Mobile Based Social Encyclopedia

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Abstract

Mobile phone has become one of the essential plug-ins of our society. The basic definition of mobile phone from its first breath till day has been evolved into an application which provides you the services of your demand via appropriate servers. This paper also talks about a similar service; the idea is to create a social bridge between experts of different crafts and normal persons via GSM network and internet; so that they can communicate with each other when required. Client will send his query to our server, this server will multicast the query to the cabinet of experts of related category, the replies of the experts either from GSM network or Website will be then unicast to the client. All the queries and responses will be saved in a centralized Database server.

Keyword: MBSE (Mobile Based Social Encyclopedia), AS (Application Server), DBS (Database Server), GSME1 (GSM Engine 1), GSME2 (GSM Engine 2), WS (Web Server), QoS (Quality of Service)

1. Introduction

In this age of internet and palmtops when world has become global village MBSE will play its part as social encyclopaedia. It'll increase the social connectivity between persons having questions and experts having answers. With the help of GSM [1] and AS, we have developed such system which can help you in two important ways.

First important way is information interchange indifferent categories. For example if you have some immediate medical issue and you can't see doctor at the moment all you need to do is to send a message to MBSE in medical category and within seconds you'll receive the response from practical experts of medical field. Similarly different categories like Electrical, Mechanical, Civil, History, Literature, Current Affairs, Education counselling and many others [6] can be added to educate the people about different questions they might have.

Second important application of MBSE is reduction of communication gap between normal person and higher level management [7]. For example in the current scenario of government it is

very difficult for the mayor of the city to listen to every man's problem and for each common man it's difficult to see the mayor for his issues. If we deploy this system for government then common man can text his issues to this system and mayor can see them using web interface and educate himself about the problems of a common man. So MBSE can play a vital role in the development of social connectivity towards positive directions.

2. Existing System

GSM has been a great device for connectivity. So it has been used in different applications like Home Automation[4][12], Street Light Monitoring & Control System, Gas Leakage Detection System, E-Notification Boards and Rail Road Transportation Safety etc. The applications of health care [3] using GSM have also been developed like GSM based Alert System [9] for Outpatient Adherence; GSM based Health Monitoring System;Mobile-Phone Based Patient ComplianceSystem for Chronic Illness Care. All these systems are more likely a GSM based monitoring [3] of the patient while MBSE is like a prescribing expert with different fields of expertise.

Different encyclopaedias are also available for gathering information they provide bulk of information related to any heading but they don't answer the listener for the specific question he is asking. Reader has to filter out the information of his demand from that bulk of information while this system will provide the specific information of his demand [7].

3. What is MBSE…?

It is a mobile based encyclopedia with the real life experts as their source of information. If you have a problem and a mobile phone then all you need to do is to type your problem and send it to MBSE, it'll multicast the problem to the cabinet of the experts of the related category, the responses will be then unicasted [8] to you.
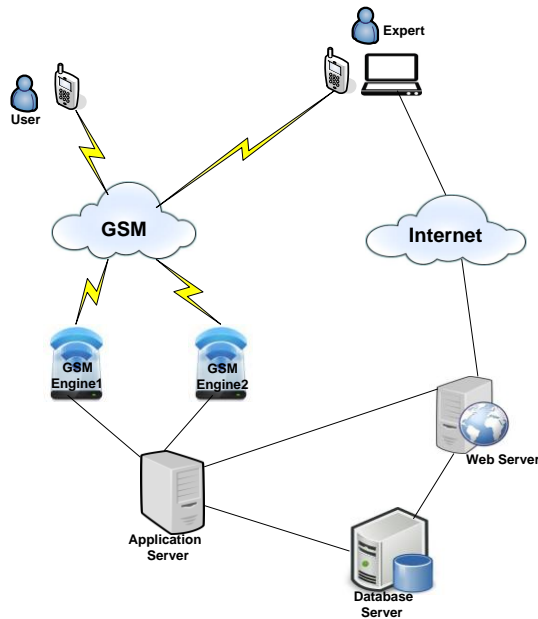
Figure 1: Project Define Diagram

The main components of the MBSE are shown in figure 1; Two GSMEs are used to maintain the quality of service. GSME1 will be listening for the queries from clients [5] via GSM network moreover it'll reply to the clients for their queries. GSME2 will connect experts to the AS via GSM network. AS is the heart of the MBSE, it is the open source server developed on RHEL to control and compile the data coming from the GSM network and Internet. The responsibilities of AS are, to save the queries and replies [11] into the DBS, AS will retrieve the list of experts from the DBS and multicast the queries to the team of experts. By keeping in mind the sensitivity of some specific categories like Medical a priority queue is maintained in the AS which is controlled by a scheduler to provide the in time service to each client. MySQL is used as DBS to save the record of the queries, replies, experts and clients. WS is developed for the experts if they want to reply via internet, this response will be received by a listener in the AS and then AS will perform further tasks upon that specific query.

4. GSME

GSME are those devices which will connect the MBSE to the end user and information sources (experts) via GSM network [2]. To maintain the quality of service we have established two GSMEs, one will take care of all the transfer of information between MBSE and clients and other will take care of all the transfer of information between MBSE and experts. With the increase in traffic we can increase the number of GSMEs to further improve the QoS.

5. Application Server

Application Serveris the heart of MBSE. It controls and compiles all the data among other components of the MBSE.

5.1. GSME Connector

The very first component in the AS is the GSME Connector. It has two parts, first one is in hardware form and other one is in software form. In hardware GSME uses TTL at its serial port. To interface the hardware board of GSME we have to made a serial port translator which translate the voltage level of GSME and serial port of the computer into each other so that communication could be possible between GSME and Computer. It is developed by using MAX232 IC. The secondary part of the GSME is a serial port driver which will configure the serial port to provide communication between GSME and AS. The main duties of this driver will be to initialize the GSMEs, connect them to the network and then start listening. To configure the serial port in linux we have to configure fcntl (to manipulate file descriptor of serial port) and termios (for configuring the setting of serial port like baud rate, flow control etc).

5.2. Temporary Buffer

As the request receives from the client it is stored in the initial queue which is named as temporary buffer. After that GSMEs will go back to the listening state. Format checker which is a threaded process will pick the request from the temporary buffer and check if the request is receive in the proper format or not. If it is in the proper format then a confirmation will be sent back to the client [10] about the reception of the request. The format of the Request is to insert the category then comma and then state the query;
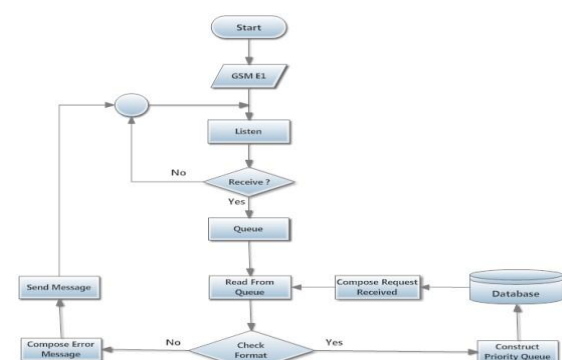
Figure 2: Received Query from Client

5.3 Priority Queue

Some categories are very sensitive and need immediate response from the server like Medical. For example if the health of a person is critical and he needs immediate medical attention; one of his

friends ask about the first aids procedure from the expert while they are on their way towards hospital to stabilize the patient then we'll have to facilitate him on our first priority. But we can't put ultimate focus upon selective categories because other clients would feel the kind of departed. So to handle this problem with the limited resources we have developed a priority queue which will fetch the requests from the Temporary Buffer and fill in the priority Queue. It is implemented using the data structure of circular linked list. There is a smart scheduler which will get Ni number of requests from the priority queue where i is the tag of priority and Ni are number of requests from the priority i in each cycle. Ni is calculated by the formula: $Ni = \frac{Pi}{100*(x1+x2+x3+\cdots+xn)}$ where Pi is the priority of the category i and xi is the number of requests for the category i.
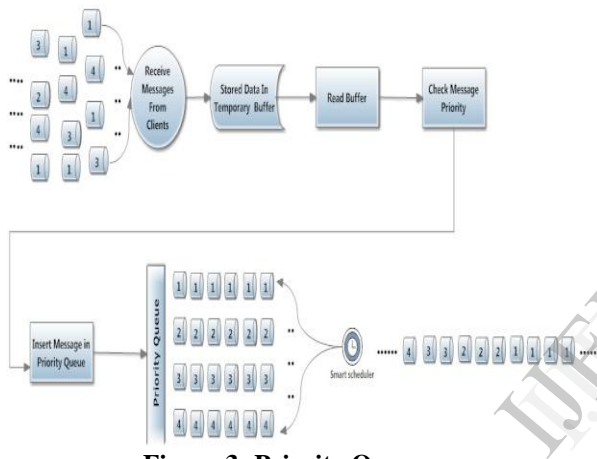

Figure 3: Priority Queue

After the maintaining of the queue smart scheduler will pass the request into the next process which will save the request into the database and generate a file number which will be unique ID of the request. This ID is duly beneficial; it enables the system to differentiate responses to each request and maintains the privacy of client. Then it'll make the query for the experts which have following format:

::File_Number,Problem::

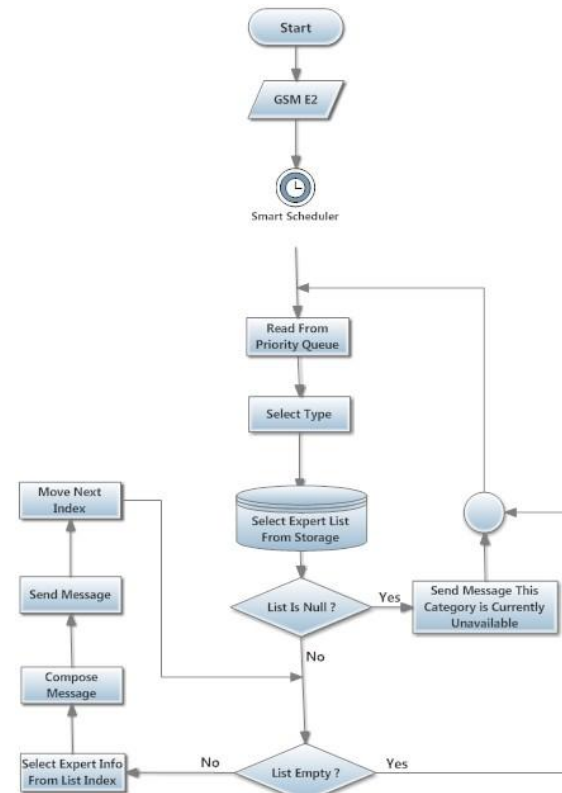Then AS will retrieve the list of the experts of that category and multi cast the request to the experts via GSME2.

Figure 4: Multicast Request to Experts

5.4 Response from Expert
Each expert has two ways to respond to a request. First one is to use the mobile phone and other is via Internet.

5.4.1 Response from Expert via GSM
If he has compatible mobile phone then he can install our app. When he'll open the app, a list of requests will be shown to him. He'll select the request and write the reply. This reply will be then encapsulated into the header [10] which is like;
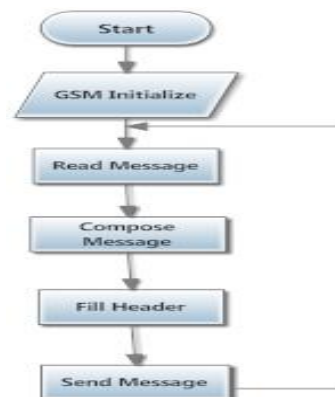
::Request_ID,Reply::

Figure 5: Encapsulation of Reply

If expert doesn't have compatible mobile then he'll have to personally write the reply into header

format. This request will be then received by AS via GSME2. AS will initiate a process which will first confirm the mobile number of the expert first, if the number doesn't belong to the expert of the respective category then he'll reply back that you are not authorized to post this reply. Else if reply is from authorized expert of the respective category then it'll be stored into the database and unicast to the client in following format;

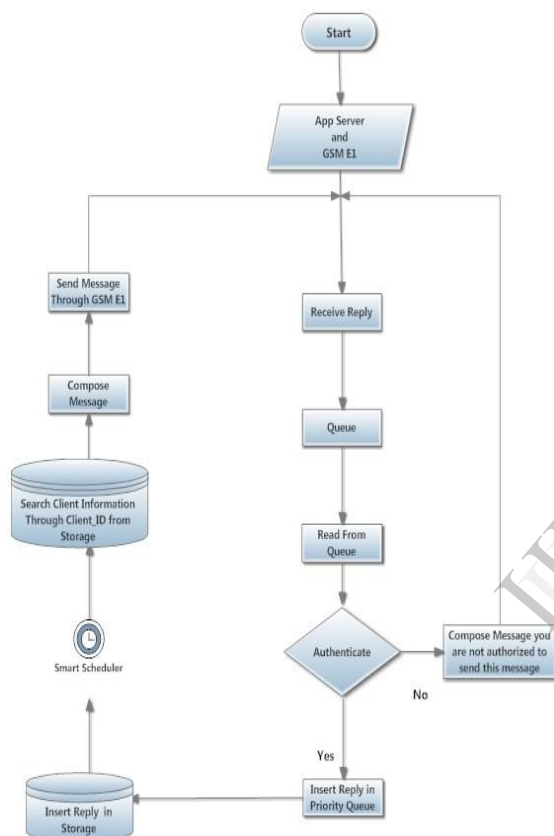::Q: <Question of the client>. A: <Answer from the expert>. E: <ExpertName>. DOQ: <Date of Query>. DOR: <Date of Reply>. ::

Figure 7: Web View for Expert

Expert will click the request and write the reply. This reply will be then encapsulated and sent to the AS. Here we have developed a client server [8] scenario to handle the reply. A server is developed in C which is acting as a listener and its client is developed in php. When expert will post reply it'll initiate a client which will establish a connection with listener over TCP and send reply to it. This listener will initiate the reply process which is same as reply via GSM except the authentication process.

Figure 6: Reply from Expert via GSM

5.4.2 Response from Expert via Internet
The other way for expert to reply is via internet. WS is developed on apache, first expert will log on to web server via username and password. Then a list of queries will be displayed on the page.
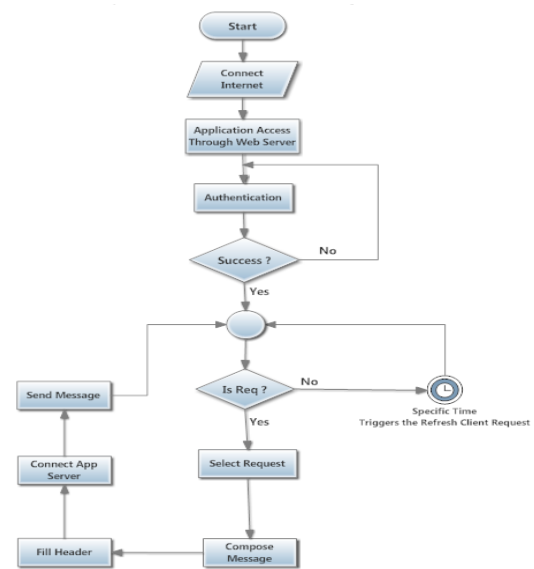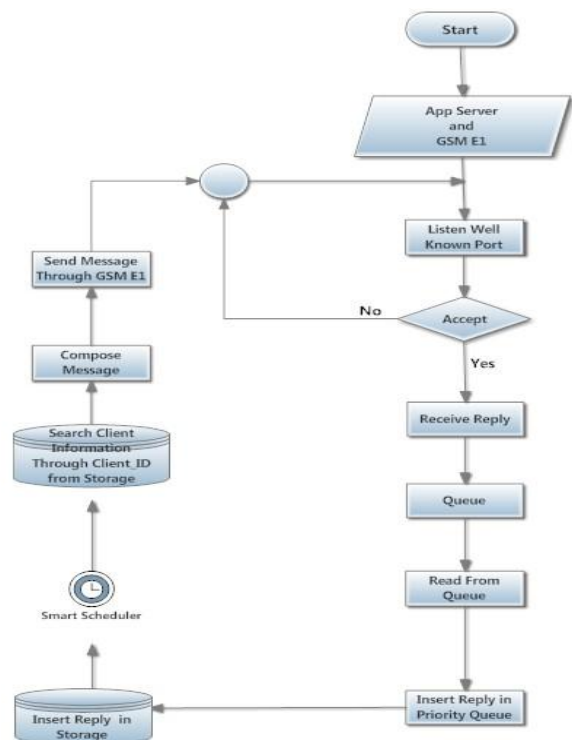

Figure 8: Reply from Expert via Web

6. Conclusion
MBSE is a versatile service which can facilitate each type of query from each type of client. It

handles the queries based upon their defined priority ratio. In this way we can educate people just with the help of a text message. Moreover this service can reduce the communication gap between the higher authorities and common person which can lead towards a compatible society.

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