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# Real Time Intelligent Transportation System with Smart Assistance for Public Safety

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**ABSTRACT:** This project focuses on safety of bus passengers. People standing on the footboard hanging out of the bus are a very common dangerous view in India. Many accidents are happening because of this. The project finds a solution to end this. The footboard is provided with sensors which identifies whether people are standing on the footboard. And if controller receives that indication it automatically stops the vehicle and will not allow moving further until the person has moved out of the footboard. The bus is also smart enough to send message to ambulance if any accident occurs. It is also provided with woman safety measures. If women face any issues while travelling in this bus a single switch press can send message to the police station. The messages are sent along with the location of the bus with the help of GPS module. The bus can identify each stop and announces the stop inside the bus.

**KEYWORDS:** GPS, Sensors, RFID Module.

### I. INTRODUCTION

The number of accidents occurring due to people hanging out of footboard is increasing day by day. A system to prevent accidents due to this is very much necessary to be introduced. Tragedies resulting from footboard travelling in buses are one of the prominent examples of road accidents. A 16 year old student was travelling on the footboard of an overcrowded MTC (Metropolitan Transport Corporation) bus in September, 2010. The youngster was crushed to death under the wheels of the bus when he slipped and fell down. In another incident, a speeding bus, having passengers hanging on the footboard, was hit by a lorry in December, 2012. Four students were fatally caught between the bus and the lorry. The basic principle behind the working of the proposed system is to stop the bus from moving when someone stands on the footboard. Even though automatic doors are available, the negligence of the bus drivers to close the door before starting the bus makes the automatic door moot. But when the system ensures that the bus does not move unless the footboard has no passengers and more importantly only when the doors are closed. In this way, human interference is completely removed by reducing the number of deaths drastically.

This paper work also focuses on providing safety to women passengers in the bus, for which an emergency switch is provided inside the bus. An additional facility of stop announcement inside the bus is also made. If an accident occurs immediate start of rescue operations is necessary. For this it is necessary to know where the accident has occurred. This bus is provided with a feature which sends accident occurred information along with the location to the nearest police station and ambulance service.

### II. BLOCK DIAGRAM

A power supply is a device that supplies electric power to an electrical load. The term is most commonly applied to electric power converters that convert one form of electrical energy to another, though it may also refer to devices that convert another form of energy (mechanical, chemical, solar) to electrical energy. A regulated power supply is one that controls the output voltage or current to a specific value; the controlled value is held nearly constant despite variations in either load current or the voltage supplied by the power supply's energy source.

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Regulated Power Supply

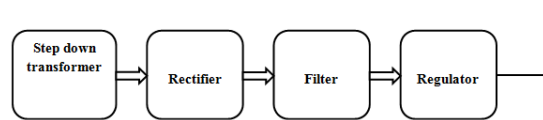


Fig.1: Regulated Power Supply

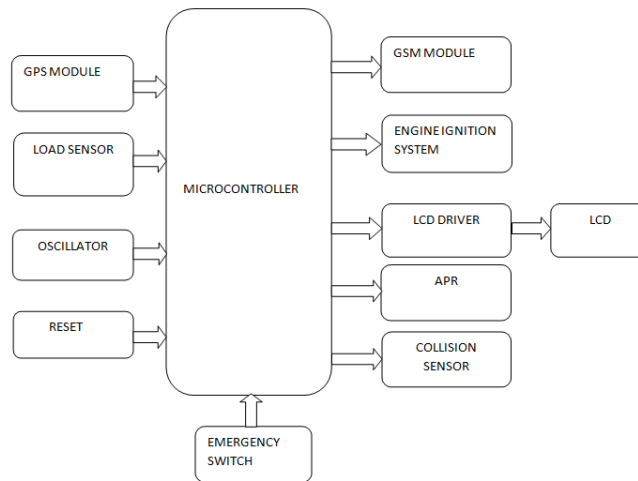


Fig. 2: Block Diagram of Smart Bus Information System

**ATMEGA32 AVR MICROCONTROLLER:** AVR is the microcontroller used in this project. The major heart of this project is AVR microcontroller, it has more features like 16bit timer, 10-bit ADC, USART, SPI, I2C, 256 bytes of EEPROM memory, and 32kbytes of flash program memory, then at last its speed of program execution is about to 1 microsecond or 10 MIPS (10 Million Instructions per second), etc. However, compare to other microcontroller it is fast and very ease to program in C language because of huge support can gain from the manufacturer for programming. The special IDE offered by the manufacture, it is named as AVR Studio IDE for it code generation purpose. This is the main component that controls the entire operations in the system. It contains 4 main ports. The reset circuit is used to reset the microcontroller. The pull up resistor is connected to Vcc. Normally the button is open then high value is reset to pin. When the button is pressed, then Vcc gets connected to the ground. So active low signal is given to reset button and the controller resets. The crystal oscillator circuit is used to generate clock for the controller. The clock pulse generator comprise of a crystal and two capacitors of 22pF each.

**LCD:** A liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. The most common application of liquid crystal technology is in liquid crystal displays (LCDs). A liquid crystal display consists of an array of tiny segments (called pixels) that can be manipulated to present information. The LCD screen is more energy efficient and can be disposed of more safely than a CRT. Its low electrical power consumption enables it to be used in battery powered electronic equipment. The data pins of LCD are interfaced with the Port of AVR Module.

**CRYSTAL OSCILLATOR:** A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep track of time, to provide a stable clock signal for microcontrollers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators.



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**RESET FUNCTION:** Reset is used for putting the microcontroller into a 'known' condition. That practically means that microcontroller can behave rather inaccurately under certain undesirable conditions. In order to continue its proper functioning it has to be reset, meaning all registers would be placed in a starting position. Reset is not only used when microcontroller doesn't behave the way we want it to, but can also be used when trying out a device as an interrupt in program execution, or to get a microcontroller ready when loading a program.

**LOAD CELL:** A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. The various types of load cells include hydraulic load cells, pneumatic load cells and strain gauge load cells. Strain gauge load cells are the most common in industry. These load cells are particularly stiff, have very good resonance values, and tend to have long life cycles in application. Strain gauge load cells work on the principle that the strain gauge (a planar resistor) deforms/stretches/contracts when the material of the load cells deforms appropriately. These values are extremely small and are relational to the stress and/or strain that the material load cell is undergoing at the time. The change in resistance of the strain gauge provides an electrical value change that is calibrated to the load placed on the load cell. The load cell used here is generally a strain gauge. When a pressure or load is applied on to it, it reads the load and it sends a message for the engine to stop.

**RFID MODULE:** In a basic RFID system, tags are attached to all items that are to be tracked. These tags are made from a tiny tag-chip, sometimes called an integrated circuit (IC) that is connected to an antenna that can be built into many different kinds of tags including apparel hang tags, labels, and security tags, as well as a wide variety of industrial asset tags. The tag chip contains memory which stores the product's electronic product code (EPC) and other variable information so that it can be read and tracked by RFID readers anywhere.

An RFID reader is a network connected device (fixed or mobile) with an antenna that sends power as well as data and commands to the tags. The RFID reader acts like an access point for RFID tagged items so that the tags' data can be made available to business applications. Here we have a RFID Reader and tags. When each tag is moved over the reader it reads the RFID number and performs the function that is already loaded into it corresponding to that ID. Here we use this module for reading the stop. As each stop is read correspondingly stop is being announced by the APR module.

**APR MODULE:** The APR96 0 0 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. It can reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion. Main function of this module is for announcement of stops. It has the sound or the stop names already recorded into it. It responds according to the stop id read through the RFID module. The announcement is inside the bus. This helps the blind to know the next station.

**EMERGENCY SWITCH:** This is provided for women safety. Whenever an emergency situation arises, this switch can be pressed, which sends an alert message to the nearest police station. The location of bus is also indicated in the message.

**COLLISION SENSOR:** This sensor senses the collision. If the effect of collision is above a threshold value it is assumed that an accident has occurred. It senses this collision and sends an accident has occurred message to the nearest police station and ambulance service.

## III. SOFTWARE

Embedded systems programming is different from developing applications on a desktop computers. Key characteristics of an embedded system, when compared to PCs, are as follows: Embedded devices have resource constraints (limited ROM, limited RAM and limited stack space, less processing power. Components used in embedded system and PCs are different; embedded systems typically uses smaller, less power consuming components. Embedded systems are more tied to the hardware.



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Two salient features of Embedded Programming are code speed and code size. Code speed is governed by the processing power, timing constraints, whereas code size is governed by available program memory and use of programming language. Goal of embedded system programming is to get maximum features in minimum space and minimum time.

Embedded systems are programmed using different type of languages:

Machine Code

Low level language, i.e., assembly

High level language like C, C++, Java, Ada, etc.

Application level language like Visual Basic, scripts, Access, etc.

Assembly language maps mnemonic words with the binary machine codes that the processor uses to code the instructions. Assembly language seems to be an obvious choice for programming embedded devices. However, use of assembly language is restricted to developing efficient codes in terms of size and speed. Also, assembly codes lead to higher software development costs and code portability is not there. Developing small codes are not much of a problem, but large programs/projects become increasingly difficult to manage in assembly language. Finding good assembly programmers has also become difficult nowadays. Hence high level languages are preferred for embedded systems programming.

## IV. CONCLUSION

This paper mainly focuses on safety of bus passengers. It provides safety for women. Though it provides different safety measures and emergency services, it has some disadvantages like misuse of emergency button by the passengers and whenever load is detected on the footboard the bus stops.

As a future extension announcement outside bus and at each bus stops can be added on to this. And also an alert message can be send to the nearby people where accident has occurred, because local support is very much helpful in such cases.

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