Global Positioned Music System (GPMS)

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Abstract - Although originally developed for the military, the Global Positioning System (GPS) has proven invaluable for a multitude of civilian application. GPMS is the new entertainment application that uses GPS. This paper introduces new music system that uses the GPS to play the songs according to the geographical area of that particular location along with the Google Map. Hence the name given is Global Positioned Music System (GPMS).

Keywords- GPS, CDMA, GPMS, DGPS, Reverse Geo decoding, Turbo – Multiuser detector.

I. INTRODUCTION

The current FM stations are broadcasting all sorts of programs and songs to attract and have all sorts of people. But, each one has different taste and view according to the situation and surrounding. For example people come to the temple with devotional mind don’t like the rap and pop songs. They simply like some sort of devotional songs at that particular time and place. Similarly this is the case with the people who are all going to the church and mosque. In the working environment, the organization is in fear of playing songs during the working hour considering the fact that the song may unfit to hear while working. The education institutions are being afraid of FM radios because of the varying moods and taste of individual students and the nature of odd songs to that environment. And hearing songs in the campus may spoil the academics and giving rise to various disciplinary issues. There are many situations like this where playing particular song may seem to be very odd. By taking all the facts into considerations we may come to the point that the songs telecasted by the FM stations may fit to some particular locations while completely unfit for all other locations. The people who are all hearing are put in the mind state of tolerance and acceptance to the unfit songs. At the extreme annoy they may switch over to some other stations or switch off the radio itself. By this current simple FM broadcasting, the individuals’ situation or the place where the song is played is not considered. One good thing about music, when it hits you, you feel no pain. But, the wrong/unfit song to surrounding may annoy/pain you. For the success of any system/station, it has to satisfy each and every individual. To achieve this so, in this paper we introduces the system called GPMS.

II. GPMS BLOCK DIAGRAM

The GPMS Block diagram consist of the following
- GPMS Receiver / Mobile Receiver
- Satellite
- GPMS Main Server
- Google Map Library
- Song Library
- Local FM Broadcasting Station

A.GPMS Receiver / Mobile Receiver

The GPMS receiver is the integration of the GPS receiver and CDMA receiver. This combination is only for the static receivers.

For the mobile phones it has already the GPS receiver and GPRS transceiver.

B.Satellite

We may use the GPS satellite itself or any sort of GSAT satellites to signal about the location to the GPMS main Server.
C. GPMS Main Server
The main server of GPMS has the position details of each and every GPMS receiver.

D. Google Map Library
This library is most important module in the GPMS system.

E. Song Library
The song library may be kind of multimedia entertainment server. We can build a small song library locally with all sorts of songs in the particular regional language. For the system worldwide all language songs are to be included in the song library. Generally available multimedia library for worldwide usage which is known to everyone is 'You tube'.

The song library may also have no of antennas to transmit the song through satellite when the necessary improvements on technology has arrived. Those ‘n’ antennas are there to telecast ‘n’ various songs.

F. Local FM Broadcasting Station
At present scenario the song can’t be telecasted through satellite itself. Because of the jitter present in the satellite communication make the hindrance to the live telecasting of the song since every FM telecasting is 24X7 programs. It also has ‘n’ individual antennas to transmit song for each group’s individually.

III WORKING OF THE BLOCKS

A. GPMS Receiver / Mobile Receiver
The navigation data are the 50- bits/s data stream modulated onto the GPS signal. The navigation data contain the satellite clock and orbital parameters which are used in the computation of user position. The GPS signal format is known as direct sequence spread spectrum [1]-[5].

To locate the place more accurately, we may use anyone of the following methods like DGPS, WAAS, L-Band, and Post processing which has its own pros and cons which is compared in [6]-[10].

Each Receiver has to signal the data about the location to GPMS main server. Globally it may be carried out by separate data packet transmission through the unique satellite. Or if possible through GPS satellite itself we may give the position of all GPMS receiver to server through proper commanding.

In the case of mobile phone receiver the tracking is very simple. The fact is that each phone having GPRS nowadays. The location detail of its position may send through the GPRS packet to the GPMS main server. [11],[12].

B. Satellite
If we are unable to communicate the GPS value through GPS satellite, the satellite may be any other commercial satellites.

C. GPMS main server
The main function of the GPMS main server is to have the updated database of each receiver of both static and mobile receiver. In worldwide transmission it has all location position from all over the world. It must be big and more powerful to handle this huge data. The updating operation is static in nature in the static receiver. The moving receivers are handled as special case which will be discussed shortly in section IV.

D. Google Map Library
The Google map is used to locate and match the position to particular group of each particular receiver. The name of particular location for the particular GPS data value is obtained directly by Reverse Geocoding [13],[14] which is easier and effective method by using DIP of Google maps. From the name of the locations obtained, each receiver is grouped. The group has temples of various religions like Hindu, Christian, Muslim, Buddhism, Sikhism, industry/organization, institution, Park/Amusement parks, and Burial yard.

E. Song Library
The songs in the library are also grouped to fit for particular group of location. This is done by anyone of the methods published in [19]-[24]. The can be directly broadcasted through wireless internet. But, there is a problem of jitter as we mentioned early. When the jitter problem is completely overcome, the song library module itself may broadcast the songs worldwide. But, till than for the flexibility and usability, first we send all groups of songs to the particular local FM broadcasting station priory. From there the song may be broadcasted to each group.

We may broadcast the songs of each group in different frequency band simply. But as the frequency band is a scarce resource we can’t do so. So, we are going to use CDMA as DS - SS. A spread-spectrum system [1],[2] typically is distinguished by the following three characteristics: 1) the data are modulated onto the carrier such that the transmitted signal has a larger (and usually much larger) bandwidth than the information rate of the data, hence the name “spread spectrum”; 2) a deterministic signal, known a priori to the receiver, is used by the transmitter to modulate the information signal and spread the spectrum of the transmitted signal; and 3) The receiver cross correlates the received signal with a copy of the deterministic signal in the process of demodulating the data. By so doing, the receiver can recover the transmitted data.

In the GPMS receiver side, for multi user detection of CDMA we may go with Turbo – multiuser detector since it has the acceptable performance [25].
TABLE I. CLASSIFICATION AND ALLOTTMENT OF GROUPS AND SONGS

<table>
<thead>
<tr>
<th>Location Group</th>
<th>Song Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization/Working place</td>
<td>Baroque Music</td>
</tr>
<tr>
<td>Educational Institutions</td>
<td>Audio of various subject Classes/seminars</td>
</tr>
<tr>
<td>Park</td>
<td>Love songs</td>
</tr>
<tr>
<td>Temple</td>
<td>Hindu Songs</td>
</tr>
<tr>
<td>Church</td>
<td>Christian songs</td>
</tr>
</tbody>
</table>

**F. Local FM Broadcasting Station**

As we mentioned earlier, current limitation in the wireless data transmission without jitter brings the importance of local FM Transmission of the song. The song sent from the main song library is broadcasted by this using CDMA technique.

**IV. HANDLING OF USER RECEIVERS**

Now consider the case as shown in the Fig 4. In this example location, we have various working companies, organizations, a park, a church, a temple, various type of institutions, and finally 3 moving receivers.

**A. Static Receivers**

From this, we can classify each receiver's form its location and can broadcast the particular song which will exactly fit to the situation. Consider the Table 1, which is the list of location groups and its corresponding allotted song groups.

The static receivers are continuously receiving the songs which are appropriate to the location.

**B. Moving Receivers**

There is the need of special handling for the moving receivers. See the case of moving receivers as shown in Fig 4. Consider the route of Red arrows routed horizontally. Let the user receiver moving through the route from left to right.

While it crosses the place called 'Madurai soft' which is a working place, the baroque music are getting received and played by the GPMS receiver. But while reaching near the ‘Mahal Thiruvalluvar High School’, suddenly the GPMS is switched to subject classes which destroy the entire objective. The case of GPMS receivers in the moving vehicle is also similar to the previous one. So, to handle...
this we are classifying the moving receivers in two categories as explained below.

1) 1. Normal Users:

GPMS first classify the moving receivers and if they are normal receivers, then it signals song library to play the songs in random manner with the limiting of devotional songs only in the morning and evening alone. In all other time the mixture of various moods of songs are broadcasted to this type of receivers.

2) 2. Premium Users:

The premium users are the one who can request to particular type of songs only like pop, rock, melodies, sad, hip hop, etc. In this case, even though the receiver is moving the requested type of songs is played without the need of location identification. For this special service, the users are charged with some fixed rates.

C. Exceptional Receivers

There may be some exceptional situation arises when the Receiver location can’t be identified in Reverse Geo-Decoding. This is true that each location can’t be available or added in the Google maps. For this case we are providing some choices. User has to select from anyone of the choices. To make difference between premium users and exceptional users the choices we are providing is the groups which are available very near to that unrecognized location, whereas Premium users can choose any type of songs available worldwide.

V. REQUIRED MODIFICATION TO THE CURRENT SYSTEM

The Mobile phone users need no change since they have all the required modules in build. The static FM receivers are modified in the way that it has to receive the CDMA signals too.

On the transmitter side, the no of transmitters has to be increased according to the no of groups as they are using CDMA technique.

VI. RESULT OF PEOPLE SURVEY

From the informal survey carried out among people of all the ages having all sort of tastes gives the result as shown in the bar graph. In Graph 1 the Y axis is the available FM station with Frequency in MHz in Madurai. X axis is the no. of users utilize the FM station.

While asking for the reason for liking other stations are as follows. Some people are hearing to FMs to know the current affairs. Some of them like the language and style of the jockeys. So they are simply hearing simply hearing to that program/station. Some of them are hearing while working just as a habit without any other reason.

VII. ADVANTAGES

The key advantages are listed below.

- The main advantage of the system is that it identifies the surrounding of each user. By means of this the individual’s interest is satisfied.
- GPMS having some sort of intelligence to fulfill the requirement of each individual.
- The conflicts of the song are completely removed by this.

In technological point of view, it has the advantages like

- The introduction of GPMS will lead the world one step ahead of intelligence automation.
- It adds up another wing to the current GPS system which is completely for entertainment.
- By GPMS the songs are seems to be in the cloud. It open up a new pathway in the Cloud computing.
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Book Chapters:


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