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A Novel Public Transport tracking system using GPS/ GPRS and ARM Cortex Processor

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Abstract: - Nowadays, utilization of motor conveyances is becoming compulsory for virtually every people. So, due to the incrementing the number of conveyances on roads traffic controlling became crucial one and additionally major quandary for general public as well as regime. In this paper, a conveyance monitoring system is proposed by utilizing the embedded system technology, which gives the keenly intellective management of public convey. This design includes the GPS, GPRS, ARM, Embedded Linux operation system etc. the proposed design provides the scheduling of communication, location tracing and ceases broadcasting, and video monitoring and additionally counts theNumber of public convey conveyances. The proposed design is prototype for desired application.

Key words - Embedded Linux system, GPS,GPRS, ARM, Public Transport

1. INTRODUCTION

In present, the motor convey incrementing so the controlling of conveyances on roads becomes a major issue. This withal effects on mundane people and restricts the development of current city. If we provide a system that monitors and controls this convey on roads it avails to surmount this quandary. A good number of tracking systems had so far been developed with a wide range of tracking facilities .But the operation cost of most of these systems is higher which obviates from widespread use. On the other hand, the rate of car larceny, asset larceny, child abducting in many countries are incrementing at a higher rate. The objective of this research is to reduce the cost of the tracking system utilizing the latest technologies and making it available to the mundane people. The system utilizes an On-Conveyance Module consists of GPS receiver and GSM modem, the contrivance resides in the conveyance to be tracked. In order to track the kineticism of the Conveyance Google Maps utilized for mapping the location. The GSM modem fetches the GPS location and sends it to the server utilizing GPRS. Extensive research

work had been carried in the field of object predicated system ranging from GSM predicated location tenaciousness to GPS predicated location Tenaciousness. The integration of GPS and GSM was first established utilizing SMS as a method of transmitting GPS coordinates. The inclusion of GPRS technology to transmit location coordinates to a remote server facilitates the tracking of object remotely utilizing any computer connected to the web. AVL-Automatic Conveyance Location system was discussed in details by Al-Bayari and Sadoun that presented under GIS environment. However a consummate FPGA implementation of the conveyance position tracking system utilizing concise message accommodations (SMS) discussed the design and implementation of a mobile object management system that makes utilization of the subsisting GSM networks and its extension GPRS for data communication. Hsiao and Chang developed analytical model to an allies the optimal location update strategy with the objective of minimum total cost. Tamil etc. did homogeneous works compared with ours but utilized the SMS for the communication. A more recent work by NishikantaPation video surveillance and tracking of moving civilian conveyance incipient dimension to the development of the tracking systems

2. RELATED WORK

Subsisting method

The paper proposes a system which fixates on enhancing the usability and productivity of subsisting bus conveyance system in Indian cities. The paper introduces a framework as an amelioration to the subsisting city bus public convey system in India - Advent Time Prognostication of bus in authentic time and approximate Seat Availability in the bus. ZigBee and GSM/GPRS Technologies can be utilized to establish a wireless network among Buses, Bus Ceases and Central Bus Stand in order to engender this interconnection.

Proposed system

Current bus accommodations are congested, unreliable, untimely and uncoordinated in India. The ownership and operation of most public convey accommodations have significantly reduced its productivity. India's cities desperately necessitate ameliorated and trustworthy public convey accommodation. The public convey needs to scale the productivity with incrementing population and its needs; the amelioration in infrastructure must be availed with the perspicacious approaches of Machine-to-Machine (M2M) communication. This

gregarious issue has enheartened us to come up with a conception for the betterment. The paper additionally suggests modifications in the design of currently used Digital Ticketing Machine to implement the feature of conveying the seat availability.

3.IMPLEMENTATION

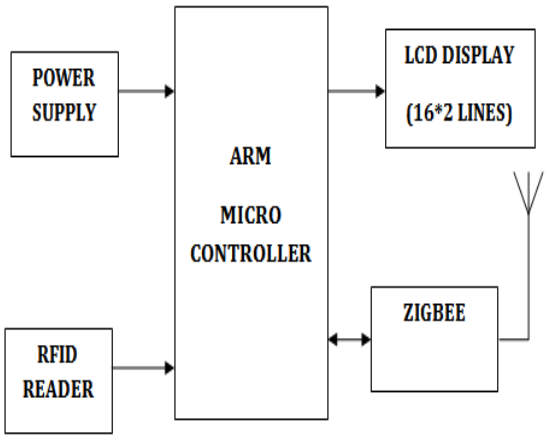

Fig 1: - In bus section

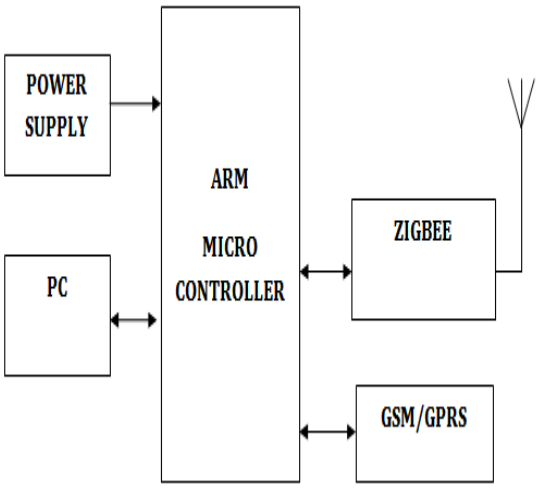

Fig 2:- Bus Stop

Generally, journey in a bus is a safe and comfort factor. During the peregrination for longer distances we should prefer to bus than any private conveyance. Whenever we are peregrinating for longer distances we feel tired and asleep. When the bus reaches the station suddenly we arouses then we can't ken where the bus is or the persons who are analphabetic can't ken where precisely the bus is currently. To surmount such kind of quandaries, this project is being designed utilizing Zigbee& GSM/GPRS technology. In bus we will be having Zigbee TX and at the cessation we will be having Zigbee RX. So, we can identify which bus is coming to the bus stop through the RF signals and will be exhibited on the LCD.

ARM Cortex Processor Profiles

In the ARMv7 architecture the design is divided into three profiles –

A Profile (ARMv7-A) - is designed for high performance open application platforms. They can handle involute applications such as high end embedded operating systems. Example products include high-end smartphones, tablet PCs and PDAs.

R Profile (ARMv7-R) - is designed for high end embedded systems in which authentic time performance is needed. Example applications include high-end car braking systems.

M-Profile (ARMv7-M) – is designed for deeply embedded microcontroller type systems. Processors belonging to this profile are the subject for this manual and are studied in more preponderant detail. The Cortex-M3 processor fortifies only the Thumb-2 (and traditional Thumb) injuctiveauthorization set. In lieu of utilizing ARM ordinant dictations, as in traditional ARM processors, it utilizes Thumb-2 injuctive authorization set for all operations. As a result, the Cortex-M3 processor is not rearward compatible with traditional ARM processors, which utilize the ARM as well as Thumb ordinant dictation set. The Thumb-2 injuctive authorization set is a very consequential feature of the ARMv7 architecture. For the first time, hardware divide ordinant dictation is available on an ARM processor, and a number of multiply ordinant dictations are withal available.

Power Supply Unit

The input to the circuit is applied from the regulated power supply. The ac. input i.e., 230V from the mains supply is step down by the transformer to 12V and is alimented to a rectifier. The output obtained from the rectifier is a pulsating dc voltage. So in order to get a pristine dc voltage, the output voltage from the rectifier is alimented to a filter to abstract any ac components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pristine constant dc voltage. The block diagram of regulated power supply

Hardware components

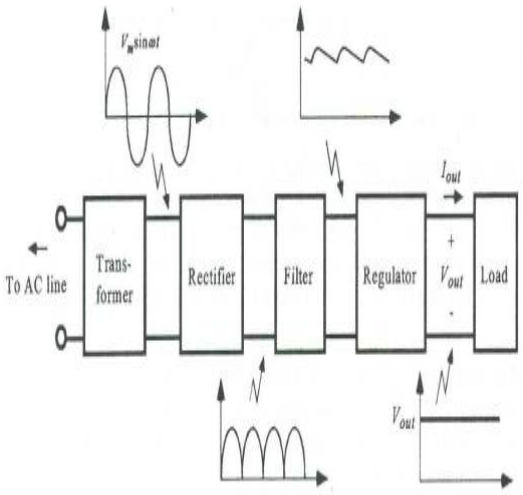

Fig:-3 Components of power supply

Zigbee

The denomination ZigBee is verbalized to emanate from the domestic honeybee which utilizes a zig-zag type of dance to communicate paramount information to other hive members. This communication dance (the "ZigBee Principle") is what engineers are endeavoring to emulate with this protocol a bunch of separate and simple organisms that join together to tackle intricate tasks. ZigBee is a low-power wireless communications technology and international standard protocol for the next-generation wireless network, reducing data size and sanctioning for lower-cost network

construction with simplified protocol and circumscribed functionality. ZigBee utilizes the PHY and MAC layers defined by IEEE® 802.15.4, which is the short-distance wireless communication standard for 2.4 GHz band. ZigBee comprises the ZigBeeplatform designations and ZigBee profiles defined by the ZigBee Coalition.

Rfid reader

An RFID reader's function is to interrogate RFID tags. The expedient of interrogation is wireless and because the distance is relatively short; line of optical discernment between the reader and tags is not compulsory. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to engender the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to arouse the tag. The receiver has a demodulator to extract the returned data and additionally contains an amplifier to fortify the signal for processing. A microprocessor forms the control unit, which employs an operating system and recollection to filter and store the data. The data is now yare to be sent to the network.

GSM/GPRS

The Ecumenical System for Mobile communication, conventionally called GSM, Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks utilized by mobile phones. The GSM standard was developed as a supersessionfor first generation (1G) analog cellular networks, and pristinely described a digital, circuit switched network optimized for full duplex voice telephony GSM is a cellular network, which denotes that mobile phones connect to it by probing for cells in the immediate vicinity.

The General Packet Radio Accommodation (GPRS) is a packet-switched data transmission protocol, which was incorporated into the GSM standard in 1997. It is rearwards-compatible with systems that use pre-1997 versions of the standard. GPRS does this by sending packets to the local mobile phone mast (BTS) on channels not being utilized by circuit-switched voice calls or data connections. Multiple GPRS users can apportion a single unutilized channel because each of them utilizes it only for infrequent short bursts. The advantage of packet-switched connections is that bandwidth is only used when there is genuinely data to transmit.

LCD display

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons: The declining prices of LCDs.The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.Ease of programming for characters and graphics.

3. RESULTS OF THE PROJECT

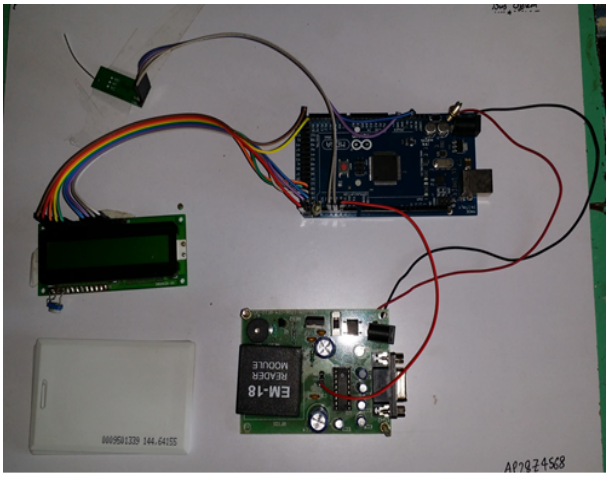

Fig:-4 Project Rfid reader& Card

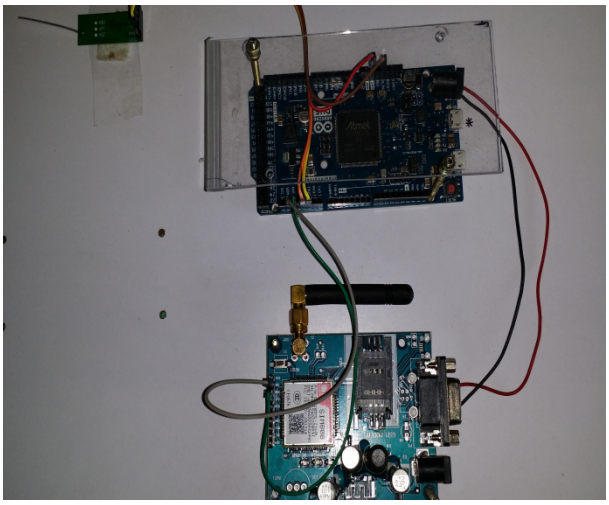

Fig:-5 ARM Cortex Processor

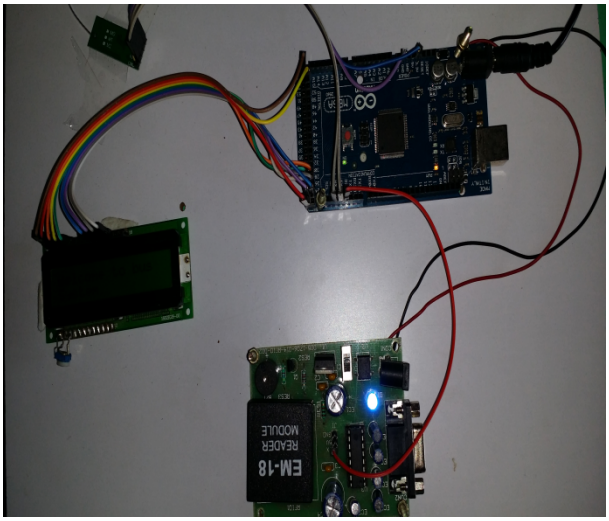

Fig:-6 GSM/GPRS

4. CONCLUSION

In this work we are discussed and implemented a public transport control system by using the GSM, GPS and ARM microcontroller. By this system we can get the desired application and also it will be useful for the public. Since it is a prototype for the actual application if we implement in real time it exhibits efficient results in desired

manner. By the presented system the vehicles can be controlled by available modules which are available in human mobiles and also vehicles.

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