Design and Implementation of GPS and Wireless Infrastructure for Advertisement on Geographical Basis

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ABSTRACT

Today era is automation era all things is going to be instinctive and handled by a solo button. Everybody wants to perceive effortless clarification of the day to day complications. As an illustration, passengers are mainly bored just as they travel by public transport (Bus, Train etc). They fancy to getting common allurement for location based statistics like important local events, peak hours, city activities etc. So it is obligatory to enact an automated mechanism that may advertise any commercial agency in a vehicle by using GPS and wireless technology. This will gratify lacks of travelers, such as location deets, travelled range, time elapsed, and it will also boost transportation gross by commercializing billboards. The angle of introducing ease of travelling by regional transport and intensifying the prosperity for the passengers' views are argued here and bulletin styles in transport services have been explained using GPS and wireless scenarios using experimental data.

Keywords: GPS, wireless technology, Mobile advertising, location advertising, Circuit-Maker 2000, NMEA.

1. INTRODUCTION

Contestable developments are seen by present successive technology in every individual field and aspect of organization. The performances of proceed technology are reviewed here in the field of advertisement for an organization to inflate their products efficacy and firm name popularity in emporium. The advertisement can also done instead of traditional advertisement methods like TV, Radio, news paper internet etc with a more efficient way using today modern and advance technology. The synthesize use of GPS and wireless technologies are new brands of advertisement which are key challengeable zones. To attain the objectives of a business or other association it is needed to advertise unfailing and everywhere using recent resources with low budget and efficient economical prices [7].

Supreme objective of this study is to elaborate LOCATION-BASED ADVERTISING using GPS and wireless technology infrastructure. To advance future studies by academic and industry researchers is the first objective, while second one is of this paper is to impart a multi-item scale for measuring fabricate the items.

As stated in Fig 1 how GPS device using wireless technology and the data provided is by the constellation of satellites. These instructions are manipulated and investigated by the controlling unit and then displays the relative stored data on screen e. g as stated in Fig 1, a vehicle having this hardware installed inside passes a station or base. The GPS apparatus allocates a data which specifies that distinct location using space or wireless technology. When the GPS data contents the system's data, the relative saved directions is preforce unveiled on the screen with announcements and visual ads for the objective of advertising.
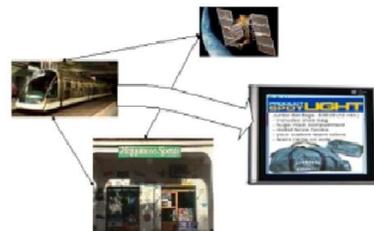

Fig. 1. location based advertising in vehicles using modern world of technology [1].

E. F. Ali

The research area "Location Based Advertisement By using GPS and wireless technology" is a eccentric and fitter stratagem of advertisement and such hardware devices are less expensive. This suggestion is never handed out in Pakistan and some other countries. It has following attributes [2] [12].

I. Providing visual information regarding passenger's ongoing position on the large screen.

II. Vocal announcements of each bus stop and particular organization or location for the strangers who are unfamiliar with the city and location or pattern.

III. As the passengers are not in a position to read the advertisements and signboards at the roadside as they are sitting in the moving vehicles so they will be provided with the visual commercial ads on the screen mounted within the vehicles and trains.

IV. Tourists can get more insight about every historical status they pass by bus or train.

V. Providing distance information in kilometers.

VI. The technology holds the aptitude for marketers to provide information and offers to consumers based on their proximity to places where the marketers' goods are accessible.

VII. The main advantage of this paper is to help the passengers and visitors about their location that they may not get their way lose.

VIII. Such kind of modern e-advertisement are very beneficial for customers.

IX. We can make use of dual function from by using this technology that is the announcement of the exact location and delight to the passengers with diverse and disparate commercials.

X. This technology provides safe and multiple avenues to users.

Currently, there are a number of concerns Lunched to Location-Based [3] [4][5][6], the key ads system kindness of Location-Based advertising Service(LBS) which can impart helpful information to users are given bellow [8]:

a) Facilitate users with precise position of the movable e-devices and vehicles.
b) The system must have documentation about every particular area and organization with exact delineation.
c) Must have the talent to issue the desire information with low latency rate.
d) The device must be smart enough to detect movable device on accurate location.

The GPS and Wireless system used to oversee and plan the advertising targeted point, in which the area of each locations and organizations with their exact figure available. With addition, using this proceed epoch of technology the mobile type ads can also issue for most preferable and required regions such as Education, Commence, Medical, Residential and Tourism [6].

2. OVERVIEW ON GPS

GP is an ingredient of modish automation for locating a person or an object in three dimensional spaces anywhere on the Earth or in the surrounding orbit. GPS is a very decisive innovation of our time on accounts of many different possibilities it brings many challengeable improvements in various fields.

This GPS system can be introduced in our current transport services like (i.e. Buses, trains etc) for location based advertisement, using LCD, with some extended manipulations, such as declaration of the covered distance and the distance from destination. Apart from that we wish to entertain passengers by turning on FM radio and also keep them updated with recent activities within the city. The Global Positioning System (GPS) is a satellite-based navigation system trumped up of a lattice of 24 satellites placed into orbit by the U.S. Department of Defense [15]. GPS was basically intended for military use, but in the 1980s, the government made the system available for public use. GPS is operated in any weather conditions and anywhere in the universe, around the clock. There are no subscription fees or setup charges to use GPS. A GPS satellite consists of approximately 2,000 pounds and is about 17 feet extended across the solar panels with power energy of 50 watts or minimum [13].

GPS satellites circle the earth twice a day in a very precise orbit and dispatch gesture information to earth. Global Positioning System, satellites transmit signals to stuff on the ground. GPS receivers passively gather satellite signals; they do not transmit. Its operations hinge on a very accurate time reference, which is outfitted by atomic clocks at the U.S. Naval Observatory and all GPS satellite include atomic clocks on board [11].

GPS receiver extended to at least three satellites in order to calculate a 2D position (latitude and longitude), and track movement 3D position (latitude, longitude and altitude) calculation needs four satellites three for above mention categories and one for time purpose. On any occasion the position of an object has been diagnosed, the GPS unit can calculate other information, such as speed, bearing, track, calculate distance, end position distance, time data about sunrise and sunset or more [11].

Ground stations are objected to clarify the orbit of each satellite. The numbers of satellites that constructed up the GPS space portion are orbiting the earth about 12,000

E. F. Ali

miles above. They are moving with constant speed, completing two revolutions in less than 24 hours. These satellites are journeying at speeds of roughly 7,000 miles per hour [14].

 GPS satellites are influenced by solar potency. They have bank of batteries for alternative installed on board to keep them functioning in the event of a solar eclipse. Small rocket boosters on each satellite keep them flying in the veracious path [15].

GPS satellites transmit two low power radio signals, designated L1 and L2. Civilian GPS provide the L1

frequency of 1575.42 MHz in the UHF band [15]. The data signals are traveled by line of sight means they can pass through clouds, glass and plastic [15].

A GPS signal consists of three different bits of materials a pseudorandom code, ephemeris data and almanac data [14]. To estimate how far away a satellite is, the receiver also knows where it is located on the surface of an imaginary sphere centered at the satellite. It then verifies the sizes of several spheres, for each satellite [13]. The receiver is located where these spheres intersect as stated in Fig 2:
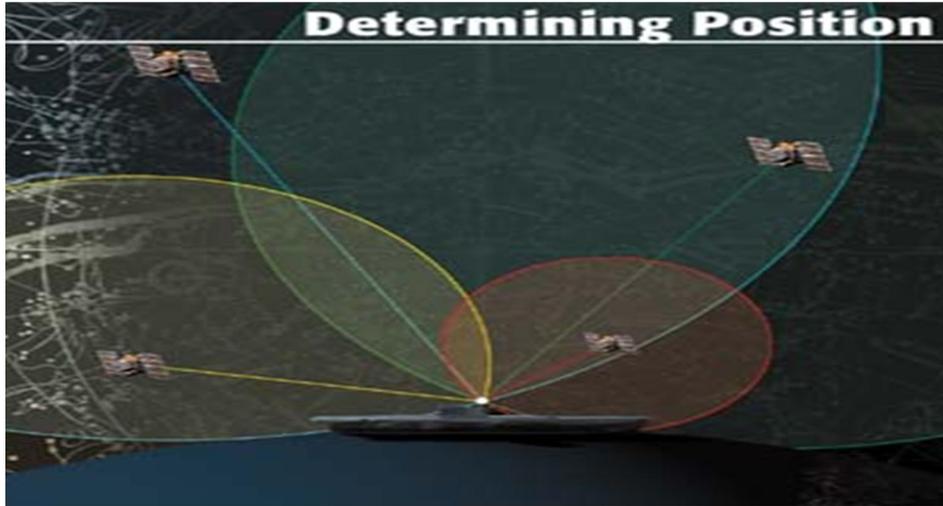

Fig. 2. Determining Receiver's Position [9]

For example, if you know I am above sea level, you can reject a point that has negative points. Mathematic calculations and computers accept us to elevate the correct point with the help 3 satellites.
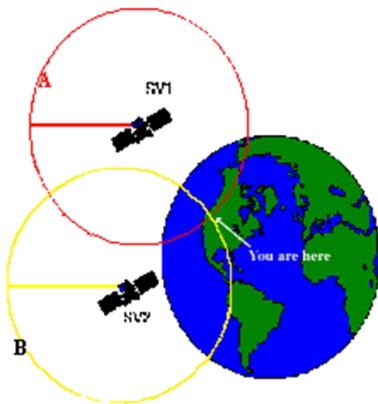

Fig. 3. computing of position by satellite [12]

Based on these instances, you can see that you need to know the following information with the object to compute your located area as shown in Fig 3:

3. OVERVIEW ON WIRELESS TECHNOLOGY

Wireless technology is the modern way of today technology it brings enormous facilities and changes for users in each and every field of life. GPS can receive information from satellite via wireless medium. The implementation of Wireless technology in Location based services is a better planned processes, using this technology data can be sent or received to everywhere from any location with less economy rates [10].

The Block sketch is show in Fig: 4 explain the stream of information and control using GPS and wireless Technology. The controlling unit, that in our case is a microcontroller, receives location co-ordinates from the GPS device and compares it with the predefined co-ordinates in it. After it finds them to be similar it would follow the corresponding units of guidance to control the other devices attached to it. The LCD and the Audio/Video devices are activated to display the relative information.
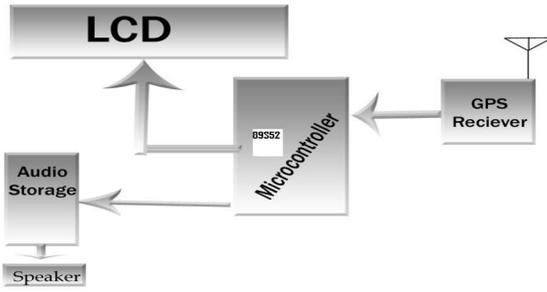
E. F. Ali

Fig. 4. Block diagram of the proposed architecture

The device consists of ON/OFF switch to turn on and off the device, GPS receiver module which receives frequencies from satellite channels and decode the carried information to a form which are easily understood by microcontroller and it supports NMEA data protocol frequencies used by GPS are mention in Table 1, microcontroller which is work for controlling of all receiving and sending data it is also called brain of the system, Audio/Video storage device for the purpose of storing the videos of relevant information about a location and a LCD which is used for displaying the received information on Screen.

Table 1: GPS frequencies [15]

GPS Frequencies	L1;	1575.42 MHz
	L2;	1227.60 MHz

4. OVERVIEW ON NMEA

Since the hardware utilizes a GPS device which communicates via NMEA protocol using wireless technology and it is severely needed to have a flavor of the mechanism to understand how the information is received and expounded by the network. The NMEA (National Marine Electronics Association) has evolved a description which defines the interface among many segments of marine electronic equipment. The standard of NMEA allows marine electronics to transfer directions to computers and to other marine elements [16].

GPS receiver worked on this standards and maximum of computer programs that issue real time position information understand and expect data to be in NMEA structure. This data includes the complete PVT (position, velocity, time) solution computed by the GPS receiver. The intentions of NMEA is to transfer a stream of information called a sentence that is totally self contained and independent from other sentences [17].

5. EXPERIMENTAL SETUP

The architecture of the analyzed Location based services using GPS and wireless technology as described in Fig: 4.The schematic architecture consists of following components: dc power supply, diode, on/off switch, 1000 micro farad electrolyte capacitor, LM7805 voltage regulator, GPS device with antenna for wireless communication, LCD, IC ULN (2803) and relays for controlling the video player and microcontroller for controlling the management of whole device.

Schematic diagram explains the whole structure of the data that how the system can be designed. Circuit- Maker 2000 software is used for, designing the proposed diagram of the analyzed architecture.

With its tremendous features and variety of virtual component library, it allows a great deal of ease in virtual circuit designing. Circuit-Maker 2000 consists of new features and technology enhancements issuing all the accessories necessary for fast and easy creation and simulation of electronic designs. The developments include a better waveform viewer, a device browser and a streamlined user interface for easier access to various features.
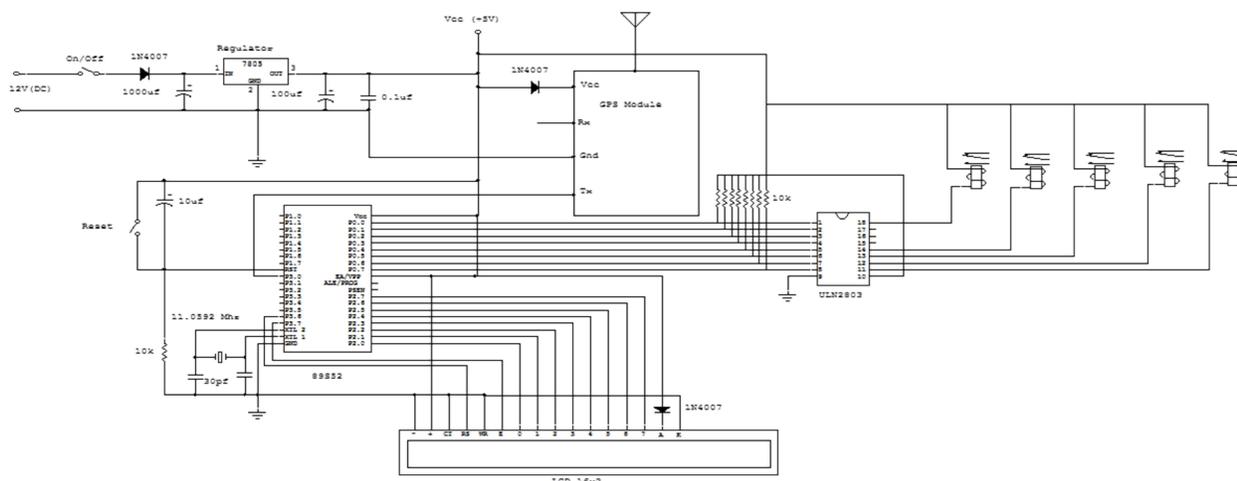
E. F. Ali

Fig. 5. Schematic presentation of proposed GPS system for Location based services

According to architecture the device is energized by a (12V) DC power supply which can replace by 9V DC battery. A diode followed by a (ON/Off) switch serves the purpose of protecting the rest of the circuit in case of reverse polarity. Clarification of device is performed by a large value electrolytic capacitor, which is connected across the DC supply to act as a reservoir, supplying current to the output when the varying DC voltage from the rectifier is supplying. A 1000uF electrolytic capacitor is connected immediate after the diode to minimize the spikes from the voltage source, for the voltage regulator. An LM7805 voltage regulator maintains a voltage of 5V for the coming circuit components where the 100uF capacitor after the IC is stabilizing the IC, by preventing it from oscillating, and responding to quick changes in load faster than the IC can. Since low value capacitors have the capability to filter high frequencies so 0.1uF capacitor is used after 100uF to filter the high frequency distortion from ICs. GPS device has 4 pins (i.e. VCC, Rx, Tx, and GND). VCC is dropped to almost 4.3V by a diode to be supplied to GPS module because an unusual behavior is observed when GPS module is supplied with exactly 5V. Tx pin is linked, to pin3.0 (RXD) of the microcontroller for serial communication where Rx of the GPS device is left unused. + ve and – ve pins of 16X2 LCD are connected to VCC and GND respectively. CT pin (used for contrast) is grounded for maximum contrast level. RS (register select) is fabricated, to PIN3.6 (WR or Write to external, 1= Display Register, 0= Command Register). WR pin of LCD is grounded to read only (1= Read, 0= Write). E (enable) pin is joined with PIN3.7 (RD) of the microcontroller. Pin0 to pin7 of LCD are connected parallel to Port2 for data. For Backlight, A (anode) is connected to VCC via a diode and K is grounded. PIN20 of the microcontroller is grounded where XTL 1 and XTL 2 are attached to crystal oscillator of 11.0592MHz. Both

the oscillator terminals are grounded via two ceramic capacitors, (30pF each) to ground the external frequencies. Since the voltage levels of the microcontroller are not sufficient to derive a relay so an IC ULN (2803) is connected after an array of pull-up resistors to operate relays with an amplified signal. The target of pull-up resistors is to make Port0 an output port. There are five relays derived from pin 11,12,13,14, and 18 to control our video player, are named DOWN, PLAY, BACK, UP, and POWER respectively. The purpose of these relay is to select peculiar video track in accordance with the received coordinates from the GPS device. Pin10 of the ULN 2803 IC is supplied with VCC in conjunction with pull-up resistors of AT89S52.Power-On Reset Circuit preliminary charging of capacitor makes RST High When capacitor charges fully it stop taking more energy, then manual reset closing the switch momentarily, will make RST High and After the reset, the program counter is loaded with 0000H with disturbance of RAM.

6. EXPERIMENTAL RESULTS AND ANALYSIS

For the aim of such simulation, we were advised to use simulation software called Proteus.

The Proteus software Design is unique in offering the ability to co-simulate both high and low-level micro-controller codes, in the context of a mixed mode SPICE circuit simulation. With this Virtual System Modeling facility, you can transform your product design cycle, reaping huge rewards in terms of reduced time to market and lower costs of development.

Simply Proteus software VSM improves efficiency, quality and flexibility in the designing process. We have implemented M IDE-51 Programmer for write program for

E. F. Ali

function the device on the basis of above discussed data. For result we have stored the following position for the purpose of detecting the location via GPS using wireless technology system.

The mention data which are stored in device are stated in table 2:

Table 2: Geographical data of different positions

Location	North hemi sphere	East hemi sphere
Position 1	3400.2	7132.1
Position 2	3358.4	7126.0
Position 3	3357.6	7130.3
Position 4	3357.7	7131.6
Position 5	3445.4	7133.2
Position 6	3359.7	7132.1

When the train or any vehicle having installed device as it passing the stored location, as the data will match according above saved data and wirelessly capture information by GPS with this the video and audio player will turn on which are controlled by microcontroller and all the relevant statements about the area will display on screen.

advertisement, speeding up the exposing time of ads in the ads markets. Through the experimental analysis, we prove that this is the only method can control the key audiences of different times. Despite the planed or the unplanned regions, Location based advertising services have batter performances than any other methods, can broadcast the neighbors' relative ads, and control the trend of the potential audiences.

7. CONCLUSIONS

This research is based on GPS and wireless pedestal describes the formation of location based advertising through GPS using current wireless technology. It has been conclude, from experimental and discusses data that today this modern era it will be better to implement current technology system we can lunch valuable and managerial techniques of advertisements in mobile phone, vehicles, buses, trains etc when they are used to follow on a distinct area. It is also observed that People can be entertain with different adds, historical building, famous products of relevant region which is a better easy way of advertising and helps people to search about their desire area or product.   The location-based services pivot on the audiences through schematic management system. It is founded that upgrading of new data regarding a product or location are needed so it will easy to vary and upload. So it is also easy for consumers they can alter, their data every time by service providers they can vary time management, adds policy, new product, event adds limited time adds etc. This system will degrade energy cost and duration of time. More traditional advertising is big problem by reason of limited rules regulation from government, because traditional advertisements are not allowed everywhere and any time. In other words, by the Advertisement Recommendation Subsystem, the advertisers only set up the ads types, designating the higher benefit advertisement to broadcast, and then can reduce the complicated setting process of the

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E. F. Ali

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