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.

This paper has been structured to provide the reader with the concepts necessary to understand the entire system. Section II will give the detail about system structure. Section III explains how the individual module of the system will work. Section IV will give the top level view i.e.) how the location is applied to music along with the necessary example of various types users. Section V to VII will give the required modification to current FM system, advantages and future explorations respectively. Section VII concludes the paper.

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

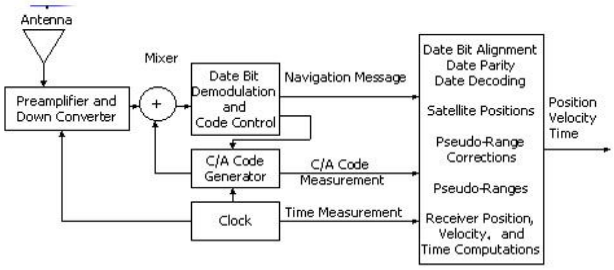


Figure 1. The general GPS Receiver

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].

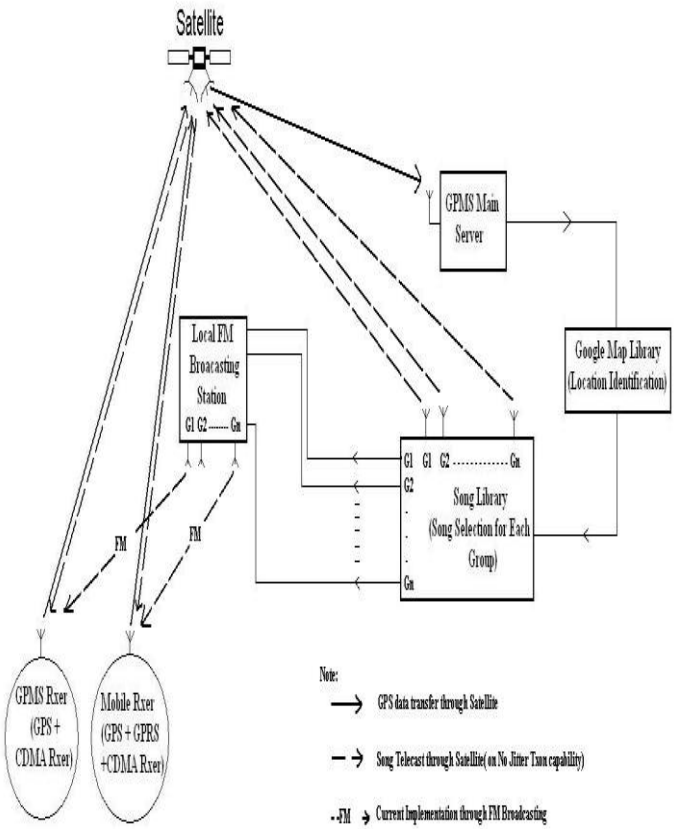


Figure 2. Block Diagram of GPMS

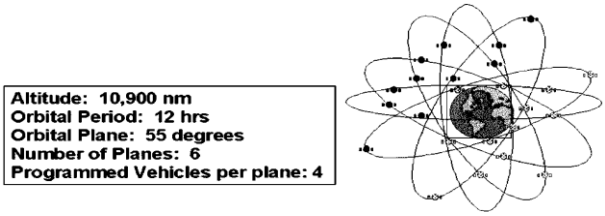


Figure 3. GPS Operational Constellation

TABLE I. CLASSIFICATION AND ALLOTMENT OF GROUPS AND SONGS

Location Group	Song Group
Organization/Working place	Baroque Music
Educational Institutions	Audio of various subject Classes/seminars
Park	Love songs
Temple	Hindu Songs
Church	Christian songs

F. Local FM Broadcasting Station

As we mentioned early 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 RECIEVERS

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 receivers 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.

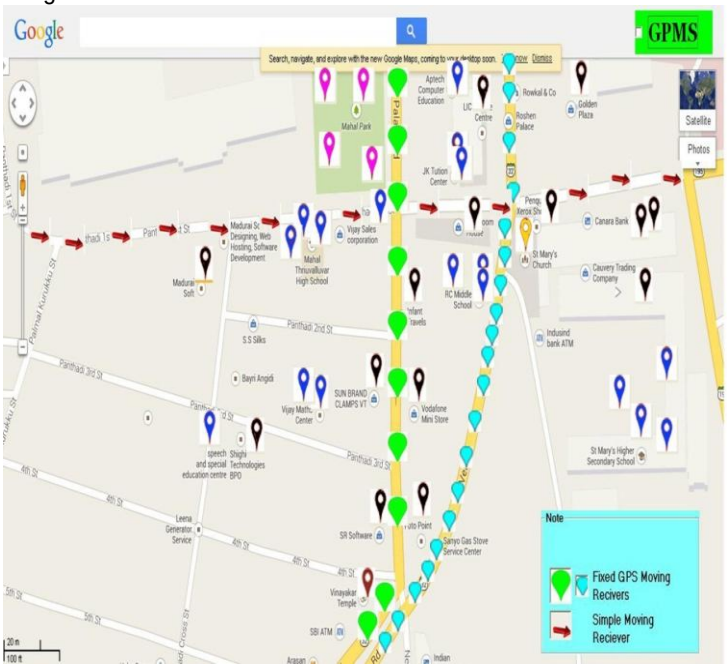


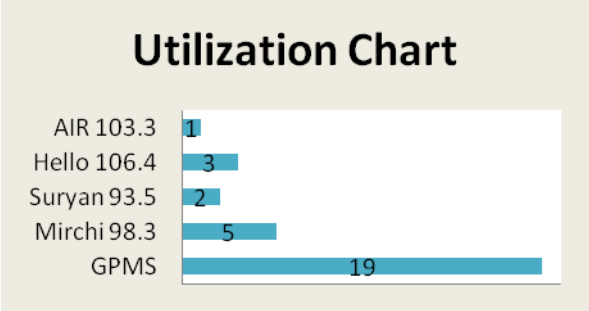
Figure 4. Example Receiver location on Google Map

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.

- The most of the memory devices that the users having are only used to store the multimedia and entertaining files like songs and videos. By introducing this GPMS the huge amount of memory usage as secondary storage is got reduced. This usage reduction may boom the improvement in the systems' primary memory and cost reduction which is the necessary need in this fast GHz quad processors world.

- The memory device usage reduction avoids over exploitation which indirectly helps to improve the sustainability of nature.

As a sum up, the main motive for any system is the complete fulfillment of the need of the users.

The GPMS fully concentrate on the interest of the individuals' requirement and will entertain the entire world 24X7 assuring the full rejoice of the each individual user.

VIII.FUTURE IMPROVEMENTS PLANNED

- The system will tie up with Google – YouTube to provide the full fledged music experience to the entire world.
- The limitations produced by the jitter will be overcome soon as the development in the field of Optical CDMA.
- Even though the power is shared among all the group of transmission which is the key feature CDMA, for proper detection each requires some additional power. The way to reduce the power consumptions will be examined and implemented.
- From the survey results, the system will plan to include the broadcasting of local current affairs side by side to achieve full of acceptance of the system.
- The Compact GPMS receiver will be designed to make possibility of availability easily to everyone.
- 'Music is the shorthand of emotion.'- Leo Tolstoy. The GPMS will be expanded to play the song according to the emotional state/mood of the every individual.

IX. CONCLUSION

It gives additional dimension to GPS for entertainment which is a new phase in its developments. Apart from technological, the main motto of the every invention is to make the users' life easy and making enjoyment. The introduced system will surely provide the full time of enjoyment to each and every individual. It will be the way to the fully automated world where each machines act according to our need automatically without commanding. By, this the socio culture and language of the whole world is opened up to everyone by means of music.

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BIOGRAPHIES

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