Footboard Avoidance System in Public Transport

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Abstract: In developing and populated countries like India problems are accidents in public transport. Among various public transport such as railways ,roadways and all ways, every year percentage of accidents in increases railways and roadways especially in cooperates/municipal bus transport .This is mainly due to foot boarding of passengers in peak hours which becomes risky travel for day to day school students, college students and other people's were injured and leads to death .In this project footboard avoidance system in public transport was proposed by using microcontroller and infrared ray sensor .The IR sensor were placed along the each staircase on both back and front side of the bus and also ultrasonic sensors used for blind spot detection. Whenever the sensor loss their connectivity due to foot boarding of the passenger it will indicates the buzzer sound and alerts the passenger, conductor and driver .If the buzzer sound exits more than 10 minutes (or) the power supply of the buzzer was lost it will automatically send the message to the 'RTO' office through the GSM module. By this message the RTO officer can take action on that bus owner, driver and conductor .By this project we can effectively reduce the footboard travel of the passenger and increase safety in the bus transport system.

I. INTRODUCTION:

The foot board avoidance system is mainly intended for reducing the accidents students when travelling in buses. Nowadays major accidents are occurred during the people travelling in footboard .This project monitors the people on the footboard and also send information to the authority. This project also senses the blind spot region of the bus and sends the information to the driver.

II. LITERATURE SURVEY:

K. Vigneshwaran, M. Kanthababu[1] has proposed the "Design and Development of Automatic Footboard Accident Prevention System" .This system consists of ultrasonic sensor, Hall effect sensor, accelerator pedal locking system and alarm indication system. The ultrasonic sensor is fixed to the side walls of the footboard of the buses to detect the presence of passengers .The Hall effect sensor is fixed on the steering arm to detect the movement of the bus. Signals from the ultrasonic sensor and Hall effect sensor enables the accelerator pedal locking system and stops the movement of the bus.The driver and the passengers are warned by alarm indication system.This present system ensures the safety of the passengers during boarding and deboarding of the buses by preventing the acceleration of the buses if there is any passenger on the footboard during the rest position of the bus. It can be easily malfunctioned by user and also it cannot produce any solutions for foot boarding its just alert the passengers and drive while traveling on footboard in the bus.

"The Intelligent Footboard Accident Prevention System in buses" proposed by Dr.G.Kalivarathan, PremSankar, Rohith Rajeev **.** The system is used to prevent the passengers from footboard accidents in buses. In metropolitan cities many people travelling in buses and some of them travel by standing on the footboard, its make risks their own life. Even though there as buses passengers often results in tragedy. Hence such an automated system which sense the passengers' presence on the footboard and restricts the driver from moving the bus. They designed this system from the scratch in such a way that the whole system is quite modular so that they can easily add extra features to the system. Once the presence of passengers is detected on the footboard, accelerator disengaged and the bus is made to slow down to rest and this causes traffic problems and discomfort to drivers and passengers. The installation procedure is very complex and the cost is also high.

Lu Guonian, Ye Chun, Sun Rujiang[3] has proposed the "Equipment using ultrasonic detector to record passenger throughput of bus".This project is used as a device for recording the number of boarding passengers in the bus at each stop by ultrasonic detector. The ultrasonic detector consists of an ultrasonic transmitter and receiver, which is connected to the signal processing circuit through an analog-digital converter. This system only recognize the number of passengers in the bus and does not prevent overcrowding in the bus.

B.V. Etrometa and J.B Leenhouts[4] proposed "A device for the automatic detection of passengers getting into and out of public transport vehicles" comprising electric pulses generating means automatically operated by such passengers. According to the invention the device is characterized by an element which under the influence of a passenger's weight is caused to move from a starting position, in opposition to a force tending to keep the element in its starting position, to approach an oscillator circuit and thereby to attenuate the oscillations generated by said circuit. This system can be only implemented in buses with doors.

S. Rohit, Shriram K.Vasudevan, S. Lokesh, K. Ajeeth, Vineet Nair develops "An Intelligent and Cost Effective Footboard Accident Prevention System".This study aims to develop a system to prevent accidents occurring due to footboard travelling in buses. Tragedies resulting from footboard travelling in buses are one of the main reason for road accidents.The basic principle behind the working of the proposed system is to stop the movement of the bus,when someone stands on the footboard.Though automatic doors are available, the ignorance of the bus drivers to close the door before starting the bus. This system can only be implement in buses with doors .

R.Jayalakshmi, K.Haripriya develops"Driver Assist System (DAS) to Prevent Road Accidents".
The Footboard travelling in buses are dangerous and the event must be prevented by implementing a system with advanced technology that stops passengers from travelling in footboard. In Metropolitan buses doors are available to shut off after the passenger boards and deboarded from the bus. The DAS features a system in which the microcontroller continuously monitors the output from the sensors placed in the footboard of the bus and stops the bus if a person stands on the footboard for more than the programmed time. The system also has IR based driver fatigue identifying system and advanced lane detection system. This system consists of the distance reflective sensor that can prevents accidents by controlling vehicle speed and also an LCD display of the passenger count and LED indication about seat availability to the display outside the bus. The engine automatically shuts down by the system when the passengers are detected on the footboard but this system causes traffic problems and discomfort to passengers as well as public.

R.Deepa proposed a "Design of Vehicle speed Control System Using Wireless Instrument Cluster".Wireless technology has completely transformed the way we livein today's world almost every automobile vehicle operates hard functions in a wire connection. Replacing a wired connection with wireless connection could prove to be productive in economic senses as it will have an effect on the weight, cost and performance. In this project she proposed a wireless network to which will control accelerating, braking, control steering and other functions in the vehicle. The Display unit is in front of the driver, Functionality interface on the dashboard at first included the steering wheel and the instrument cluster.The instrumentcluster contains gauge speedometer, tachometer, odometer, fuelgauge, and other telltale. The main objective of this proposed system is to design a wireless instrument cluster to operate the vehicle in safe speed at critical zones using IEEE 802.15.4 standard. Wireless communication between vehicle body control unit and instrument cluster unit for indicate the vehicle functionality and sensor unit used for safe distance measurement For Simulation purpose the Vehicle unit consider as personal computer and the instrument cluster hardware is designed with ARM controller for interfacing and design a functional process of the vehicle, this proposed system provides efficient vehicle speed control.

Abdus Samad Kamaled's paper presents a vehicle driving system in a model predictive control framework that effectively improves traffic flow. The vehicle driving system regulates safe intervehicle distance under the bounded driving torque condition by predicting the preceding traffic. It also focuses on reducing the effect of breaking on the vehicles that follow, which helps jamming waves attenuate to in the traffic. It observes that the system reduces congestion from the traffic and improves the traffic flow. Since, the smart vehicle continuously attenuates the jamming waves, the flow of vehicles in the following traffic becomes smooth, so need some string stability.

In Rubini.R, proposed a system has an alerting, recording and reporting system for over speed violation management. The Zigbee transmitter used to transmit the speed limit of the particular lane entered by the vehicle and also gives alert like road works, stepslopes, school zone in the form of messages and also in LCD. The receiving device placed in the vehicle which receives the messages and sends to the microcontroller. When speed of the vehicle reaches the speed limit it displays the warning and if exceeds the limit, the microcontroller records the speed and time. The LCD displays the speed limit and shows the number of times, the speed was exceeded. A GSM module sends message to the nearest traffic department immediately after the driver neglect the rules. A supportive device is also provided, which can be operated only by the traffic police which can retrieve the data stored at any time.

F.Parvez Ahmed' paper focus on combining the GPS with embedded wireless system. This is a new technology in intelligent vehicle control for remote location application using ARM. In ordinary system they are developed to control the speed of vehicles. The main objective of this system is to operate the vehicle in safe speed at danger zones. The transmitter present in the base station which is designed for Frequency Modulation (FM), the receiver part is implemented in Vehicle. The ARM processor is placed at receiver side, which receives the critical frequency, and then it is activated in critical mode. Speed Control Driver (SCD) can be custom designed to fixed into the vehicle's dashboard, and display the information on the vehicle. When the information is received, it automatically alerts the driver, so he can reduce the speed depending on the time and zone. The novel system is implemented with the support of embedded processor and the simulator.

Gummarekula Sattibbuet' paper describes the advancement in the processor technology and microcontroller has opened a new system designed to prevent the accidents. These accidents are caused due to ignorance of drivers in seeing traffic signals alongside the road and other things on the roads. So to intimate the driver about the zones and to automatically maintain the speed is accomplished by means RF technology. The main objective is to design an Electronic Display controller which is used for controlling vehicle speed and monitor the zones and can be custom designed to fit into the dashboard of the vehicle to display information. If this system is adopted by some state can effectively can reduce the number of road accidents caused by speeding

vehicles or losing control of the vehicle at speed breakers or by ignorance of driver towards traffic signals. This paper presents a new design to control the speed of the vehicles at remote places for fixed time.

Sunil ,R. Kewate Road accidents can be prevented by adopting measures such as Traffic management, improving quality of road infrastructure and safer vehicles. The existing techniques still do not able to reduce the number of accidents. Hence, there is a necessity to implement the Intelligent Speed Adaptation (ISA) in which the speed of the vehicles can be automatically controlled. In this analysis, it proposes automatic speed control system based on color strips for highway road and the roads where the speed control within limit is required. Various colour sensors are able to capture more than one color for multiple color sorting applications. Depending on the type of the sensor, it can be programmed to recognize only one color, or multiple color types.The methodology explains that a various color strips are marked on the roads. The speed control within the limit is required. The color sensor attached in the vehicle will recognize the color marked on the highway road and maintain the speed of the vehicle within the limit. In this proposed system, the color detecting sensor of particular intensity is used to activate/deactivate the system. In actual practice, the system works that when vehicle enter in speed limiting roads like express–high way, high way and any other roads where the speed limit is required etc.,

III. EXISTING MODEL:

The existed model uses accelerator pedal lock system .If the people stand at footboard when the bus is in stationery state the pedal lock system starts and lock the accelerator pedal. In motion condition , when the passengers on the footboard is detected, the buzzer produce a beep sound to the driver.

IV. PROPOSED MODEL:

The system, indicates the people standing in the footboard using an ultrasonic sensor. If the footboard travel continues, the vehicle is stopped with prior information.The footboard travelling is intimated through mobile phone.Objects in the blind spot region are detected and is informed to the driver.

V. OPERATION:

The main component of the system is IR sensor .There are six set of IR sensors are directly connected to the Arduino micro controller.IR sensor emits Infrared rays through the steps. When the bus is running a people cross the infrared ray signals the transmission of emitted rays was stopped by the obstacles due to the discontinued transmission of IR sensor automatically it passes information to the input of Arduino micro controller. After completing this process the TIMER will be switch ON. If TIMER will exceeds 5 to 10 sec , then the buzzer is switch ON and the sound of the buzzer exceeds the 10 minutes it automatically send the report to the RTO office from the data base of the Arduino micro controller.

The Arduino micro controller that contain a details like Bus Number Bus Permit Number, Name of the Bus Owner and Bus root etc…. In this system it's also includes the self safety system process it act at the malfunction stage .if the power supply of the IR sensor or buzzer were disconnected it also send the information to the RTO office report the problem of the malfunction. The system consists an LCD display to see the count of the timer when the people standing in the footboard.

VI. COMPONENTS:

INFRARED RAY SENSOR:

An Infrared ray sensor is an electronic instrument that is used to sense certain characteristics of it surroundings .Infrared sensors are also the capable of measuring the heat being emitted by an object and detection motion .This type of sensor measures only infrared radiation rather than emitting it. It is called passive IR sensor .In this system the IR sensor emits the infrared rays to the receiver from the transmitter .When the transmission lines cut by any obstacles (or) any passengers it loss their transmission and pass the information to the buzzer .The IR sensor will work 1 to 5metres.

LCD & LED:

Light Emitting Diode (LED) is an semiconductor device that emits visible light .When an electric current passes through it .The light is not particularly bright but most LED's it is monochromatic occurring at a single wavelength .In this project the LED used for the notification system that placed infront of driver seat .That LED indicates the entire system were at activate (or) not. The LED contains two different colours like red and green .The red colour indicates the system at 'OFF' stage and green colour indicates the system at 'ON'stage.

The two LCD displays are placed one outside the bus and another near the driver steering. All the alerts given to the driver as well as the passenger is given in the display. It also shows the Number of passengers inside the bus in real time.

GSM MODULE:

A GSM system is an architecture used for mobile communication in most of the GSM/GPRS module is used to establish communication between a computer and GSM/GPRS system countries .Global Pack Radio Service is an extension of GSM that enable higher data transmission rate.

In this system GSM used for communication between the RTO office and bus transport .It work at when the IR sensor (or) buzzer system fails (or) more than the buzzer sound activate at exist minutes it automatically passes the report to the RTO office by this GSM module .That report contains detail about bus transport and etc…

BUZZER:

The buzzer is used to alert the driver whenever the passenger stands in footboard continuously.

ARDUINO MICRO CONTROLLER:

Arduino is the micro controller board based on the ATmega328.It has 14 digit inputs/output pins,6 analog inputs, a 16 MHz quartz crystal, and USB connection. Arduino language is mainly set of C/C++ functions that can be called from user code.

The Arduino get the output from IR sensor and that output to the timer circuit of the controller. That timer counts the same amount of minutes. After the minutes exists, the timer transfer the signal to the buzzer. Then that gather signal of buzzer it indicates the sound. Those that operation were controlled by the Arduino micro controller.

VII. CONCLUSION:

This work footboard avoidance system in public transport is designed for the safety of the passengers travelling in the buses. The major components of the system are ultrasonic sensor, Infrared sensor; PIC microcontroller and GSM module are connected with proper circuit. This system occupies less space and consumes less power. The system successfully overcomes the drawbacks of other systems and ensures the safety of passengers travelling in the buses. The cost of the system is less.

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