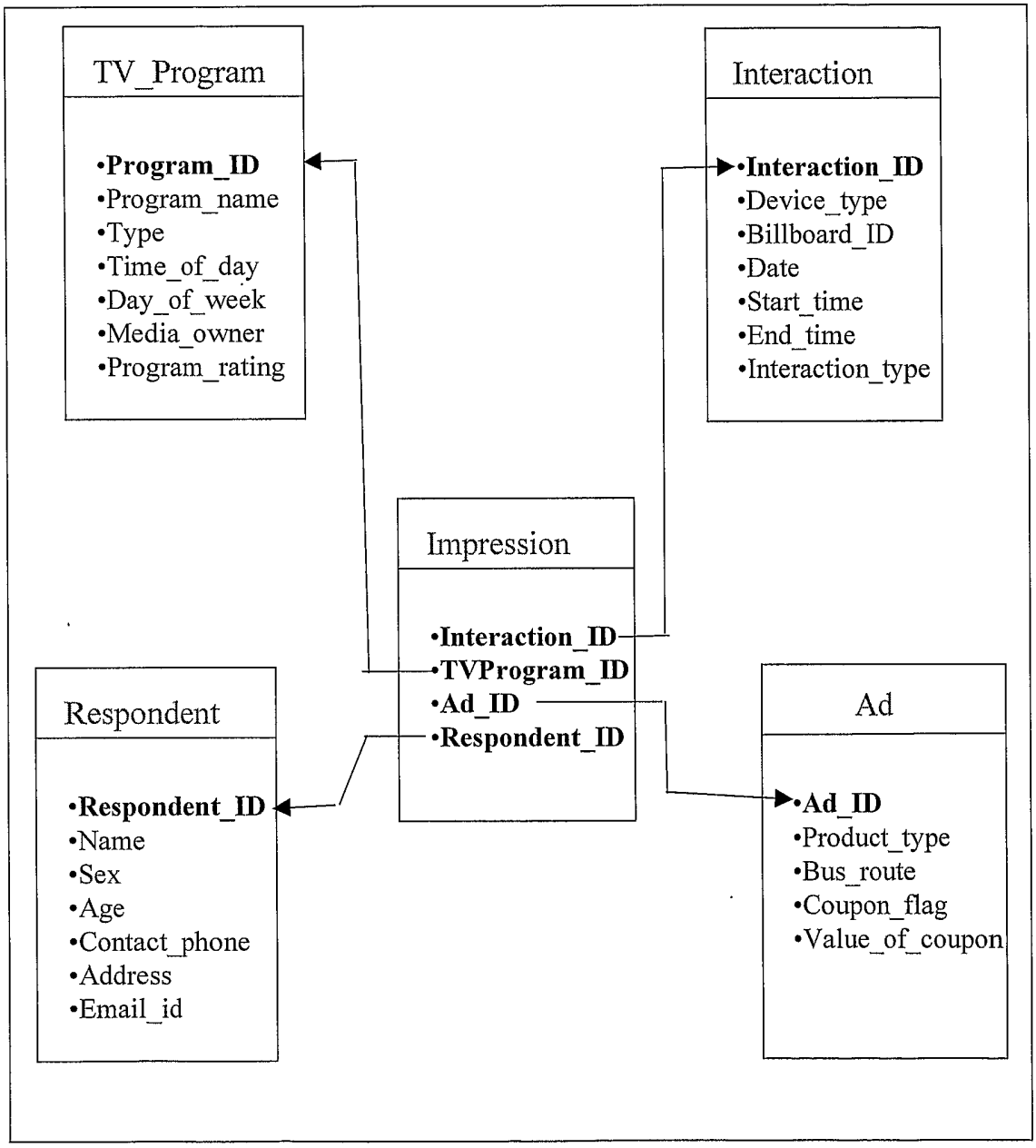

Request for discount coupon sent with user profile (age, sex etc), phone number, device id etc stored in the handheld.
Bus device id, bus location, etc.
Interactive Ad Bus Device
Discount coupon
Handhelds
TV Broadcast Server
TV Schedule
Content
Interactive Ad Server
Other Interaction data such as product code, transaction information , etc.
Interactive Ad Bus Device
Interactive Ad Database
•interaction data
•market data
•demographics data
Longrange Wireless
• SMS
• DVB
• Wireless Modem
Shortrange Wireless
• SMS
• IRDA
• Bluetooth

Figure 3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•Day_of_week
•Media_owner
•Program_rating
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•Billboard_ID
•Date
•Start_time
•End_time
•Interaction_type
Impression
•Interaction_ID
•TVProgram_ID
•Ad_ID
•Respondent_ID
Respondent
•Respondent_ID
•Name
•Sex
•Age
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•Coupon_flag
•Value_of_coupon

Figure 4

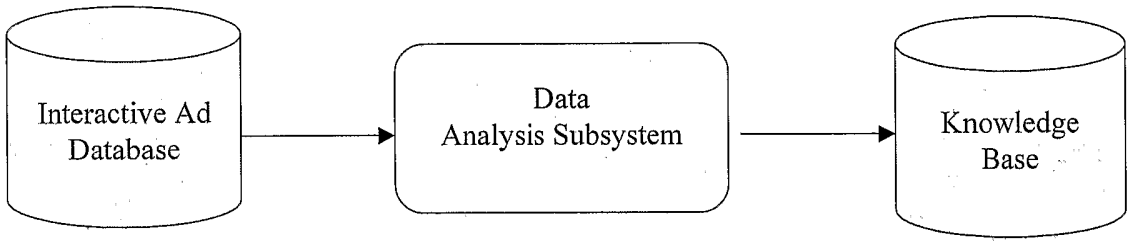

Figure 5

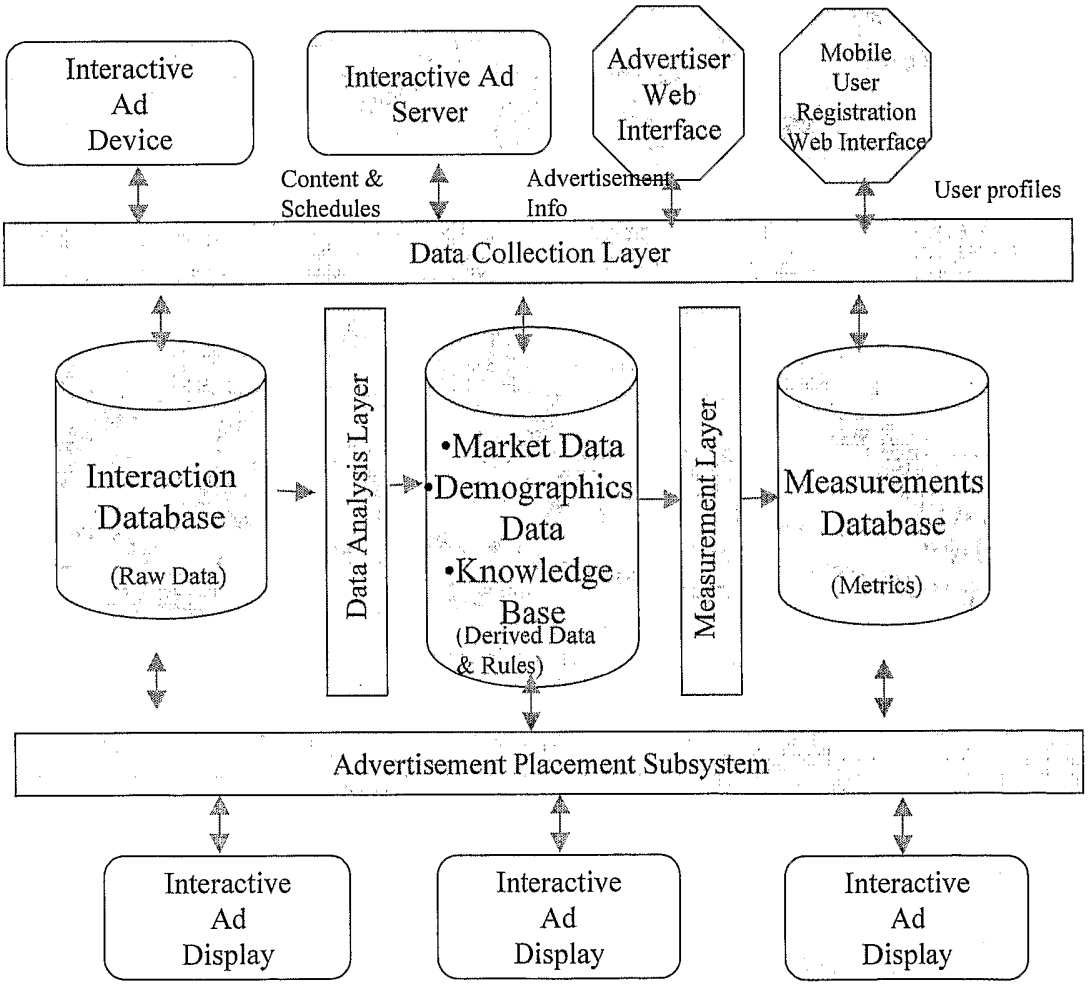

Figure 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG01/00169

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI, JAPIO: advertising, effective, demographic, mobile phone and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5510828 A (LUTTERBACH et al) 23 April 1996 Whole document	1-34
X	US 5823879 A (GOLDBERG et al) 20 October 1998 Column 21 line 36 - column 29 line 57, figures 6A-8B	1-34
X	US 5948061 A (MERRIMAN et al) 7 September 1999 Whole document	1-34

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 October 2001	24 OCT 2001
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **GREG POWELL** Telephone No : (02) 6283 2308

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG01/00169

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1035485 A (NCR INTERNATIONAL INC) 13 September 2000 Whole document	1-34
X	WO 99/54828 A (STRAIGHT UP SOFTWARE INC) 28 October 1999 Whole document	1-34
X	WO 2001/09789 A (TMP WORLDWIDE) 8 February 2001 Whole document	1-34

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SG01/00169

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	5510828	NONE					
US	5823879	AU	18330/97	CA	2243582	CN	1212634
		EP	956119	US	6183366	US	6264560
		WO	9726061				
US	5948061	NONE					
EP	1035485	JP	2000285175				
WO	99/54828	AU	36592/99	US	6006197		
WO	2001/09789	AU	62390/00				

END OF ANNEX