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Design of Global Location System Based on Embedded Linux Using ARM9

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***Abstract* — The design of Global location system based on ARM mainly build by Linux. The architecture and working of this system is introduced in details, and introduces the Global location system which uses the ARM microprocessor as a control unit interfaces with GPS and GPRS modules. In general GPS modules will give latitude and longitude values. Using these values we cannot predict location name to overcome this we had designed. In this paper we are developing a web page which links to Google map URL and the latitude and longitude values are passed to the web page with ARM processer. The main advantage of this system is the web page will be accessed on the ARM processor which has display unit also. By this the persons in mobile unit can also know the exact location with the map view.**
GPRS Connected to ARM processor for mobile communication where internet can be accessed.

***Keywords* — GPS, GPRS, ARM, Base Station Module, Mobile Module.**

I. INTRODUCTION

In our system the GPS and GPRS module are interfaced with the ARM processor where the GPS will pass the latitude and longitude values to ARM processer and GPRS access the internet in ARM processer and the latitude and longitude values are passed to the developed webpage and with the help of Google URL the located name and map is displayed in webpage. In this developed webpage it also shows the time. Using this location name and time the data base is maintained of each and every point on mobile location. This webpage also have the security by providing the unique USER ID for observing the system location.

Using the Global Positioning System (GPS, a process used to establish a position at any point on the globe) the Following two values can be determined anywhere on Earth. One's exact location (longitude, latitude and height co ordinates) accurate to within a range of 20m to approx.1mm. precise time (Universal Time Coordinated, UTC) accurate to within a range of 60ns to approx. 5ns.Speed and direction of travel (course) can be derived from these co ordinates as well as the time. The co ordinates and time values are determined by 28 satellites orbiting the Earth.

II. HARDWARE SPECIFICATIONS

The following hardware components are used in building the entire system.

A. GPS
B. GPRS Module
C. S3C2440A PROCESSOR (Friendly ARM9 Board)

A. GPS Module

LS20030~3 series products are complete GPS smart antenna receivers, including an embedded antenna and GPS receiver circuits, designed for a broad spectrum of OEM system applications. The product is based on the proven technology found in LOCOSYS 32 channel GPS SMD type receivers MC 1513 that use MediaTek chip solution. The GPS smart antenna will track up to 32 satellites at a time while providing fast time to first fix, one second navigation update and low power consumption. It can provide you with superior sensitivity and performance even in urban canyon and dense foliage environment. Its far reaching capability meets the sensitivity requirements of car navigation as well as other location based applications.

B. GPRS Module

The GPRS core network allows 2G, 3G and WCDMA mobile networks to transmit IP packets to external networks such as the Internet. The GPRS system is an integrated part of the GSM network switching subsystem. In 2G systems, GPRS provides data rates of 56–114 Kbit/second.2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and third (3G) generations of mobile telephony. It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels.USB 3G/GPRS modems use a terminal-like interface over USB 1.1, 2.0 and later, data formats V.42bis, and RFC 1144 and some models have connector for external antenna. Modems can be added as cards (for laptops) or external USB devices which are similar in shape and size to a computer mouse, or nowadays more like a pen drive.

C. S3C2440A Processor (Friendly ARM9)

Today, the ARM family accounts for approximately 75% of all embedded 32-bit RISC CPUs making it the most widely used 32-bit architecture.S3C2440 is a Samsung company's microcontroller which is designed based on the structure of ARM 920T family. This microcontroller works for an voltage of +3.3V DC and at an operating frequency of 400 MHz The maximum frequency up to which this micro controller can work is 533 MHz. We cannot get S3C2440 microcontroller individually. We will get it in the form of FRIENDLY ARM board otherwise we can call it as MINI 2440 board.

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III. System Modules and Network Operation

The first part of this system is mobile unit. It uses a GPS Module for getting latitude and longitude values; those are the important part of this project. These values (e.g.1077-2345.3522N, 1055-09022.0288E) will be sent to the ARM Processor along with the particular mobile unit no.ARM Processor will sent these values to the URL that we have provided. This can be done by GPRS. The proposed Global location system makes use of GPS Module which is interfaced to lower power consumptive and highly advanced micro controller like S3C2440.the particular URL will be opened on the ARM display unit. The block diagram of the mobile unit is shown in the Fig.1

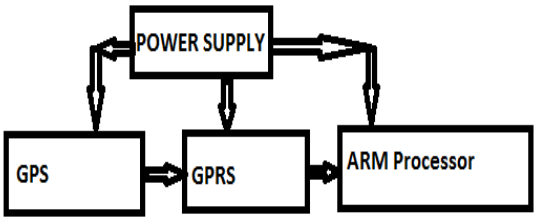


Fig.1. Mobile Unit

In the second part of the system is base station. There will be web site that we have designed particularly for this location identification system. These web pages will receive latitude and longitude values along with mobile unit no and map directly to the Google maps. This will display the map of the location with name of the place. Along with these values it also displays time, date, and speed. There will be individual database for different mobile units. The block diagram of base station is shown in Fig.2

Fig.2. Base Station

The execution of this project is done in the linux environment. Ubuntu is the linux operation system used. Using VMware a virtual memory is created in the pc, in which Ubuntu is operated, without actually installing the complete linux operating system. In recent days, these kinds of systems find applications in various domains such as- public places like railway stations, air ports, bus stops, Industries, defense, stadiums, etc.

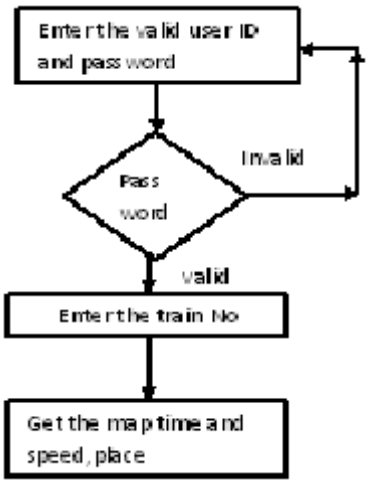
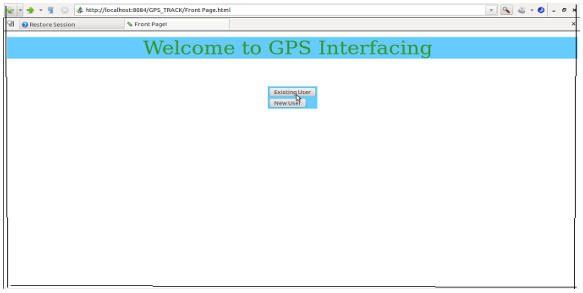
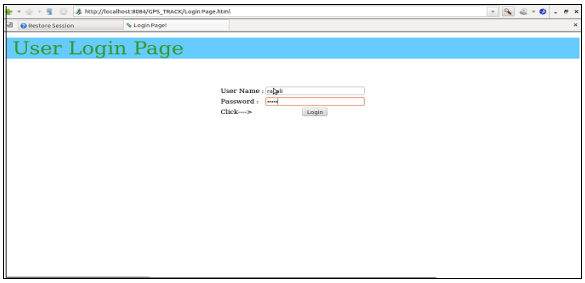
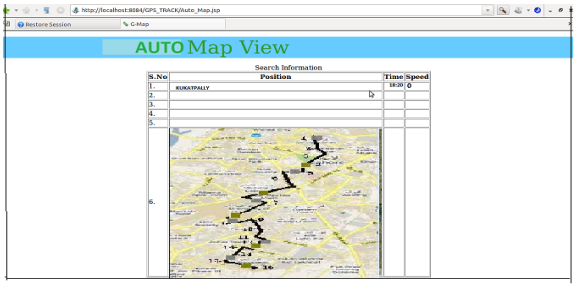


Fig.3. Flow chart

IV. Result Analysis







As shown in the above figures when the user's login with correct details then the webpage will give the exact map of the mobile unit along with speed, time, and place.The same map will be opened on the mobile unit graphical display unit also

V. CONCLUSION

This Paper **"Design of Global Location System Based on Embedded Linux Using ARM9 Processor"** has been described. It has been eliminates burden of mapping each and every latitude and longitude points. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced ARM9 board and with the help of growing technology the system can be successfully implemented. This system finds more applications in military & defense cell.

VI. FUTURE SCOPE

The system **"Design of Global Location System Based on Embedded Linux Using ARM9 Processor"** can be extended by getting an accident detection message back to the web page and this system can used for all kind of the vehicles where data can be maintained in server on the base of vehicles registration number which makes easy for the authorized persons to verify vehicles data.

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