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A SYSTEM FOR INTERACTIVE INFORMATION DISPLAY ON A BILLBOARD

Field of the Invention

This invention relates to a system for interactive, electronic, information display and refers particularly, though not exclusively, to such a system where a user with a mobile telecommunications device can interact with the display.

Definitions

Throughout this specification a reference to an advertisement is to be considered as being a reference to an advertisement in digital form, and includes a display or information display in digital form.

Throughout this specification a reference to content is to be taken as including a reference to text, video, audio, animation and/or music pertaining to any type of displayed information, including advertisements.

Throughout this specification a reference to a billboard is to be taken as including a reference to a CRT, liquid crystal display, or other similar laptop display device, and can include a stationary billboard or a mobile billboard including a billboard mounted on or in a vehicle such as, for example, a taxi, bus or train. If a mobile billboard, users can use or interact with the billboard from within the vehicle, or from outside the vehicle.

Throughout this specification, a reference to a cell phone is to be taken as including a reference to a cellular telephone, mobile telephone, hand phone, computer, notebook computer, personal digital assistants, or any other portable or hand held, telecommunications enabled device.

Background of the Invention

Traditional forms of advertising are ubiquitous by their presence by the roadside, in cinemas and other public places. They are large, appealing and eye catching. They

have a certain presence that the high-technology variety on the web and cell phones do not possess. On the other hand, they are static, cumbersome to change and do not readily support any purchase or transaction.

Web based and cell phone based advertisements are dynamic, in that they can change according to the user, their demographics, requirements and/or behaviour. Further, the user can selectively choose or filter information from the advertisement, and even carry out electronic commerce transactions on the advertisement. However, they are restricted to the user's computer or other device. They are also not as ubiquitous as the former.

Also, traditional billboards and banners do not encourage individuals to create and display their own advertisements and messages

Consideration of the Prior Art

WO9959283: Integrated Advertisement For Wireless Communication Devices With Rich Content And direct User Response Mechanism

This relates to the distribution of electronic advertising for wireless communication devices. The specification claims to overcome the various limitations of conventional electronic advertising by providing an advertising system, method, and software product that is fully integrated into the user interface features of a wireless communication device. The invention disclosed provides for rich content advertisements that include any variety of fonts, type styles, and graphic images to be included in an advertisement on the wireless communication device. The disclosure further provides an integrated response mechanism that enables users to directly respond to an advertisement with a variety of different actions.

WO002389: Information Access With Targeted Marketing Capability

This discloses a communication architecture and service where subscribers can obtain wireless cellular access to information providers, and enables advertisers to

market advertisements to individuals fitting specific demographic profiles. The service provided by this architecture permits cellular telephone subscribers to dial into a content server that provides access to a wide variety of information not normally available to mobile subscribers. Individually targeted advertising can also be provided to receivers of broadcast information or entertainment content through this architecture.

US5724521: Method And Apparatus For Providing Electronic Advertisements To End Users In A Consumer Best-Fit Pricing Manner

The invention disclosed is a method and apparatus for providing electronic advertisements to end users in a consumer best-fit pricing manner is disclosed and which includes an index database, and a consumer scale matching process. The index database profile database provides storage space for the titles of electronic advertisements. The user profile database provides storage for a set of characteristics which correspond to individual end users ofo the apparatus. The consumer scale matching process is coupled to the content database and the user profile database, and compares the characteristics of the individual end users with a consumer scale associated with the advertisement. The apparatus then charges a fee to the advertiser, based on the comparison by the matching process.

US6002450: Two-way Remote Control With Advertising Display

The remote control disclosed includes a visual display, first wireless circuitry for receiving from a host device data in the form of selected information, eg, an advertisement, to be displayed, stored or processed, second wireless circuitry for sending information, control circuitry and software for controlling operation of the remote control, and the software including a display default routine for returning to the display the display of the selected information received by the first wireless circuitry.

US5948061: Method Of Delivery, Targeting And Measuring Advertising Over Networks

This discloses methods and apparatus for targeting the delivery of advertisements over a network such as the Internet. Statistics are compiled on the individual users and networks and the use of the advertisements is tracked to permit targeting of the advertisements of the individual users. In response to request from affiliated sites, an advertising server transmits to people accessing the page of a site an appropriate one of the advertisements based upon the profiling of the users and networks.

US5844181: Information Display System

A display system within elevator cabs or elevator waiting areas that facilitates the simultaneous display of advertising and general news information is described. Broadcast from a remote control center, advertising and general news information are transmitted to, and stored in, a display memory. It is subsequently displayed on a screen according to a remotely modifiable program schedule. The display is updated such that it contains a copy of the latest broadcast schedule, as well as the advertisement and information programming, automatically displays a day's program according to the most current broadcast schedule. The display units are each individually addressable thus allowing groups of displays to be simultaneously updated from a remote centralized location with information such as news updates and the like.

The problems with much of the prior art is that most (except US584418) disclose advertisement distribution in a wired or wireless computer network such as, for example, the Internet, cell phones and pagers. As such, they do not combine the presence and appeal of the traditional billboard with the dynamism and effectiveness of computer-based advertising. US5844181 does overcome this limitation to some extent. This uses billboards and banners to display information, but is limited to elevator waiting areas. Further, it does not allow the user to interact with the advertisement in any way, either for downloading, uploading necessary information,

uploading other advertisements, for payments to be effected, or for transactions for e-commerce.

Most also relate to the distribution, management, scheduling of the advertisement and other transactions for e-commerce. None disclose supporting user interaction for uploading their own advertisements, or for posting messages on the existing advertisement.

None of the prior art disclose advertisements supporting an ad-hoc community of interested users with their mobile devices near the site of the advertisement for exchange of information and opinions among the users.

Further prior art includes GB2326053 of Red Fig Limited which discloses a billboard being a large video display in a public place (page 1 lines 3-28, page 7 line 17 et seq). Users can interact with the video display and each other as described in page 9, line 1 et seq as "subscribers ... can use their mobile stations to control the images displayed by the display screens and receive accompanying signals. The images may comprise video presentations, advertising or informational materials, games ... or live video ... for conferencing". Conferencing is described in page 23 line 11 et seq in which the conference members can talk to each other while seeing them on the display screen, in effect, a video "chat room". The display may be segmented to display images according to the wishes of the users (page 24, line 26 et seq).

In essence it is an interactive display apparatus with an audio subsystem, a control subsystem and a plurality of video subsystems. The video subsystems have access locally to image data. The video subsystems are controlled by the control subsystem which then send command messages to the video subsystem. A person watching the display of one of the subsystems can dial into the audio subsystem and thereby control the operation of the video subsystem.

This system is most similar to the present invention in terms of interaction with the display. However, the system is not about downloading of extracting information

from the display onto the mobile device or uploading information from the mobile device onto the display. Further, it does disclose about electronic transactions.

EPO822535 of AT&T Corporation discloses an interactive multimedia advertising and electronic commerce on a hypertext network. Advertising may be targeted to individuals based upon the users' interests, ie, profile (col 11 line 30 et seq). The user may interact with a sales agent, get more product information, purchase products etc as described in col 9, line 52 et seq.

This is a system and method for providing targeted, interactive, multimedia advertisements and electronic commerce capability on a hypertext network. Advertising software from a server is loaded on a user's client computer through a browser at the user's request. The display screen of the client computer is partitioned into a browser area, which retains the full functionality of the underlying browser, and advertising area. Controls affecting the presentation and content of the advertisement streamed from the server to the client computer are available to the user in the advertising area, as are secure purchase and electronic coupon controls. The present system is different from this in that client (which could be a mobile device) is provided an interface to control, download or upload itself what is displayed on another larger display. The larger display itself could be connected to other servers.

The above disclosure is for use in a desktop setting. The present invention is used in a wireless setting to control public displays.

5724424 of Gifford discloses a system for purchasing goods or information over a computer network including uploading and downloading information regarding advertisements, product information, costs, making payment, etc (col 4 line 44 et seq). It is a complete system for the purchasing of goods or information over a computer network is presented. Merchant computers on the network maintain databases of digital advertisements that are accessed by buyer computers. In response to user inquiries, buyer computer retrieve and display digital advertisements from merchant computers. A digital advertisement can further

include a program that is interpreted by a buyer's computer. The buyer computers include a means for a user to purchase the product described by a digital advertisement. If a user has not specified a means of payment at the time of purchase, it can be requested after a purchase transaction is initiated. A network payment system performs payment order authorisation in a network with untrusted switching, transmission, and host components. Payment orders are backed by accounts in an external financial system network, and the payment system obtains account authorisations from this external network in real time. Payment orders are signed with authenticators that can be based on any combination of a secret function of the payment order parameters, a single use transaction identifier, or a specified network address.

This is specific to purchasing of goods over computer networks. This does not disclose interactive displays, for extracting or uploading information/messages, chat rooms, notice boards, games, and many other aspects of the present invention.

5133081 of Mayo discloses an electronic display that is remotely programmably via wireless telephone (col 6, lines 14-38, col 15, line 15 et seq).

As such it is a remotely controllable message broadcast system includes a Central Programming Station, and many Remote Message Transmitters and repeaters. The Central Programming Station includes a library of broadcast messages and a set of Remote Message Transmitter programming instructions. A transmitter in the Central Programming Station transmits selected broadcast messages from the library and selected Remote Message Transmitter programming instructions from the set to all the Remote Message Transmitters. These are sent over a wide area transmission network such as a licensed radio link. The transmitted instructions may include global instructions which apply to all Remote Message Transmitters, and unique (addressable) programming commands which apply to an individual one of the Remote message Transmitters.

Finally, EP0978814 of Ciesse Sistem Sri discloses a "color electronic billboard, utilizable by network, with telephone transmission ... of variable advertising and

public interest messages" (col 1, line 1 et seq). This is made of containers for led luminous billboard (p 2), each having electronic elements, that align themselves allow the composition of electronic boards (p 1) to a maximum of 16 million. It has variable dimensions according to the number of containers. It also has a special command unit, able to manage animated images, including a tridimensional images, receiving transmissions on telephonic and via satellite network in real time.

This disclosure is related to broadcasting information and advertisements to billboards over wireless or satellite broadcasts and controlling the billboards thereof. It does not disclose interaction between users' mobile devices and the billboard for information extraction or uploading, as in the present invention.

Objects of the Invention

The principal object of the present invention is to combine the advantages of the traditional information display and advertisement systems such as billboards and banners, with those of the newer systems such as web, cell phone and pager based information display and advertisement systems.

A further object is to provide a system which will have the ubiquity and appeal of billboards in public places, while including the dynamic features of the newer systems such as selective download of information, redirection to the place of interest, and remote electronic transactions for e-commerce.

Yet another object of the present invention is to encourage individuals (in addition to companies and organisations) to place their own content by interactively uploading their information into the system.

A further object is to enable a user in the vicinity of the system to form an ad-hoc network between their cell phone and the system to interactively upload content and software programs into the system. Alternatively, the user can also connect to the system using normal wired connection such as dial-up or LAN to place content.

A final object is to enable the system to support formation of a community among those who are interested in the content, so that they can chat, exchange information and opinions about the content displayed.

Summary of the Invention

With the above and other objects in mind the present invention provides a system to provide interactive on display on a billboard (as defined herein), the system including: a communication means for establishing a connection with a user, cell phone (as defined herein) of user; a user interface to enable the user to interactively upload content (as defined herein) from their cell phone and download content to their cell phone.

The communication means may be a network managers. The system preferably includes one or more of:

a content management to help users interactively upload contents from their own cell phone, schedule contents according to user preference and a contract, and manage other aspects of advertising;

an electronic display for displaying text, graphics, audio and video of the content;
a content processor that displays graphics-rich content including animation programs;

and a transaction manager to in carry out purchases of any advertised items.
This allows an individual or organization to create and upload content into the system interactively. It may be without human intervention. The system supports automated management of content including scheduling, payment and message delivery.

The system may further allow the creation of ad-hoc networks of cell phones to form a community of users who can exchange information and opinions on the content, and to play games using all or part of the billboard as the display.

Preferably the system has a wireless interface, which may form ad-hoc local area networks with a user in the vicinity possessing a cell phone, and may be able to recognise the user's needs through a user profile in their cell phone.

The Display Manager may manage the display space on the billboard to show more than one content at the same time, whereas it is the Content Manager which can choose the content to display for a desired period of time, at a desired space and area, depending on the user profile of the cell phone user. The content displayed may be based on the user profile.

The user can download content of their interest into their cell phone. The content may be provided in an interactive format, where user could browse for more information, make a transaction, or save the information for future reference.
User may be able to upload their comments, opinions or other information about the advertisement so that other users browsing for the information would be able to see them. This may include the raising of queries in relation to the advertisement, or requesting further information.

Users browsing or downloading the content can of desired, form virtual chat rooms.
A user can upload their own content and specify time duration of display of that content. there may be provided a method, and means, to authenticate the content posted by user so that the user can be held responsible for what is posted, and also to prevent content unlawful or offensive from being displayed. The user may also execute an electronic transaction, and pay the associated cost, for the purchase of the product or service.

The billboard may be linked to one or more web pages through a network, which will help to give up-to-date information of the products and services advertised on the billboard. This may include, for example, the latest price or sales information. It may also be used replace the advertisements. This provides additional convenience of remote authoring.

This may allow advertisement producers for billboards to switch to more powerful, and cheap relatively inexpensive, media authoring tools, and may also assists manufactures to collect data about buyers, and to understand their concerns and opinion about the products.

Description of the Drawings

In order that the invention may be readily understood and put into practical effect a number of embodiments and examples will now be described by way of non-limitative example only and with reference to the accompanying illustrative drawings in which:

Figure 1 illustrates the components and architecture of the system of the present invention;

Figure 2 illustrates an implementation of the present invention for cellular phone clients;

Figure 3 illustrates the initiation of a connection by the user;

Figure 4 is an illustration of an exemplified WML user interface;

Figure 5 illustrates how a user can download content;

Figure 6 illustrates how a user can post content on;

Figure 7 illustrates how a user can post comments; and

Figure 8 illustrates how a user can make a payment.

Description of Preferred Embodiments

Figure 1 and 2 show the simplest implementation of the present invention for Wireless Application Protocol (WAP) enabled cellular phones. The billboard in this embodiment acts as a WAP Gateway that forms an ad-hoc network with the cell phones in the vicinity. The billboard can also be connected to by the client by the client dialling a telephone number associated with the billboard. The billboard acting as a gateway directs encoded user requests to one of the plurality of advertisement servers from where the content originates. The gateway decodes the responses from the advertisement server and sends it to the cell phone making the request. For

example, the gateway could communicate with an origin server for advertisements for a particular brand of shoes. It would communicate in a secure way to update the user's credit card information or post some content in server, and it would send server responses back to the cell phone user.

The gateway has the Billboard Manager which may have the components for managing advertisements as described previously. These components are: Mobile Ad-hoc Network Manager, Content Manager, Transaction Manager, Display Manager, Security Manager and Community Manager.

The components of the system are:

- Mobile Ad-hoc Network Manager for setting up wireless ad-hoc networks or communities with users who are in the vicinity;
- User Interface that will help users interactively upload contents from their devices and download contents to their devices;
- Content Management Server that will schedule the display of contents according to user preference and contract, and manage other aspects of the advertising;
- Electronic Display for displaying the text, graphics, audio and video of the content;
- Content Processor that displays graphics-rich content, including animation programs; and
- Transaction Manager that helps in carrying out user payment for plcing contents or for carrying out purchases of the advertised items.

Each of these components will now be described in detail.

MOBILE AD-HOC NETWORK MANAGER

Mobile Ad-Hoc networks manager is a software module capable of talking to the underlying wireless hardware. It also acts as a broker between various subsystems and the cell phone. The minimum functionality provided by this layer is as follows.

1. Establishing Connection

It establishes connection to wireless devices in the vicinity. In a traditional way a connection can be made when a cellphone dials up to the billboard through a well known phone number. If mobile device supports Bluetooth, connection can be established without even dialling in, when the user moves to the vicinity.

2. Finding Device Capabilities

Once the connection is established, the Ad-hoc Network Manager can determine the nature of the cell phone making the connection to be able to send a cell phone profile of the device to the Content Manager. The Content Manager can later pass information to the cell phone based on its device profile and hence its capabilities.

3. Getting the User Profile

The Mobile Ad-Hoc Network Manager extracts the user profile from the cell phone of the user. This profile may exist in the cell phone: a very simple example being the user's telephone number. It updates this profile to the Content Manager. The Content Manager can request the Mobile Ad-hoc Network Manager to obtain additional profile information which may be in a remote server, over a network such as, for example, the Internet or the telephone network.

4. Delivery of Content

The Mobile Ad-hoc Network Manager handles the delivery of content to the cell phone. The Content Manager, or a remote server, can provide the content. This module handles user inputs and takes action accordingly. Usually it relays this request to the Content Manager to take suitable action.

5. Brokering Electronic Payment

The Mobile Ad-hoc Network Manager can broker electronic payment with a remote client through their cell phone. Through the Security Manager, it can establish a secure connection with both the mobile client as well as a remote

transaction server. It can transmit credit card information from the cell phone to the remote server.

6. Upload of Content

This layer acts as a broker for accepting content from mobile users via their cell phone. The uploaded content may be community messages, comments, or content posted by the user. The uploaded content may be in the form of pre-prepared templates having fields for completion by the user and/or being in a question - answer fromat.

CONTENT MANAGER

The following are the functions of the Content Manager:

1. Management of Content

The Content Manager maintains a database of the content to be displayed on the billboard as well as on the mobile client's cell phone display. The database list may include device profile, user profile and preferences. The Content Manager's main responsibility is to map the content to be displayed to the profile of the client. This can also be based on historical data so that the Content Manager can "learn" the responses of a user based upon their past interaction with the billboard.

2. Translation of Content

The content displayed in the billboard may not be in a form suitable for display on the display of cell phones. This is mainly because of the difference in sizes of the billboard and the cell phone. The content manager translates the content into a format understood by the cell phone. This may involve translation of content into WML format or any other suitable format. However, it is also possible for the content to be stored separately in a format (such as WML) understood by the cell phone.

3. Mapping of User Profile to Billboard Display

The Content Manager decides which information needs to be displayed at which time, and for how long. The decision is made based on user profile, and priority for different content based on what the content provider has paid. It also decides on the area of display for content based on the same priority rule. The display may be divided into a plurality of areas, each with a different content. The display manager does the actual display.

4. Accepting Content from Users and Indexing It

The Content Manager accepts content provided by the user via the network manager. If this is a comment for a particular content or advertisement posted earlier, it adds this against the specified content and indexes it. If it is a new content to be displayed in the billboard, it accepts the content and indexes it. After any required payment is accepted, it creates a payment profile against the content.

In addition, new content can be generated by the Content Manager using a process of querying the mobile client.

DISPLAY MANAGER

The Display Manager divides the display in time as well as space. The Display Manager receives its instructions from the Content Manager to display specific content.

The display manager provides the user interface for displaying content by the billboard or other display device, and for downloading and uploading content and related information by the user. The display may be divided into logical windows. This can help to display more than one advertisement at the same time. The display manager also uses all standard media/display software to display content.

TRANSACTION MANAGER

When the user decides to post content, the Transaction Manager receives a notification from the Mobile Ad-hoc Network Manager, wherein the Transaction Manager takes over. The following steps are used to accept content:

1. authentication of the user;

2. brokering payment and accepting payment;

3. submitting the content uploaded from a user's cell phone to a remote site to check for acceptability of the content. This is to prevent obscenities or other unwanted, or undesirable, matter from being posted;

4. obtaining the profile to which the content is relevant. This could be in a keyword index when the content is being displayed; and

5. submitting the information to content manager so that it can index and store it for display.

COMMUNITY MANAGER

The Community Manager facilitates the formation of a community to carry out a discussion on a particular content or topic of interest. The Community Manager also helps the user join an existing community. This includes:

1. Presenting Community of Interest to the User

Community Manager obtains a user's profile from the Content Manager. It checks the list of active communities at that point. It invites the user to join an existing community or allows the user to create a new community.

2. Formation of Community

The Community Manager helps in the formation of a new community. A Community can be private, just like a private chat, or a game played between

a few users over the billboard in which instance all or part of the billboard may be used for the display of the game, The formation of a public community with many users being able to chat with many others is also supported, as is the formation of a community to facilitate a public auction of goods and/or services. In the case of an auction, users can enter bids using their cell phones.

3. Managing Messages Posted to Community

The Community Manager directs a message coming from the Mobile Ad-hoc Network Manager to the right community.

4. Disbanding the community

The Community Manager disbands community when all users sign off.

The following examples describe various scenarios of user interaction with an advertisement using the system of the present invention.

Example 1: User moves to the vicinity of a billboard (Figure)

Assuming that user has configured his cell phone to receive information from the billboard, the following steps may take place:

1. the client software in the user's cell phone broadcasts its presence;

2. the Mobile Ad-hoc Network Manager in the billboard negotiates with the cell phone and establishes a connection;

3. the Mobile Ad-hoc Network Manager informs the Content Manager of the user presence;

4. the Mobile Ad-hoc Network Manager brokers and sets up a separate session between the user and Content Manager;

5. the Content Manager moves from idle mode to active mode.

6. the Content Manager talks to the to user's cell phone via the ad-hoc network and requests relevant information to understand the capabilities of the cell phone;

7. the Content Manager queries the cell phone to obtain the user profile;

8. if the user has a preference, the Display Manager displays content on the billboard matching their preference;

9. if there are multiple users, based on all the user's preference, the Display Manager may display multiple advertisements by dividing the display; and

10. the Display Manager also presents the users with various options. For example, this could be in the form of a number (eg. four) menu choices for the following user actions: upload information, download information, execute a transaction, and form a community for chat. Depending on the user's choice, the Transaction Manager may be activated to carry out the user transactions.

Example 2: User moves away from the vicinity of the Smart Billboard

Assuming that the user has configured his cell phone to receive information from the billboard, the following steps may take place:

1. the Mobile Ad-hoc Network Manger polls to see the state of the session;

2. after periodic retries, it finds that the cell phone is not responding;

3. it deletes the session; and

4. it then informs the Content Manager of the termination of the session,

5. the system removes the user from the list;

6. if there are no more users, it moves to the idle state.

Example 3: User desires to download content from the billboard (Figure 5)

1. the user clicks on relevant user interface items (menu item, button, display area, and so forth) to initiate download of the content from an area on the billboard;

2. the system gathers the information about the content of the user's interest;

3. it presents the user with options to download information at various levels of detail;

4. the user selects the level of detail they want; and

5. the system downloads the information into the user's cell phone. Alternatively, the system can send the content to the user's email, or normal mail, address.

Example 4: User desires to post comments/messages to the billboard (Figure 7)

1. the user sees a content of his interest and decides to comment on it;

2. the user composes their response on their cell phone;

3. the user selects the upload option;

4. the Mobile Ad-hoc Network Manager receives the user's response; and

5. the Content Manager appropriately indexes the response and stores it.

Example 5: User desires to post content on the billboard (Figure 6)

1. the user creates the advertisement or content they want to post in their cell phone. This may be done either online or offline;

2. the user selects the Execute Transaction option in the billboard using their cell phone;

3. the Mobile Ad-hoc Network Manager commences the transfer of data from the user's cell phone to the billboard;

4. the Advertisement Manager hands over the session to the Transaction Manager;

5. the Transaction Manager authenticates the user (through an appropriate mechanism);

6. the Transaction Manager accepts a required payment through the user's cash or credit card;

7. the Transaction Manager asks the Advertisement Manager to accept the advertisement;

8. the Content Manager queries the user for keywords for the information posted;

9. the Content Manager queries the user for other relevant information such as their preference of placement of content in the display, schedule information, and so forth; and

10. the Content Manager maps the content to an appropriate category, and decides duration of display, time of display, area of display, and the prominence to be given to the content.

Example 6: User wants to form a Community

1. the user selects a user interface option in the display to form a community;

2. the Content Manager presents the user with a list of existing communities based on their profile, and also advises of the option to form a new community;

3. if the user wants to join a community, it informs the Community Manager appropriately ;

4. if user desires to form a new community, it informs the Community Manager appropriately;

5. the Community Manager forms the new community and invites users with similar profiles to join the community.

Example 7: User wants to exit from a Community

1. if a user leaves a community, the Community Manager decrement the user count; and

2. if all users leave the community, the Community Manager closes the community.

As shown in Figure 3, billboards installed in shopping centres or other places can have telephone numbers which are preferably well known or easily remembered. For example, 1-800 or 1-900. The WAP Gateway receives a call from a user and makes the connection with the user. The Wireless Session Layer of the WAP protocol stack helps to maintain the session with the user. Alternately, the Ad-hoc Network Manager could form an ad-hoc network with cell phones that have a facility for an ad-hoc network. The third generation cell phones fitted with Bluetooth technology are stated as having the capacity for ad-hoc networking.

Although the present invention supports ad-hoc network formation among all users connected to the same billboard, this embodiment describes only a connection between a WAP user and the billboard.

The user interface is conceptually illustrated in Figure 4. Once the connection is established, the WAP Gateway looks for the user profile before it presents the user with options.

The user profile could be obtained in many ways. It could be obtained from the User Profile Database where existing users have already signed up, from the SIM card in their cell phone, or it could also be obtained from user's previous usage of the billboard. In other cases, the WAP Gateway can allow the user to select whatever information they want to display on the billboard. The Billboard Manager presents the user interface to be displayed at the user's cell phone for further interaction. In this particular form, the client interface will be generated based on WML.

The Billboard Manager interprets the user preference or profile information and displays the contents matching the user preference. If there are several possible contents which could possibly match the stated preference of the user preference, the Billboard Manager divides the display in space, or time, or both. The amount of space or time a particular element of content may be allocated for display will depend on the internal priority set for each element of the content. This internal

priority again may depend on how much the content providers have paid to display their content.

If there are multiple WAP clients connected, the Billboard Manager may assign priority to a particular user based on their profile. One such criteria may be their purchasing power (which may be stored in a secure server, and preferably not in the billboard), provided such information is available.

Whenever a particular advertisement or content in general is displayed on the billboard, various options like download, comment, forward information, contact information, and so forth, are provided to the client in the form of a simple menu for display on their cell phone. This menu arrangement could be based on the WML card interface specifically developed for WAP. The user's may pause certain information to be displayed, fast forward to the next information, go back to the previous information, and so forth.

This dynamic user interface is created in the client using WML, WML script. The WAP Server generates this. The option generated is based on user preference as well as the content which is being displayed at that point of time.

Information could be made available to a user in various ways. This may be based on user choice. Simple information like telephone numbers and contact addresses can be made available in a phone book friendly format which can be downloaded into the cell phone.

Alternately, the user may want the information forwarded by email to their email address. The WAP Gateway will connect to the relevant Origin Server or a Catalogue Server (where the phone numbers or addresses are catalogued) to forward such a request. This is useful when the user may want to handle media-rich information, which may not be easy to download into a cell phone.

Alternately, the user may want to leave his contact information and time to make contact, if they are interested. The WAP Gateway again handles such a request and

updates the relevant Origin Server or Catalogue Server. The Origin Server or Catalogue Server may generate a paging or email message to the user as per the user specifications. The server at the same may also inform the owner of the Origin Server of such a request for follow-up action. Further alternatives include having information forwarded by mail, appointments for interviews being made, and so forth.

Posting information to be displayed is one option which the present invention provides when a user connects to it. This is illustrated in Figure 6. The WAP Gateway forwards such request to the Smart Billboard Manager internally. The Billboard Manager decides the space and time allocated to the users based on the payment model. The Smart Billboard Manager may also submit this to the Origin Server so that the posted message can be monitored. This helps to view the content to prevent any unwanted, illegal or obscene material being posted.

The WAP client can also specify the URL from where the content can be obtained up.

To now refer to Figure 7, comments, responses and opinions can also be posted for a particular message, information or advertisement previously posted on the billboard. To make sure that these messages are not obscene and are not unduly harmful in particular, the messages can be monitored at the Origin Server, where they are stored before forwarding them for viewing by other users.

To now refer to Figure 8, the WAP protocol stack has a WAP Security Layer to handle content in a secure manner. When a user wants to make a payment, the Billboard Manager initiates a secure communication with the cell phone user. Credit card information is authenticated by the WAP Gateway by connecting to a predefined Secure Payment Server. The whole transaction of payment may be handled by the Secure Payment Server.

Users browsing the billboard at the same point of time can form a community for exchanging information, ideas and opinions, or even the playing of games, which

may be wholly or partially displayed on the billboard. These games may include trial versions of games as a form of promotion to encourage users to purchase the complete game package. The Billboard Manager can facilitate in the formation of the community based on the user's profile and interests. The server receives message from each WAP client and updates other users in the same community through WML, or any other form of short message service.

The Billboard Manager will normally ask the WAP Gateway to send a message to individual users inviting them to join a particular community of their interest. This invitation is sent in the form of a WML message. The WML interface could be a menu item of the different communities presently in existence at the particular billboard. The users can join the community of their choice, and take part in the forum, conversation, or any other activity being carried out in the community. When a user opts to join the community, the WAP Gateway forwards this request to the Billboard Manager. The Billboard Manager registers the user for the particular community and maintains a list of members of the community.

The system of the present invention provides a billboard an other display device which has the presence, ubiquity, size and appeal of a conventional billboard and banner type of information display and advertisement; is as dynamic as the computer/network based advertisements; is able to download selected information such as company information; is able to do user end filtering based on his preferences; and is able to do payment and transaction for E-commerce via the advertisement; provides a mechanism for an individual to form a wireless network with the system to interactively upload his own content using their notebook, palmtop, PDA, cell-phone, or any other mobile device. Users can input information such as the schedule of their content, their preferences, and make payments, and carry out other transactions. They can also answer queries sent by others regarding their content. In addition, the system supports dial-up or LAN connection to the system for uploading the above information; interested people can form an ad-hoc network with the system to post queries, send messages and write opinions about the product or service advertised; and

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supports the formation of a community of devices of the interested people (using Mobile Ad-hoc Network Technology or Bluetooth or any other wireless infrastructure) to exchange information or opinions pertaining to the content.

Whilst there has been described in the foregoing description several forms and examples of the present invention, it will be understood by those skilled in the technology that many mind variations in details of design and operation may be made without departing from the present invention.

Claims

1. A system to provide interactive display on a billboard , the system including a communication means for establishing a connection with a cell phone of a user; and a user interface to enable the user to interactively upload content from their cell phone and download content to the cell phone.

2. A system as claimed in claim 1, wherein the content includes one or more of the group consisting of text, video, audio, animation, music, displayed information, and advertisement.

3. A system as claimed in claim 1, wherein the billboard is one or more of the group consisting of a CRT, liquid crystal display, laptop display device, a stationary billboard, a mobile billboard, a billboard mounted on a vehicle, and a billboard mounted in a vehicle.

4. A system as claimed in claim 3, wherein the vehicle is a taxi, bus or train.

5. A system as claimed in claim 1, wherein the cell phone is one or more of the group consisting of a cellular telephone, mobile telephone, hand phone, computer, notebook computer, and personal digital assistant.

6. A system as claimed in claim 2, wherein the advertisement is one or more of the group consisting of an advertisement in digital form, a display in digital form, and an information display in digital form.

7. A system as claimed in claim 1, wherein the communication means is a network manager.

8. A system as claimed in claim 1, including a content manager to enable the user to interactively upload content from their cell phone, schedule contents according to user preference and a contract.

9. A system as claimed in claim 1, including an electronic display for displaying text, graphics, audio and video of the content on the billboard.

10. A system as claimed in claim 1, including a content processor that displays graphic-rich content including animation programs.

11. A system as claimed in claim 1, including a transaction manager that enables the user to execute purchases of any advertised items.

12. A system as claimed in claim 8, wherein the communication means is able to determine the nature of the cell phone and its capabilities, and to obtain a user profile, for forwarding to the content manager.

13. A system as claimed in claim 7, wherein the network manager is responsible for one or more in the group consisting of: the downloading of content to the cell phone, brokering electronic payment, transmission of credit card information of the user to a remote server, and accepting content from the user via the cell phone.

14. A system as claimed in claim 8, wherein the content manager is responsible for one or more in the group consisting of: mapping the content to be displayed to a user profile, translating the content into a format understood by the cell phone, and generating new content.

15. A system as claimed in claim 11, wherein the transaction manager is responsible for one or more in the group consisting of: authentication of the user, brokering payments, accepting payments, submitting content uploaded from the user's cell phone for acceptability, obtaining a user profile relevant for the content, and submitting information obtained to a content manager.

16. A system as claimed in claim 1, further including a community manager for enabling the formation of a community.

17. A system as claimed in claim 7, further including a community manager for enabling the formation of a community.

18. A system as claimed in claim 16, wherein the community manager is responsible for one or more of the group consisting of: joining the user into an existing community with no users, creating a new community for the user, disbanding an empty community, obtaining a user profile from a content manager, and directing any messages from a network manager to the community intended to receive that message.

19. A system as claimed in claim 1, including a content manager to enable the user to interactively upload content from their cell phone, schedule contents according to user preference and a contract, and an electronic display for displaying text, graphics, audio and video of the content on the billboard.

20. A system as claimed in claim 1, including a content processor that displays graphic-rich content including animation programs, and a transaction manager that enables the user to execute purchases of any advertised items.

21. A system as claimed in claim 20, wherein the communication means is able to determine the nature of the cell phone and its capabilities, and to obtain a user profile, for forwarding to the content manager

22. A system as claimed in claim 19, wherein the communication means is responsible for one or more in the group consisting of: the downloading of content to the cell phone, brokering electronic payment, transmission of credit card information of the user to a remote server, and accepting content from the user via the cell phone.

23. A system as claimed in claim 21, wherein the content manager is responsible for one or more in the group consisting of: mapping the content to be displayed to a user profile, translating the content into a format understood by the cell phone, and generating new content.

24. A system as claimed in claim 20, wherein the transaction manager is responsible for one or more in the group consisting of: authentication of the user, brokering payments, accepting payments, submitting content uploaded from the user's cell phone for acceptability, obtaining a user profile relevant for the content, and submitting information obtained to a content manager.

25. A system as claimed in claim 19, further including a community manager for enabling the formation of a community, the community manager being responsible for one or more of the group consisting of: joining the user into an existing community with no users, creating a new community for the user, disbanding an empty community, obtaining a user profile from a content manager, and directing any messages from a network manager to the community intended to receive that message.

26. A system as claimed in claim 1, including a content manager to enable the user to interactively upload content from their cell phone, schedule contents according to user preference and a contract, and a content processor that displays graphic-rich content including animation programs.

27. A system as claimed in claim 1, including an electronic display for displaying text, graphics, audio and video of the content on the billboard, and a transaction manager that enables the user to execute purchases of any advertised items.

28. A system as claimed in claim 26, wherein the communication means is able to determine the nature of the cell phone and its capabilities, and to obtain a user profile, for forwarding to the content manager; and the network manager is responsible for one or more in the group consisting of: the downloading of content to the cell phone, brokering electronic payment, transmission of credit card information of the user to a remote server, and accepting content from the user via the cell phone.

29. A system as claimed in claim 26, further including a community manager for enabling the formation of a community, the community manager being responsible for one or more of the group consisting of: joining the user into an existing community with no users, creating a new community for the user, disbanding an empty community, obtaining a user profile from a content manager, and directing any messages from a network manager to the community intended to receive that message.

30. A system as claimed in claims 1, including a content manager to enable the user to interactively upload content from their cell phone, schedule contents according to user preference and a contract; and a transaction manager that enables the user to execute purchases of any advertised items.

31. A system as claimed in claim 1, including an electronic display for displaying text, graphics, audio and video of the content on the billboard, and a content processor that displays graphic-rich content including animation programs.

32. A system as claimed in claim 30, further including a community manager for enabling the formation of a community, the community manager being responsible for one or more of the group consisting of: joining the user into an existing community with no users, creating a new community for the user, disbanding an empty community, obtaining a user profile from a content manager, and directing any messages from a network manager to the community intended to receive that message.

33. A method of displaying an advertisement on a billboard to enable interactively by a user using a cell phone of the user, the method including the steps of:

a) displaying the advertisement;

b) establishing a connection with the cell phone;

c) obtaining the nature of the cell phone and its capabilities from the cell phone;

d) obtaining a user profile from the cell phone; and

e) enabling the user to interact with the advertisement by one or more of the list consisting of: uploading content to the billboard, and downloading content from the billboard.

34. A method as claimed in claim 33, wherein the content includes one or more of the group consisting of text, video, audio, animation, music, displayed information, and advertisement.

35. A method as claimed in claim 33, wherein the billboard is one or more of the group consisting of a CRT, liquid crystal display, laptop display device, a stationary billboard, a mobile billboard, a billboard mounted on a vehicle and a billboard mounted in a vehicle.

36. A method as claimed in claim 35, wherein the vehicle is a taxi, bus or train.

37. A method as claimed in claim 33, wherein the cell phone is one or more of the group consisting of a cellular telephone, mobile telephone, hand phone, computer, notebook computer, and personal digital assistant.

38. A method as claimed in claim 33, wherein the advertisement is one or more of the group consisting of an advertisement in digital form, a display in digital form, and an information display in digital form.

39. The method of claim 33, wherein the user can specify display criteria when uploading content to the billboard.

40. The method of claim 39, wherein the display criteria includes the duration of display, the area of display, the number of display, the time of day of display, and the day of the week for the display.

41. A method as claimed in claim 33, wherein the download to the cell phone is first translated into a format acceptable to the cell phone

42. A method as claimed in claim 33, wherein the advertisement is of a content determined by obtaining user profiles of all users connected, and determining from the user profiles the most appropriate content.

43. A method as claimed in claim 33, wherein an upload from the cell phone of the user is first checked for acceptability of its content.

44. A method as claimed in claim 33, wherein there is included the step of obtaining a user profile from the cell phone of the user.

45. A method as claimed in claim 44, wherein the advertisement has a content, the content being mapped to the user profile prior to being displayed.

46. A method as claimed in claim 33, wherein a plurality of advertisements are displayed at the same time, each in a different region of the billboard.

47. A method as claimed in claim 38, wherein the advertisement is in the form of a game to be played by the user using the billboard for the game display.

48. A method as claimed in claim 33, wherein the content uploaded to the billboard is a comment from the user on the advertisement being displayed.

49. A method as claimed in claim 33, wherein the content uploaded to the billboard is a user's advertisement for display.

50. A method as claimed in claim 49, wherein prior to displaying the user's advertisement its content is checked for acceptability.

51. A method as claimed in claim 50, wherein the user is required to pay for the display of their advertisement prior to its being displayed, and upon the payment being made a payment profile is created against the user's advertisement content.

52. The method as claimed in claim 51, wherein prior to accepting the user's advertisement and the user's payment, the step of authenticating the user is performed.

53. The method as claimed in claim 33, wherein a community manager invites the user to join a community of other users.

54. The method as claimed in claim 33, where a community manager invites the user to form a community of at least one user.

55. The method as claimed in claim 54, wherein the at least one user is selected from the group consisting of: the user, and a plurality of users.

56. The method as claimed in claim 33, wherein the uploaded content uses prepared templates, the prepared templates have fields for completion by the user.

57. The method of claim 56, wherein the prepared templates use a question and answer format.

58. The method of claim 33, wherein the user can specify display criteria when uploading content to the billboard, the display criteria including the duration of display, the area of display, the number of display, the time of day of display, and the day of the week for the display.

59. A method as claimed in claim 33, wherein the advertisement is of a content determined by obtaining user profiles of all users connected, and determining from the user profiles the most appropriate content, a plurality of advertisements being displayed at the same time, each in a different region of the billboard.

60. A method as claimed in claim 33, wherein the download to the cell phone is first translated into a format acceptable to the cell phone, and an upload from the cell phone of the user is first checked for acceptability of its content.

61. A method as claimed of claim 33, wherein the advertisement is of a content determined by obtaining user profiles of all users connected, and determining from the user profiles the most appropriate content, a plurality of advertisements being displayed at the same time, each in a different region of the billboard.

62. A method as claimed in claim 33, wherein the content uploaded to the billboard is a comment from the user on the advertisement for displayed, but prior to displaying the user's advertisement its content is checked for acceptability; the user being required to pay for the display of their advertisement prior to its being displayed, and upon the payment being made a payment profile is created against the user's advertisement content, and prior to accepting the user's advertisement and the user's payment, the step of authenticating the user is performed.

63. The method as claimed in claim 62, wherein the uploaded content uses prepared templates, the prepared templates having fields for completion by the user.

64. The method of claim 33, wherein the user can specify criteria when uploading content to the billboard, the upload from the cell phone of the user being first checked for acceptability of its content.

65. The method of claim 64, wherein the display criteria includes the duration of display, the area of display, the number of display, the time of day of display, and the day of the week for the display.

66. The method as claimed in claim 53, wherein the advertisement is in the form of an auction of goods and/or services.

67. The method as claimed in claim 66, wherein the user can enter at least one bid using their cell phone.

The method as claimed in claim 35, wherein the user can interact with the mobile billboard when the user is external of the vehicle.

68. The method as claimed in claim 35, wherein the mobile billboard is mounted within the vehicle, and the user can interact with the mobile billboard when the user is within the vehicle.