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Dynamic, Localised and Personalised Marketing Model

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***Abstract*– Advertising media is the most powerful means of communication which creates different marketing interests among people (customers). Over the years, TV, radio, newspapers, magazines and road side hoardings has always broadcasted and communicated advertisements to customers. With the advancement of technology, internet, smart phones and PDA's advertisements are modulated in an interactive mode. So, designing a personalized advertising scheme becomes the need of an advertiser. Many researchers have proposed various solutions for providing location based advertisements to users, out of which some have also been implemented in real life scenarios. In our paper we propose a unique marketing scheme in which the advertisements are generated dynamically in a personalized manner according to the current location and requirement of the consumer. The user will have flexibility for customizing the type of service to request. The result of this paper will produce a new business model, which can help the advertisers to settle with a benchmark for the utilization of marketing resources in a proper way.**

***Index Terms*– Context Aware Services, Global Positioning System, Mobile Computing and Web Services**

I. INTRODUCTION

INFORMATION is the determinant in everyday life. So, accessing correct information resources is the key to one's life and of course towards success of a commercial business. With the technological development during the past decade, we possess powerful handheld devices which has capabilities like that of a PC. These advances have triggered people not only to access right information but also getting them when and where they require. Information or any entertainment service which can be accessed with the help of any mobile devices through a mobile network and also the information is provided in complaint with the current geographical location of the user can be termed as Location Based Service. Services include finding location of a user, real-time traffic information, digital Map services, information of nearest market places and of course emergency services like information of nearest hospitals, police stations and ATM counters etc. Selection and reformation of these kinds of services for providing anywhere and anytime community services to users has been a field of high interest for researchers.

Location Based advertisements can be delivered through many ways like pushing leaflets to visiting people, providing large hoardings on road-side etc. With the advancement of powerful mobile devices, many inbuilt technologies in it can be utilized for delivering the same. This field has been explored by many researchers all over world, to provide optimized solutions for delivery of location based services. Some, of these works include finding location based on a connected Wi-Fi network, based on collection of inter-related systems or even using Global Positional System.

II. LITERATURE SURVEY

Location based services are developing rapidly with the advent of small portable handheld devices. Researchers are working on this, to make them more personalized and more effective. Many proposals have been suggested and out of them many are being implemented as working system. Brief discussions on them is done, which includes effectiveness of them as well limitations and problems, which are required for better understanding of this work.

People visiting a new location always need information for that place. Even a local resident may need to query for relevant information at his location. So, using services based upon user's location is the demand of this era. One way of gathering information on an area is from asking local residents. This has been the ultimate solution for many decades, and had always been a reliable option in distress.

With the advent of new technologies, we are not willing to ask people for information, instead take help from internet. Selecting this option is not only that internet is the catch word these days, instead it has every contents available. We can search anything in internet, starting from emergency services to private services.

The Internet is the repository of all sorts of data. Still, one can never leave the option of asking local residents for information.

This is evaluated by [1], which states a system for social navigation in which a user is provided with bunch of SMS to his mobile about the details of information required for navigation. The system also states to place a phone call to any

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registered resident of the urban area, on failure of providing any information on requested service. It uses the mobile network provider to identify user location. This system forcibly place a call to a registered local resident, this gives confidence to the user on reliability of the resource. Thus, [1] looks after some basic demands of roaming users.

Problems with this option of asking people for information is that, the resident may not be willing to respond to the request. The user may feel shy of talking to an unknown for suggestion. Even if the information is gathered, still reliability of the data is uncertain. This doesn't make the system trust worthy by many users. So, this system proposes a system which would store information for delivering, and if it fails to provide such, then a call may be placed to local resident on request.

A general study on location based service finds that the working system needs to store location specific information. Firstly, location specific information and secondly, gathering the resources are the main difficulties usually faced.

CityFlocks [1] provides a good solution by forming a focus group of workers. Their task is to survey the market and gather information of advertisers. This work needs tremendous effort and also takes lot of time for gathering and also updating the stored information. Though, this facilitates storage of precisely location specific information. Also in this strategy the services delivered are always reliable for the recipients.

Generally, providing the optimized best solution is always the goal for any system [1]. meets this by using Iterative design strategy following a contextual design approach [1], [5]. Record is kept for each selection of service by a user, which makes indexes to each service. So, advertiser with maximum index can be provided to a new user at the top of list, as the best possible advertiser. This is the contextual design approach in providing optimized results [5]. The focus group makes a set of test scenarios and provides them to roaming users, results of which are also utilized in providing the best solution to any query submitted by user. Google Maps plays an indispensable role in the web-based mapping world. Hundreds of Google-map-based web applications can be easily accessed via any web browsers with an Internet connection [6]. The focus group can also be provided with a task of adding comments to specific locations from Google map. So, when user searches using a tag name, then the system may search the Google map location saved tags by focus group and depending upon that the results are delivered. This is a unique technique as it takes help of Google map, as it is the ultimate solution for any map based application [1]. makes the persons who add tags to Google map as the local residents who can be called whenever the user request for. Since, the persons who are storing details of a particular location in Google map, hence we can assume that he has lot of information on that area.

Other than placing calls, if the proposed system [1], [2], is able to deliver results from the system database itself then selecting a suitable delivering mode is mandatory. Short Message Service is an alternative for delivering Location Based Services [7]. This work [2] has selected SMS as the mode for delivering contexts. For any requested service, the results are fetched from database and one by one are sent to user mobile as short messages. Short messages have lots of limitations [9].

Another research work [3] proposes a system in which client users are connected to the server via a working Wi-Fi connection. User within the applicable domain of Wi-Fi requests for a service from his mobile phone. Server receives the request along with the mobile number from which the request is sent. Server has an inbuilt mapping table known as Location Identifier (LI), which receives a phone number and maps that number with its location of origin. This location becomes the current location of the user. This system removes use of network provider for location searching. Wi-Fi has limitations on operating frequency, power supply and access capability of Wi-Fi network is 1000 feet outdoors [8]. Hence, for covering a large area of service, the administrator needs to place many access points which rises cost of the implementation. Still this system can be implemented if we can replace the Wi-Fi technology with basic Internet technology.

Looking ahead from the stated systems, here we propose a unique idea of developing a commercial business which would involve an automated server providing services to users when and where they require. We state a Location Based Marketing Strategy which has the potential to provide an easy interface for delivering services to consumers, as well gives freedom to the administrator from gathering all Marketing Information of a particular location.

Even our work guarantees that the advertisements are not delivered forcibly to user mobile phone i.e. spamming. All content delivered is completely based upon permissions from the targeted content receivers.

In rest of the paper we would be discussing about the methodology of our proposed system, how our work will respond to a significant enhancement of previous works mentioned earlier. Next few sections will also state some test results performed over practical data.

III. METHODOLOGY

The marketing strategy of our proposed system is such that the various community service providing bodies in an area, like Hospitals, Police Station, Ticket (Bus/Air) reservation counters, ATM counters and even Shops, Cinema halls, Malls, Multiplexes etc. will provide related information to our system for feeding their advertisements to all consumers anywhere and anytime required. Consumers from his mobile phone may request for any service enlisted by our application. List of advertisers including details of them are displayed in the mobile phone personalized for the user.

We have divided next parts into few sections, each with brief descriptions of our system. Section I holds the basic architecture of our proposed system. Section II briefs the working of proposed architecture. Section III shows the entire work flow of our system.

A. Basic Architecture

Fig. 1 represents the basic architecture of our system. It shows three external entities, Administrator, Advertiser and the Consumer. Location Based Marketing (LBM) is the

system which interacts with the above mentioned entities. We divided our service in six different processes like Register (1), Login (2), Update (3), Application Initiation (4), Select Service (5) and Response (6). Each of these processes is represented by circles. Rectangles are used for external entities. Arrow heads shows the flow of data in and out of the Location Based Marketing System and also in between different processes.

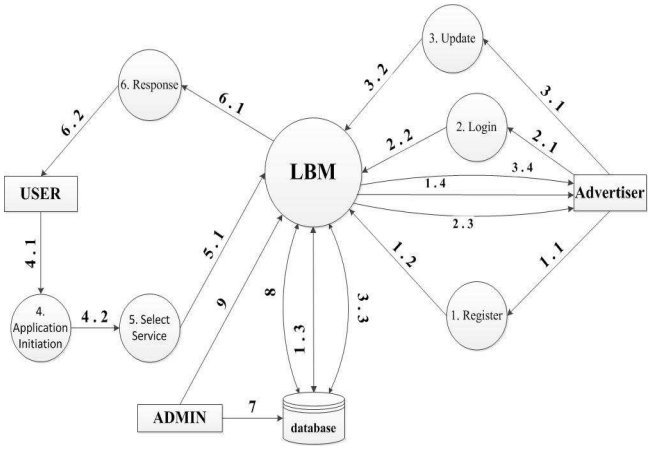

Fig. 1: Proposed System Architecture

The given Table 1 shows functions of each tasks depicted in the Fig. 1.

Table 1: List of tasks performed

Name	Task performed
1.1	Advertiser registers himself to our service
1.2	Advertiser submits the form provided for registration
1.3	New advertiser is added to our database
1.4	Notification for successful registration is delivered
2.1	Registered advertiser for updating logs in to the system using Email ID and Password
2.2	System goes through a verification process
2.3	Advertiser is notified for successful verification
3.1	Advertiser provides its new details in the updating form
3.2	Submits the form
3.3	New data for the service provider is updated to our database
3.4	Notification is provided to the advertiser on successful updation
4.1	User downloads the application software in an Android Mobile phone
4.2	On launching the application, LIST view of all services are displayed
5.1	The service selected and the location of user are sent to the web server for further processing
6.1	Our system on successful retrieval of location based services provides the result
6.2	The results are delivered to the Android Mobile phone in a LIST view mode
7	Administrator has maintains the database
8	Administrator also supervises the web server, including the web pages being presented and the type requests received from user
9	Every query is processed from the database maintained by the administrators

B. Working of the System

This section contains entire details of each process mentioned in Fig. 1.

Process - 1 of Fig. 1 represents the registration process. This registration process is for the Advertisers who are willing to use our service for reaching targeted consumers. Our system registers every new advertiser. The advertisers provide their personal details and detail of marketing information. Personal details contain information which would help consumers to contact the advertisers when required. Mostly this personal details section is needed for the system to identify the location of the Advertiser, which in turn is necessary for providing Location Based Services.

Process - 2 of Fig. 1 represents the Login process. This process is needed for identifying a registered advertiser for updating its marketing details. This login process requires an Email Id and Password as the Login criterion provided at the time of registration. Advertisers need to update their information on a monthly basis for their marketing policies, so this Login process for each of them is needed for the smooth working of our system.

Process - 3 of Fig. 1 represents the Update Information process of a registered Advertiser. Marketing information like stock availability, available outlets or branches, direction from any local landmark etc. are taken as input while registration. As advertisers need to update their marketing details like discounts every month, we have provided this facility in our system. Thus any registered advertiser will have the flexibility of updating their marketing information, to be delivered depending upon their own policies.

Process - 4 of Fig. 1 represents the Application initiation process, which is directed towards the end users i.e. the consumers of our service. Users need to launch our application in their mobile device and request for any service listed in the application. Our application states to provide list of available services depending upon the location from which the application has been launched.

Process - 5 of Fig. 1 shows the process by which consumer's selected service request is retrieved from our data store. Whenever user selects any service, our application sends the selected service to the working server.

Process - 6 of Fig. 1 shows the process of responding to the consumer with the retrieved results. The retrieved result from our data store enlists the names of advertisers. Our system allows consumer to select any name from list and view the detail advertiser information. Full details like stock availability, available outlets or branches, direction from any local landmark, current discounts, pictures and even any video if available.

C. Work flow within the System

Working of our system can be demonstrated with the help of the basic block diagrams for consumer part Fig. 2 and advertiser part Fig. 3.

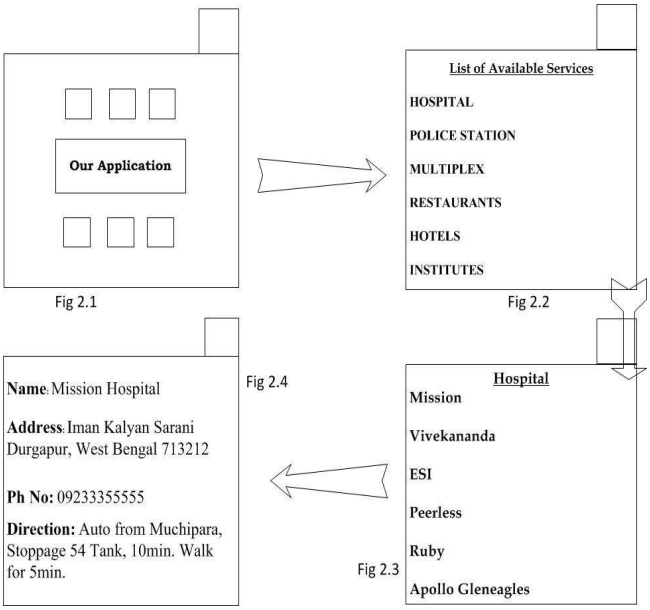

Fig. 2: Block Diagram for consumer part

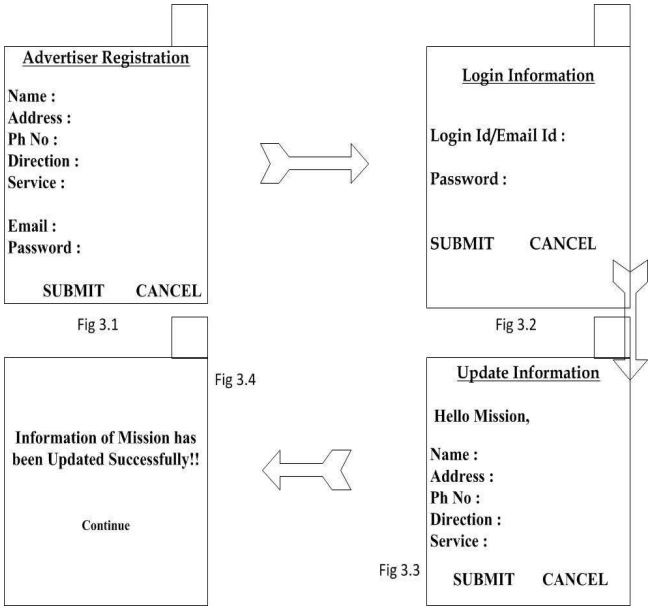

Fig. 3: Block Diagram for advertiser part

Working of our system is divided in two modules, one for the consumer and other for the advertisers. Fig. 2 shows how a consumer of our service interacts with the system. Fig. 2.1 shows the visibility of our service among other mobile applications installed on user's mobile phone. Consumer launches this personalized application when and whenever required. Fig. 2.2 shows the first window displayed on launching our application. It lists the name of services available from data store on basis of the location from which the application is launched. This list of services varies depending upon location of user and data stored by our advertisers in our data store. On selecting a service our application displays list of name of advertisers for that location, as shown in Fig. 2.3. Consumer interested in detail information of an Advertiser may select its name, as shown in Fig. 2.4, this displays every information stored by the Advertiser including detail address, direction, current offers, pictures and even video advertisements if possible.

Advertisers are provided with a very decent interface for updating their details in to our system. Fig. 3.1 shows the first page of Advertisement, in which they are asked to fill up a registration form, containing details of their services, including direction and address. Every Advertiser here is identified by a unique Email Id and Password. This information is used by Advertisers, to Log In to the system Fig. 3.2. Their advertising details are always needed to be updated, so our system provides an Update Information page for updating details after Logging in Fig. 3.3.

IV. RESULTS

The entire system is being implemented according to the above methodology. We have divided our system in two major part, user and advertiser. We tested this system on Android platform for user part and created a web site which the advertiser would be accessing.

Our testing platform specifications are as follows:

Hardware Specification:

Processor: Intel Core i3 @2.53GHz
RAM: 4GB
HDD: 500GB
System Type: 32bit Operating System
Operating System: Windows 7

Software Specification:

API: Eclipse Helios
SDK: Android SDK
Version: Android 2.2
Version Name: Froyo
API Level: 8

Mobile Phone: Samsung Galaxy Tab S2

Web Browser: Internet Explorer 9

Database: Oracle 11g

Application Server: Apache Tomcat 7

For implementing our work, we needed to assume, few locations over which we will be testing our service, list of services which will be initially available for selection, list of advertiser names acting as content providers in those selected locations offering any service from the specified list and lastly, a mobile phone with capability of running our application for test purpose.

We have selected five real life locations, with exact latitude and longitude indentifying each. The locations are Garia, Jadavpur, Ballygunge, Durgapur and Asansol all belonging to state West Bengal. Later we will provide results after testing our application in these locations.

We have chosen 15 different services which will be available in our application for the user to select. These 15 services include emergency services like Hospital, Police

Station, Clinics, Fire Brigade etc. and other private services like School, College, Retail Market etc.

List of advertiser names, their advertising details and location are collected and used. We have selected advertisers in such a way that for every service (total 15 services) in every location (total 5 locations) we have at least one advertiser to test our application. To test our mobile application, we have assumed an Android Operating System based mobile phone with inbuilt GPS receiver. This selection is purely on basis of testing, and we can customize our application for practical implementation in any available Mobile phone Operating Systems like Symbian OS (Nokia mobile phones), Bada OS (Samsung mobile phones) Windows 7.5 Mango OS (Nokia or Samsung Windows Mobile) etc.

Working of the user part is performed using an Android emulator of version-2.2 (Froyo), and it is tested over Samsung Galaxy Tab S2 smart phone, as shown in Fig 4**.** The mobile application is installed in the phone, along with other menu items. Here the mobile application is shown using a red circle, along with other inbuilt applications.

This is the first option shown when a user launches our application from the menu items. This displays name of all services available irrespective of current GPS location.

This list of items is the registered services by advertisers for different areas. This list is touch pad scrollable, giving user a very easy and classy interface to deal with the problem.

As shown here with red mark, we tested this application by selecting the service "CLINIC" for location 22.46 and 88.38 GPS location. This GPS location is for GARIA within Kolkata, West Bengal.

This describes the results of query submitted by the user. From Fig. 5, when user had selected a service, the request is sent to web server for processing. This request with the service name is received by web server and queried the database for the results. Results contain details of every registered advertiser. Since, details of each advertiser would contain lots of data, so it will be difficult for showing all of them in the same mobile screen. So, we provided the list of only the names of service providers. Like in this case, we have selected "CLINIC" with GPS data 22.42 and 88.38. First, all service provider names with service as CLINIC is fetched and then the results are filtered with the GPS data.

Thus Fig. 6 shows the list of CLINICS in the area 22.42 and 88.38 i.e., the location "GARIA" as per our database.
Fig. 6 also shows that we had selected CLINIC-2 to view its details, which is shown in next Fig. 7.

This is the ultimate page of our application. It shows details of that advertiser whose name is selected by user from Fig. 6. Hence, the user is provided with full details of only that advertiser whose names were selected from last menu list. The user is always having the option to go back to Fig. 6 and select any other advertiser name and view its details.
Here the details of CLINIC – 2 is being shown as in last picture we have chosen CLINIC-2 for details. And, since 22.42 and 88.38 is the GPS location for area GARIA, hence the details of CLINIC-2 also shows that it is in location – GARIA, mentioned with red circle.

Fig. 4: Samsung Galaxy Tab S2

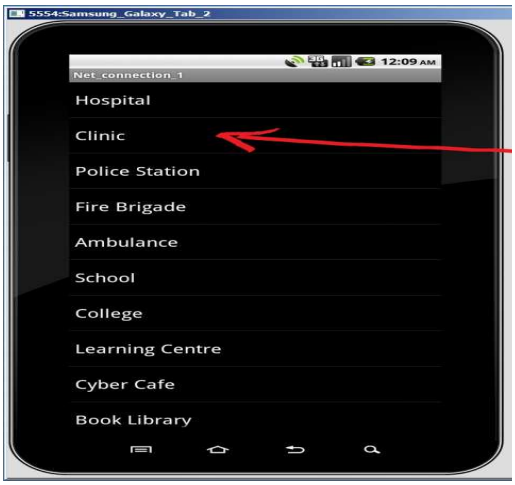

Fig. 5: Request to web server

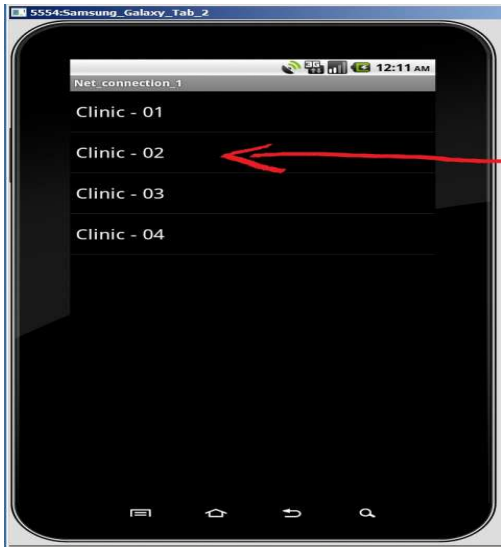

Fig. 6: List of CLINICS in the selected area

Fig. 7: Detail overview

V. DISCUSSION

As mentioned before, many researchers have worked on providing unique solution to Location Based context providing. Many [1], [3] dealt with such a system in which the working server needed to be updated with necessary information manually, before accepting query from consumers. Our system doesn't rely upon professionals to provide field study for gathering information. Advertisers would force their information to the system, to avail this unique marketing strategy for a very nominal rate. System would always be up to date with currents details of every Advertiser. In our proposed system, if no data is available to be displayed, then nearest location details are supplied forcibly, instead of calling local resident as is the case for a few methodologies [1]. Building a server which can diagnose location based upon mobile number of user [2] is not at all possible in India, due to changed transmission rights recently. So, our system removes finding location from the task of server, instead fetches location of user from the client's mobile itself. Whenever consumer launches our application, the GPS enabled platform of mobile phone fetches the Location (Latitude and Longitude), which in turn is used to categorically select advertisers according to its locality. In [3] the web server needs to be placed after every 1000ft of an area, since the users are connected via weak Wi-Fi links. This makes the cost of project rise to the maximum level. Our system also uses a web server for communicating between client mobile phone and service details data store. But, we don't rely upon Wi-Fi links instead have used the plain old internet technology, for communicating. Thus, our web server becomes accessible to any mobile phone user from anywhere and anytime. This also adds to the notion of Location based Services, delivered irrespective of time and place.

Many works [1], [2], [3] have utilized the SMS technology for delivering services to consumers. Delivering interface should be friendly with the users for better working of a system [4]. In these cases, users are receiving bunch of SMS's in their mobile phones with the information about service requested. This doesn't balance the limitation of small handheld devices like that of Mobile Phone. Firstly, this technique discards the limitation of limited memory space in Mobile Phones. Secondly, sending many SMS's for a single service, as well drives out large battery and processing resource for receiving all those SMS's. Our system delivers results to Mobile Phones, using a LIST view [4]. Client views a list of elements on his mobile screen, and these elements are auto scrollable to give a good look and feel of the application. The LIST view method [4] of providing resources to small handheld devices, complies with its limitations. Thus, installing and working of our application doesn't threat major drawbacks. For a working server to deliver bunch of SMS's is always costly from administrators part, instead our system deals with data transfer over internet for a very low cost. Thus, to sum up this section of discussion, our system has the potential to lead through a major turnaround in Marketing Strategies.

VI. LIMITATIONS AND FUTURE WORK

In our work, as of now we have provided textual notifications for contents to the users. But, for advertisements, if our work can be extended to include audio, video and map based notifications, then this would be a working model for any city in India.

Any user requesting a service desires to get the best possible service provider name in his list at the top. But, our system doesn't guarantee that, it provides list of service provider names in the order as they get stored in database. So, as extension of our project is concerned, we will be implementing an algorithm by which the most selected content provider would be visible at the top of list. Hence, list of advertiser names would be provided on the basis of mostly visited advertiser, categorically.

Lastly, we have tested our results over various mobile phones having Android Operating System (from version-2.1 to 4.0). Next we will consider developing a generic system, by which any Mobile Phone user can use our services. Mobile phone operating systems which we are considering for making generic implementation are Symbian OS for Nokia phones, iOS for Apple I-Phones, BlackBerryOS for BlackBerry smart phones and WindowsOS for Nokia or Samsung Windows smart phones.

VII. CONCLUSION

This work focuses on permission based advertisement and not on unsolicited advertisements i.e. spamming. Here users will have lenience to accept contents wherever and whenever they require. We assure that our system is developed in such a way that the content providers can never reach the targeted users, without their permission. This scheme sets an example for utilizing information resources for marketing in an effective way.

This technology can change the definition of advertisement or take advertising to a different level and can enhance our social activity by helping both the sides of economy, the

consumer and the producer. The proposed technique has a deep penetrating power in the masses and help in advertisement and logistics management.

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