TOUCH SCREEN BASED WIRELESS SCHEDULE TO COMMUNICATE WITHIN AN ORGANIZATION.

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Abstract— Touch screen is evolving at such a rapid pace that new doors have been opened in this field of application and also in wireless communication application using touch screen. This project is a combination of both touch screen and wireless application using radio frequency as a mediator. The main purpose of the project "touch screen based wireless schedule" is to develop healthy wireless communication with in an organization (Here organization refers to multistoried shopping mall) without the need of personal interaction.

With the touch of the finger tip on the touch screen attached to daily scheduling, the co-ordinates are scanned and the value is sent as input to encoder which is driven by driver to PSOC kit and displayed on LCD screen for customer's need, which is then sent to receiver's end with the use of RF sender.

RF receiver is tuned properly to receive signal at server end. The distance between them up to 5m-6m. With the help of monojack, the values or signal transferred from sender side are copied into DTMF decoder and the decoded value will be sent to PIC microcontroller, which reads the received data and send it to PC with the use of MAX 232. The values will be converted by MAX 232 from TTL logic to RS 232 logic which is then sent to CPU using RS232 wire .

This project not only helps in making individual work easy but also makes the work productive.

Keywords: - **Touch screen, wireless application using radio frequency, PSoC (Programmable System-on-Chip), LCD (Liquid crystal display), DTMF (dual tone multi frequency*) decoder, PIC (Peripheral Interface Controller) microcontroller, MAX 232, CPU using RS232 wire.**

1. INTRODUCTION

Whilst competitors are still paying thousands to communicate in traditional ways, one can innovate and move their business forward with one of the latest PR (Public Relations) and marketing methods available today. This method uses the latest in Bluetooth marketing techniques to send targeted marketing information and offers directly to potential customers' mobile phones. The medium used for advertisement is Bluetooth, all this leading to an increased customer base and profits.

This project is suitable for entertainment plazas, theatres, shopping malls. Data sent includes information about latest offers offered by the shopping mall, advertisement of forthcoming movies, detailed information about current bookings and movies, location map of the shops in the mall, this can then be viewed.

In the traditional way to advertise a large amount of money had to be invested and spent. The mobile based advertisement uses web server and set of distributed servers which are connected through LAN to send advertisements to the customer.

Bluetooth Servers continuously discover new Bluetooth-enabled mobiles. Each Mall/Shopping centers maintains their own servers. If any new person enters the premises it sends an invitation to receive advertisements. Client mobile displays the same. If client mobile approves the request then server starts sending advertisement to client mobile. Advertisement could be text message, images, Audio, and videos Advertisement could include pictures say, cars, pictures of latest mobile phones, and latest bikes images or any other consumer products as well as location map of the shops in the mall etc. videos are like trailers of movies etc. In server side, the server maintains a user interface for adding new advertisement, deleting the existing advertisement. This can be done remotely from any system provided the user has the necessary authentication.

Projects start with administrator login. For administrator following option is available [1].

- Adding new advertisements.
- Deleting an advertisement.
- Editing an advertisement
- Viewing all stored advertisement.
- Starting Bluetooth server.

This paper explains about a distributed application. Bluetooth servers are distributed in different machine. Each machine act as Bluetooth server and continuously discover new Bluetooth-enabled mobile. Each server detects the incoming Bluetooth-enabled mobiles. It first checks whether the other servers had detected this mobile. If it was already detected by the other servers, then it sends the remaining advertisements that were not yet sent.

1.1 Advantages

- Free Brand Awareness
- Enjoy vastly improved customer relations by offering your existing customer base offers and promotions without spending anything (apart from the cost of electricity).
- Free efficient Business Advertising.
- With a steady stream of people walking past your shop - but no guarantee they'll enter, why not reach out and invite them inside? You could send a promotional animated image [2] offering 10% off if they come in and show you the message!
- There is no cost involved to send/receive any individual broadcast.

2. OBJECTIVE

2.1 Project objective

The project is directed towards a better understanding and learning of the current technology. It's aimed at creating a product targeting a large scale industry-the advertising industry. The 21st century is the age of automation and this project is aimed at bringing this revolution to the advertisement industry too. Hence it not only gives an opportunity to enhance our knowledge about the latest but also helps us in developing a tool of high usage.

2.2 Academic Objective

The project is developed using object oriented concepts with the up to date code structure. It has helped us get a better insight to the object oriented programming concepts, especially about the languages used in this project that incorporate these concepts.

2.3 Languages/Technology Used

- J2SE (Java 2 Platform, Standard Edition).
- J2EE (Java 2 Platform, Enterprise Edition).

2.3.1 Role of Java Each Concepts in Bluetooth Advertiser

2.3.1.1 Java Basics:

Java Basics is basic concept in that all the other java concepts are built-in. This project designed using following java basic concepts.

- Exception: used handle error.
- Thread: used handle multiple task at time.
- Package: used to store classes and interface.
- Socket: used to create network connection.
- RMI: used to create distributed application.
- Awt: used to create user interface.
- Swing: used to create rich user interface.

2.3.1.2 JDBC (Java Database Connectivity):

JDBC mainly used to establish connection with database. This project uses Microsoft Access database it is accessed through JDBC.

2.3.1.3 Bluetooth APIs (Application program interface):

Bluetooth advertiser uses Bluetooth as communication media. Project broadcasts the advertisements through Bluetooth. Java Bluetooth APIs is used to establish connection with all Bluetooth enabled mobile.

2.3.1.4 Servlet and JSP (Java Server Pages):

Administrator can load or register new advertisement using web in this project.

3. REQUIREMENT ANALYSIS

3.1 Purpose

The purpose of this document is to demonstrate the requirements of the project **Mobile Based Advertisement**. The document gives the detailed explanation of all the user requirements, external requirements, functional requirement and non-functional requirements.

3.2 Project Scope

The scope of this project is to fully automate the advertising process right from the creation to the distribution to the customer. Bluetooth technology will be used to achieve this.

This system intends on understanding of following applications

- Web based interface
- Bluetooth recognition
- Web severs- Distributed server interaction.

3.3 Document Conventions

The following are the list of conventions and acronyms used in this document and the project as well:

- **Server:** A PC it broadcasts the advertisement.
- **User:** who will use the system
- **Client:** A mobile which receives advertisement.
- **Bluetooth:** is a specification for the use of low-power radio communications to wirelessly link phones, computers and other network devices over short distances.
- **JAVA:** Is a widely-used general-purpose application programming language
- **User Interface Layer:** The section of the assignment referring to what the user interacts with directly.
- **Data flow diagram:** It shows the dataflow between the entities.
- **Interface:** Something used to communicate across different mediums
- **Microsoft Access:** Most popular relational database. Many windows plans allow Microsoft Access databases.

3.4 GENERAL DESCRIPTION

3.4.1 Product Perspective:

This project deals with broadcasting advertisement through Bluetooth to all detectable mobile phones in the near vicinity. A person entering the premises can download this data using Bluetooth enabled services. This project is suitable for entertainment plazas, theatres, shopping malls. Data includes information about latest offers offered by the shopping mall, Advertisement of forthcoming movies, detailed information about current bookings and movies, location map of the shops in the mall. Which can then be viewed, deleted, saved.

3.4.1   Product Features:

- Bluetooth network is used for broadcasting.
- Server broadcasts image file as advertisement.
- Server broadcasts audio file as advertisement.
- Server broadcasts video file as advertisement.
- Server broadcasts text file as advertisement.

3.4.2   User Characteristics

3.4.2.1 Client**: -** The client for whom the product is designed is an advertising chain.

  Example: Shopping Mall

3.4.2.1 Users**: -** The intended users of this system are

3.4.2.1 Administrators

- Maintains information of all the users in the system
- Maintains information of all the categories of advertisements and their intended values.
- Administers the distribution of advertisements to the client mobile and also administers the interaction between the various distributed servers.

3.4.2.1 Customer

- Receives the invitation to view advertisements.
- Needs to enable or disable the reception option.
- Can save or discard the received advertisements.

3.4.3 Operating Environment

This product is proposed to work in the following environment

- Windows XP, SP2
- JDK 1.5 or higher
- Apache Tomcat Server 5.0 or higher
- MS SQL Server 2005 or higher

3.4.3 Design and Implementation Constraints

The Product is developed using Java and bluetooth SDK. And MS SQL the backend database for this sequential query language.

3.4.4 Assumptions and Dependencies

- The administrator has enabled the server option.
- All distributed servers also have enabled the start server option and have contacted the main server.

- The Bluetooth dongle has been connected and enabled.
- Each local device has its own unique ID and so does the user mobile.
- All the distributed servers are connected to the main server by LAN.

3.5 Specific Requirements

This illustrates organizing the functional requirements for the product by system features, the major services provided by the product. This section outlines all the requirements of a fully functional system

.

3.5.1 Detailed Description of Functional Requirements

3.5.1.1 Starting the server

Table 3.1 Starting Server

Purpose:	This module deals with starting the server so that actively participate with the distribution of the advertisements.
Inputs:	The IP address of the RMI (Remote Method Invocation) severs is given.
Processing:	The RMI sever is searched for and connection established.
Outputs:	The RMI client is activated.

3.5.1.2 Bluetooth Device Discovery

Table 3.2 Bluetooth Device Discovery

Purpose:	In this module, the local device and remote device is to be detected and a unique ID returned for each.
Inputs:	Dongle is attached to the system and device is brought to the vicinity of the server.
Processing:	The dongle detects the local and remote device.
Outputs:	The devices are registered with the main server.

3.5.1.3 Advertisement Distribution

Table 4.3   Advertisement Distribution

Purpose:	In this module, once the device is registered the main server starts flushing advertisements to the distributed server which in turn sends it to the customer.
Inputs:	Advertisements sent to the distributed.
Processing:	Connection is established with the client mobile.
Outputs:	Advertisements are sent to the client mobile.

3.5.1.4 Advertisement Administration

Table 4.4   Administration Distribution

Purpose:	In this module, the administrator has several options such as adding, deleting, modifying and viewing advertisements.
Inputs:	Option and the value if any associated.
Processing:	The required change is processed.
Outputs:	The operation is saved or updated for further usage.

3.6   *Hardware requirements:*

- Bluetooth enabled mobiles (preferably Nokia or Sony Ericsson).
- Bluetooth dongles (D-Link or Billion ton dongle).
- LAN connection for all the servers.

3.7   *Software Interfaces:*

- Aventana bluetooth SDK.
- Widcom bluetooth stack.
- Tomcat Server.
- Servlet API jar to interact with Apache Tomcat Server
- JDBC interface to interact with MSSQL Server.

3.8   *Communications Interfaces:*

Bluetooth network is used as Communication interface.

3.9 Non Functional Requirements

3.9.1 Performance Requirements

The product should satisfy the following performance requirements.

- **Reduced human intervention**: The Bluetooth system should function independently without the need for human monitoring.

- **Higher throughput device detection**: Bluetooth local device should continuously operate detecting the customer mobile in the vicinity**.**

3.9.2 Security Requirements

Increased admin security: The main server should be highly secure and   accessible only by the administrator.

3.9.3 Maintainability

Mobile based advertisement system is an easy to maintain because its written in object oriented language. Independent classes for GUI and functionality is maintained. It can be easily modified.

3.9.4 Portability

Since the system is written in Java language so it is portable to any machine using JVM. It can run on any Microsoft operating system like XP, 2003.

4. DESIGN CONSIDERATIONS

The aim of our project is to send advertisements details to the customer mobiles through Bluetooth. The following aspects were considered when designing the software

- Detect the mobile phones under the vicinity.
- Check whether the advertisement is already sent to the phones.
- The user is given an option either to select the advertisements or cancel in the beginning only.
- If advertisements are not sent than send the advertisement details to the phone.
- The main consideration in the project is that the advertisement is sent to the mobile phone only once in a day, though detected by a server twice it does not send the details to the phone.

5. Design of Modules

5.1 Distributed client (RMI Client)

Distributed client is used to shear advertising process in different machine. These clients receive advertisements one by one from RMI server (using RMI concept) and it broadcasts to all detectable mobiles. Fist it discovers all detectable mobiles. Then it checks each detected mobile advertisement broadcasted or not. If it is not broadcasted then it broadcasts advertisement. Using this we can shear the workload in different machine. The RMI client is the process that runs on the distributed machines. Each RMI client establishes its connection with the RMI server by making use of the IP address. It can then use the Interface objects to call for the different methods and in turn get its response again in the form of objects.
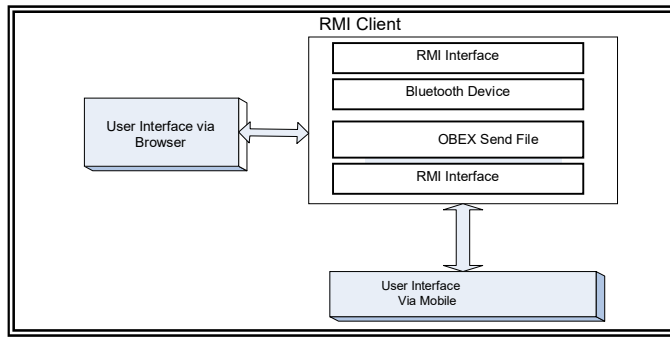
Fig 5.1 Distributed Client Modules

5.2   Web Server (RMI Server)

It is also called main server. Only the administrator with proper permission can log on to the server, he can either add, delete, update advertisements which is then broadcasted to the distributed servers which in turn sends it to the customer mobile. The main server which is also a RMI (remote method invocation) server can itself broadcast advertisements; it also maintains the RMI registry to keep track of RMI client and the server. Hence the RMI server also incorporates the RMI client. This module is operated by the administrator. It is only this module that needs human interaction on the repeated on the basis.
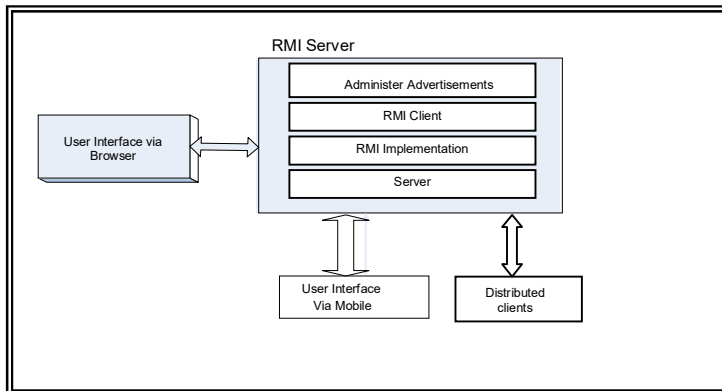
Fig 5.2   Web Server Module

5.2.1   Shop advertisements

The administrator can perform four functions

- Add advertisements
- Update advertisements
- View advertisement
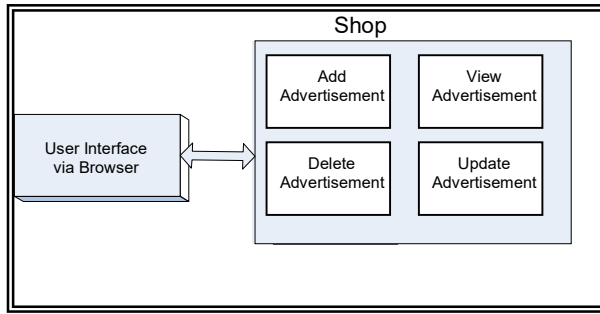- Delete advertisement

Fig 5.3   Shop Advertisement Module

While adding a new advertisement he has to provide mall name, shop name and offers as input if one of the input is not provided properly it results in error page.

5.2.2 File advertisement

The administrator can perform three functions

- Add file advertisements

- View file advertisement

- Delete file advertisements

The administrator has to give file name and file type as input, the file type can be jpeg, mpeg, mp3, pnp and so on. If the input is valid then it gets stored in the main server which can be then be broadcasted to the distributed client.
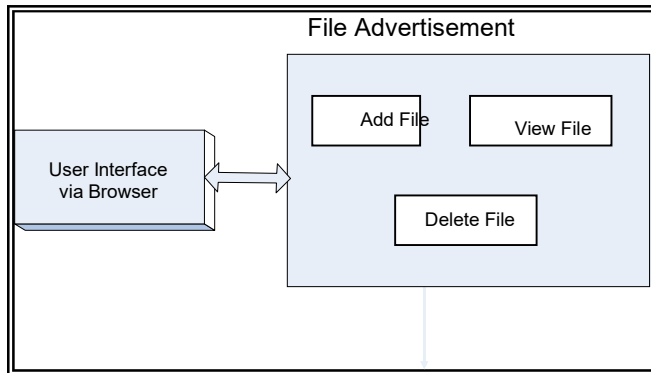

Fig 5.4   File Advertisement Module

5.2.3   Film advertisements

The administrator can perform four types of functions

- Add Ticket Details Of Theater

- View All Ticket Details

- Delete Ticket Advertisement
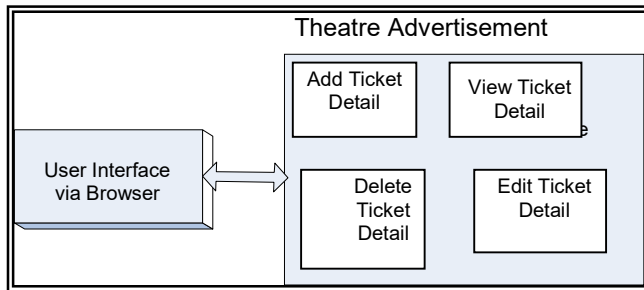
- Edit Ticket Advertisement

Fig 5.5   Film Advertisement Module

The administrator has to give theatre name, movie name, available ticket, total ticket as the input when all the parameters are provided properly it gets stored in the database else error is reported.

6. DESIGN DESCRIPTION

6.1 System architecture

This provides the overview of the system built. It depicts how distributed servers are connected to a main server through LAN .The dongle which is attached to the distributed servers detects the mobile under the vicinity and sends the advertisements to them [4].
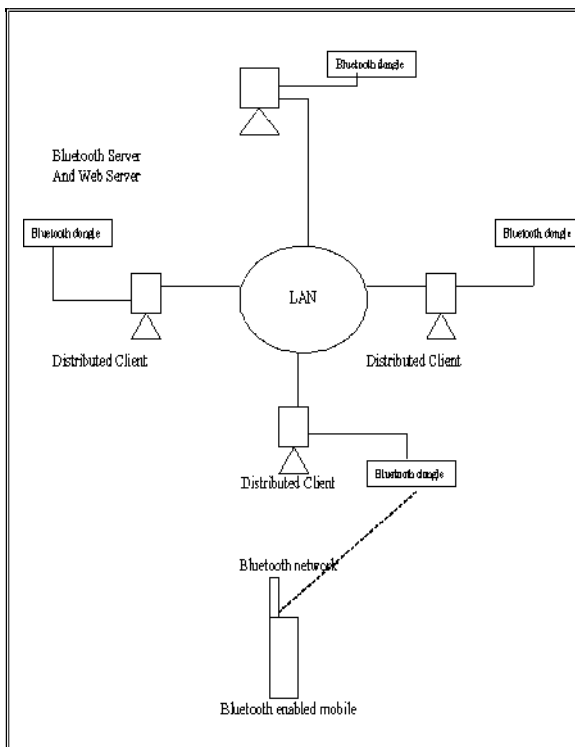
Block Diagram:

Fig 6.0-1: system architecture

6.2 Dataflow diagrams

Here the system is designed from the functional point of view, so modeling each part as a set of interactive functional unit is important. The functioning of the main component of system architecture is described below.
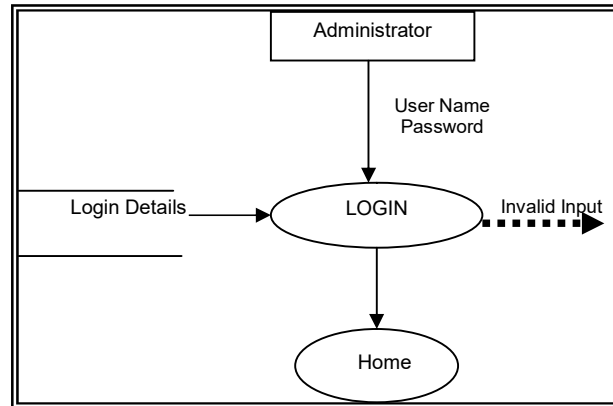
6.2.1 Login

Fig 6.2 DFD for Login

6.2.2 Main server module

This shows how client mobile is detected and advertisement is sent. This shows the working of all the three entities.
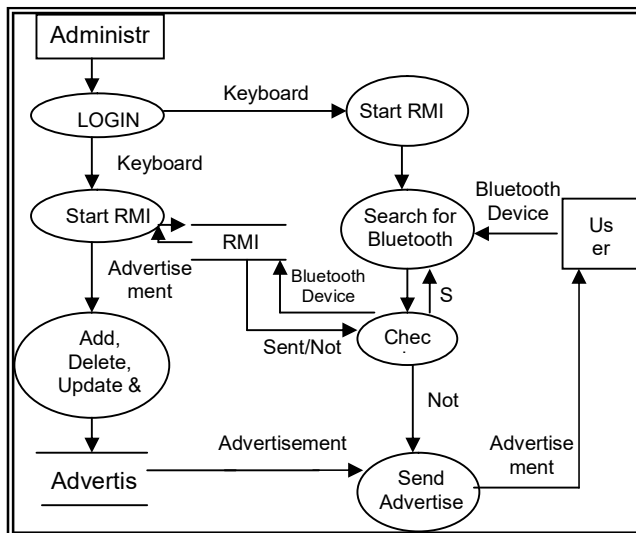
- Web Server
- RMI Client
- RMI Server

Fig 6.3 DFD for Main Server Module

6.2.3. Sequence Diagram

The diagram shows the flow of events, initially distributed client detects the mobile and then forwards the mobile id to the server, which checks the id if advertisement is not sent distributed client broadcast the advertisement. On top of the horizontal lines are objects, vertical line shows the life time of objects, horizontal lines with arrow shows the flow of events [7].
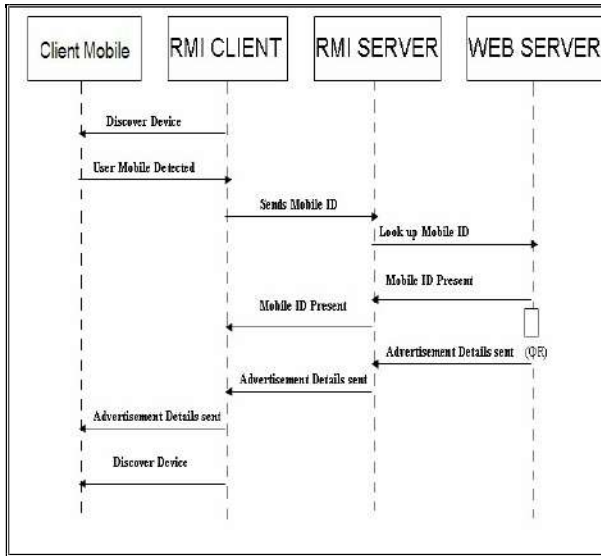
Fig 6.4   Sequence diagram to send Advertisement

6.2.4   Activity Diagram

6.2.4.1 Shop advertisements module

This diagram for the shop advertisement shows the four functions and the input to be provided to them, once the valid input is provided the advertisements gets stored in the database which is than sent to the distributed client.
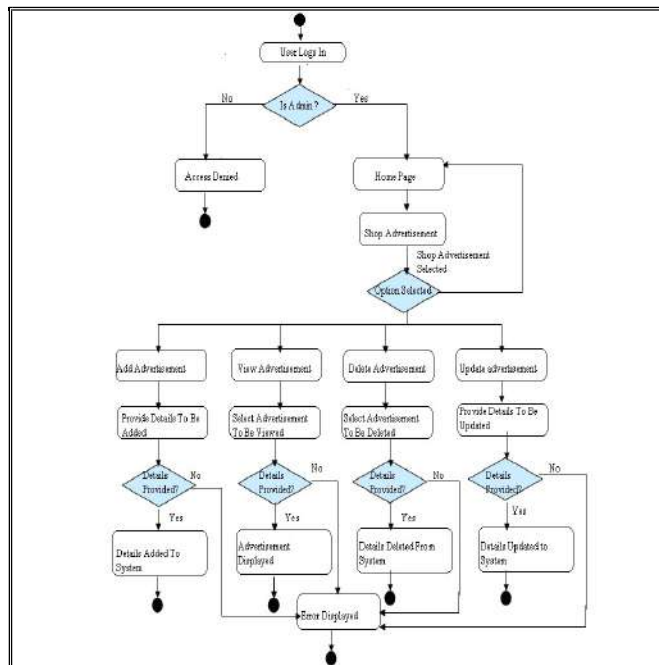

Fig 6.5   Activity Diagram For Shop Advertisement Module

6.2.4.1 File advertisement module

This diagram for file advertisement module shows three functions performed by the administrator namely adding new file advertisements by giving file name and file type such as jpeg, mpeg so on as the input if it is

valid then the new advertisement gets stored in the web server which is than sent to the distributed server.   The administrator can delete multiple file advertisements by using ht radio button, when done successfully, success result is displayed else states error and lastly administrator can also view all the advertisements stored in the main server by clicking on view all file advertisements.

7. Code Implementation

7.1 Code for detecting Bluetooth devices

Initializing and creating objects for the local and remote devices [4]

```
LocalDevice              local;
DiscoveryAgent   discoveryAge;
Hashtable                bluetoothDevices= new Hashtable()
DefaultListModeldeviceList;
String                btAddress
String[] DeviceNames=new String[10];
  String[] RDeviceAddress;
  JTextArea jta;
  int BluetoothDiscoveryCompleted=0
BluetoothDevices(String[] RDeviceAddress,JTextArea jta)
{
        this.RDeviceAddress=RDeviceAddress;
         this.jta=jta;
}
```

Code calling the search for local device connected to the machine

```
run()
{
    bluetoothDiscovery();
  }
bluetoothDiscovery()
{
        LocalDevice = LocalDevice.getLocalDevice()
        ldName=localDevice.getFriendlyName();
         ldAddress=localDevice.getBluetoothAddress();
       jta.append("\nLocalDevice Name: "+ldName);
       jta.append("\nLocalDevice Address: "+ldAddress);
}
```

Code for remote devices

```
deviceDiscovered(RemoteDevice btDevice, DeviceClass cod)
{
        int check=0;
        String add=btDevice.getBluetoothAddress();
```

```
            for(int i=0;i<bluetooth.count;i++)
            {
                    if(RDeviceAddress[i].equals(add))
                    check=1;
            }
}
```

7.2 Code to establish connection with remote device and send file [5].

```
OBEXSendFile(String adr,String FileContent,int a,JTextArea jta)
{
        jta.append("\nOpening OBEX Connection....");
        jta.append("\nText Advertising is :"+FileContent);
        jta.append("\nDestination Address:"+adr);

        String adrProto = "btgoep://"+ adr +":9";
      System.out.println("adrProto :\n"+ adrProto);
       cs = (ClientSession) OBEXConnector.open(adrProto);
       HeaderSet hs = cs.connect(cs.createHeaderSet());
       System.out.println("created header set");
       //byte text[] = "Chat Send File Test Message from PC".getBytes("iso-8859-1");
        byte text[] = FileContent.getBytes();
      hs.setHeader(HeaderSet.NAME, "Advertisement"+a+".txt");
       hs.setHeader(HeaderSet.TYPE, "text");
     //hs.setHeader(0x49, text);
  if everything fits inside a packet, the data can be packed in the PUT command
       Operation po = cs.put(hs);
       po.openOutputStream().write(text);
       po.close();
       cs.disconnect(null);
       cs.close();
       cs=null;
       // Approve (Open or Save) was clicked
}
```

7.3 Code to implement the RMI client

The object for remote method invocation is created which is then used by RMI services [6].

```
String url;

RmiInterface ri=null;

RmiClient(String ip)
{
```

```
    url="rmi://"+ip+"/RmiBluetoothServer";
    ri=(RmiInterface)Naming.lookup(url);
}
public RmiInterface getRemoteObj()
{
        return ri;
}
```

7.4 Code for the RMI interface.

This interface is implemented by most of the classes for the provision to send the advertisements and also update the check record.

```
String[] getAllTextAdv();
String[] getAllFileAdv() ;
String[] getAllFilmAdv();
byte[] getFileData(String FileName) ;
int check(String add);
```

7.5 Code for the RMI implementation

The RMI server runs on the administrative server and responsible to handle request for services from the Distributed client. It hence fetches the advertisements places it in suitable format and ports it to the distributed server which in turn communicates it to the client [7].

```
Connection con;
Statement st;
ResultSet rs;
String[] AllTextAdv;
String[] AllFileAdv;
String[] AllFilmAdv;
```

Connection is established with databse using JDBC to receive details regarding advertisements and client devices.

```
    Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
   con=DriverManager.getConnection("jdbc:odbc:blue");
  st=con.createStatement();
```

Retrieving text Advertisements

```
        String[] getAllTextAdv()
         AllTextAdv=new String[100];
         rs=st.executeQuery("select * from TextAdvertisement ");
while(rs.next())
```

```
                {
                        String MallName=rs.getString("MallName");
                        String ShopName=rs.getString("ShopName");
                         String Offers=rs.getString("Offers");
                        AllTextAdv[inc1++]="Mall          Name:        "+MallName+"\nShop       Name:
"+ShopName+"\nOffers: "+Offers;
                }
```

Retrieving File Advertisements

```
        String[] getAllFileAdv()
        {
                AllFileAdv=new String[100];
                rs=st.executeQuery("select * from FileAdvertisement ");
                while(rs.next())
                {
                        String FileName=rs.getString("FileName");
                         String FileType=rs.getString("FileType");
                         AllFileAdv[inc2++]=FileName+"."+FileType;


                }

        }
```

Retrieving Theatre Advertisements

```
        String[] getAllFilmAdv()
        {
                AllFilmAdv=new String[100]
                 rs=st.executeQuery("select * from Theatere ");
                while(rs.next())
                {
                        String TheatereName=rs.getString("TheatereName");
                         String FilmName=rs.getString("FilmName");
                        int av=rs.getInt("AvilableTicket");
                         int total=rs.getInt("TotalTicket");


                }
        }
```

Sending the File data

```
 byte[] getFileData(String FileName)  throws RemoteException
```

```
{
            URL url=new URL("file","localhost","files\\"+FileName);

            String path=url.getPath();

            File selFile = new File(path);

            System.out.println("selFile path \n"+ selFile);

            System.out.println("selFile name \n"+ selFile.getName());

            bytetext[]= getBytesFromFile(selFile);

            return text

}
```

Updating the CHECK record for the detected Bluetooth device

```
int check(String add)

{

java.util.Date d=new java.util.Date();

String              date=new              String(new              Integer(d.getDate()).toString()+"/"+new
Integer(d.getMonth()+1).toString()+"/"+new Integer(2000+d.getYear()%100).toString());

rs= st.executeQuery("select * from Check where BluetoothAddress='"+add+"' and Date='"+date+"'   ");


while(rs.next())

{

        return 1;

}


Int kk=st.executeUpdate("insert into Check values('"+add+"','"+date+"' )");
```
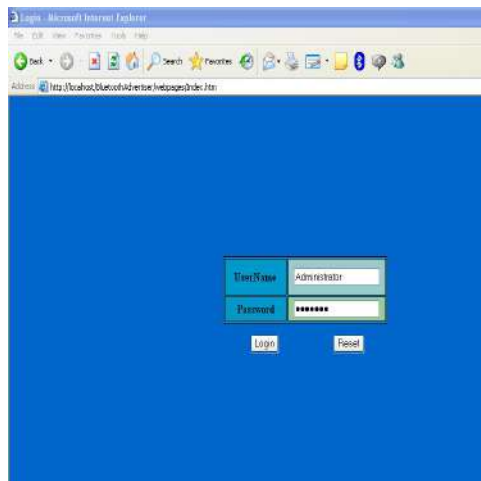
8. RESULTS

8.1 LOGIN PAGE

Fig 8. 1: LOGIN PAGE

8.2 HOME PAGE

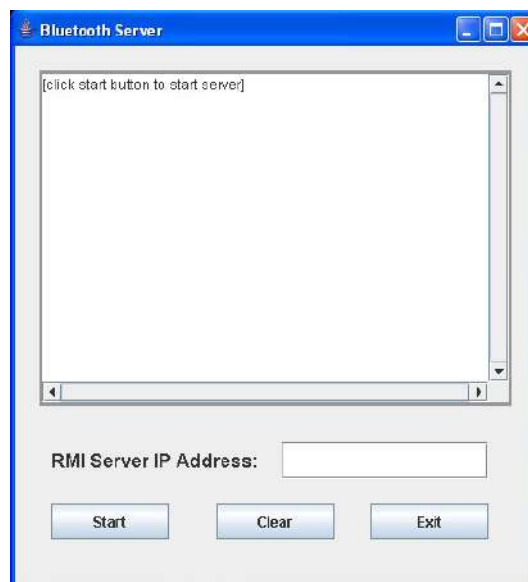Fig 8. 2**:** HOME PAGE

8.3 BLUETOOTH SERVER

Fig 8. 3: *BLUETOOTH SERVER*

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8.4 SHOP ADVERTISEMENT

Fig 8. 4: *SHOP ADVERTISEMENT*

8.5 ADDING NEW SHOP ADVERTISEMENT
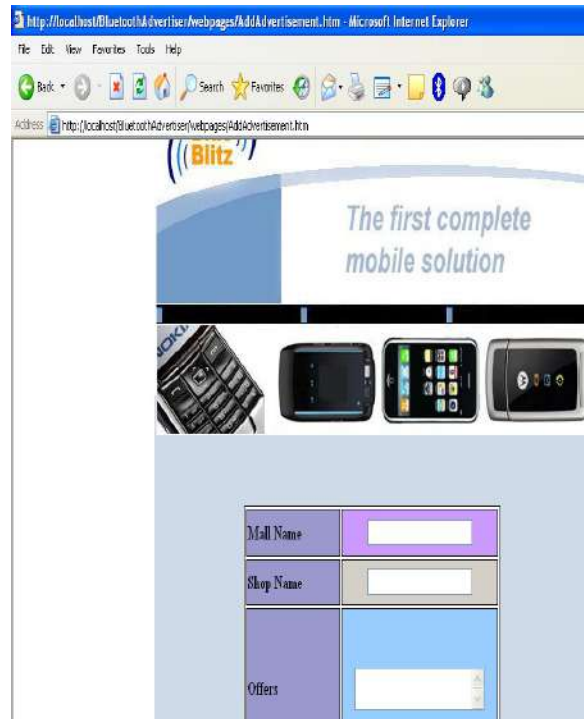

Fig 8. 5: ADDING NEW SHOP ADVERTISEMENT

8.6 VIEWING SHOP ADVERTISEMENTS

Fig 8. 6: VIEWING SHOP ADVERTISEMENTS

8.7 FILE ADVERTISEMENT

Fig 8. 7: FILE ADVERTISEMENT
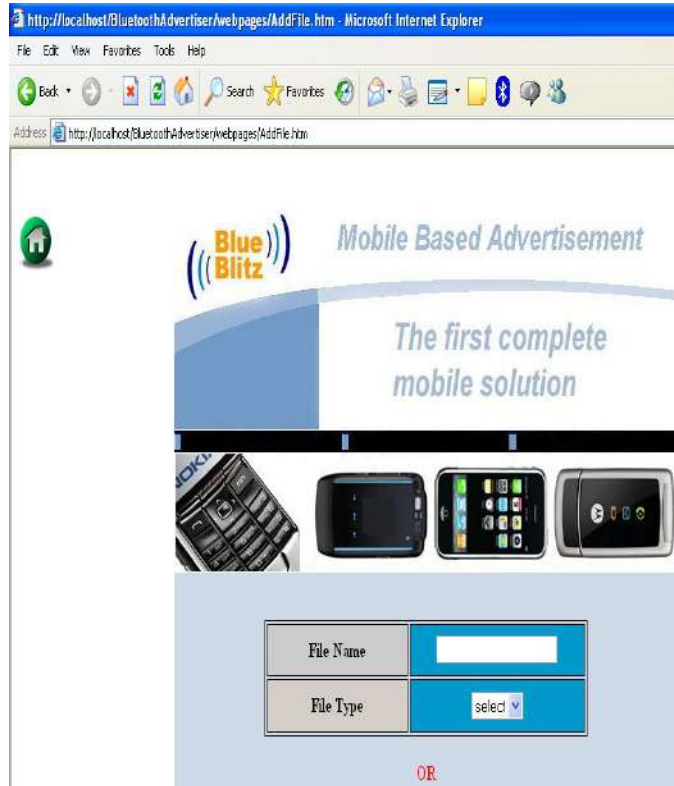
110

8.8 ADDING FILE ADVERTISEMENT

Fig 8. 8: ADDIND FILE ADVERTISEMENT

8.9 DELETING FILE ADVERTISEMENT

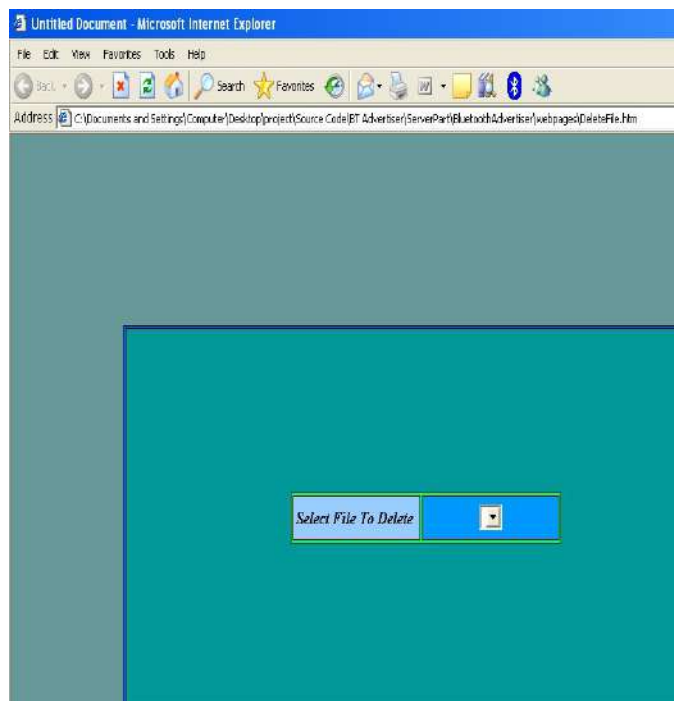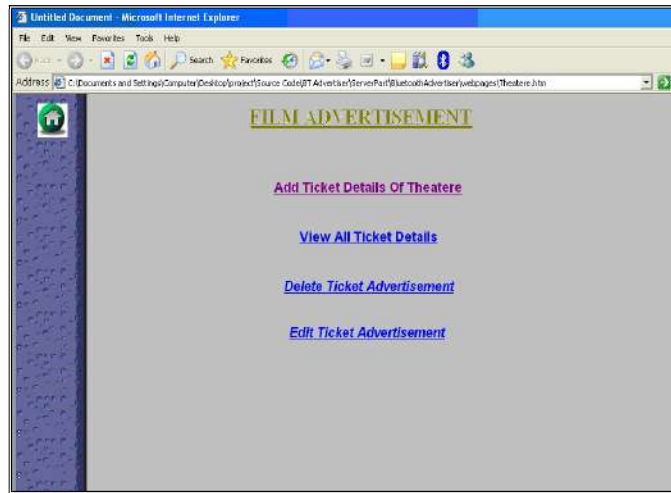Fig 8. 9: DELETING FILE ADVERTISEMENT

8.10 FILM ADVERTISEMENT

Fig 8. 10: FILM ADVERTISEMENT

8.11 ADDING FILM ADVERTISEMENTS

Fig 8. 11: ADDING FILM ADVERTISEMENTS

VII. CONCLUSION

As was noted in the introduction our projects main aim is to detect all the mobile phones which come under the vicinity and broadcasts advertisement to them, this way of broadcasting advertisement is more suitable because it involves less cost, as sending and receiving one advertisement does not involve any costs

The main advantage of this project is that once the particular client mobile is detected and advertisement is sent to it on the approval of the customer, if the same client mobile is detected by the server, the client id is checked by the server and advertisements are not broadcasted once again.

This project not only deals with sending text advertisement but also picture advertisement can be sent which is more impressive to the customer.

For business involving day to day changes this way of advertising is more efficient because old advertisement can be updated and new offers can be included which is broadcasted to the client mobile.

There are chances when a client passes through the shop and does not get to know about the offers, by sending advertisement in this way all the offers will be in the client mobile, he or she can enter the shop if they wish to.

Thus, the project developed is advantageous to both client who is receiving the advertisement as well as the shop which is sent advertisement as it increases the customer.

However, the project has few drawbacks as the range of the bluetooth is limited, once the person moves out of the vicinity advertisement is not sent and once the advertisement is sent, when detected later remaining advertisement is not sent. The range of bluetooth signals is at times impended by environment factors such as thick walls.

VIII FUTURE ENCHANCEMENTS

Because of time constraints we were able to include only the basic functionalities, however the main function has been provided in which the server detects client mobile and sends advertisements, we were able to successfully show this feature in a distributed network which was connected through lan, there are many extensions which could be carried out to make the project better.

- Creation of interactive advertisement.
- Creation of flash advertisements.
- Listing of all the advertisement on the mobile phone and based on the interest the customer should be able to select the advertisement and receive only that advertisement.
- To keep track of actual number of advertisement which the customer receive on the mobile phone.
- To keep track which advertisement is received in the first discovery and send those advertisement which was not successfully sent in the first discovery when detected again.

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