International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 03 | Mar 2020 www.irjet.net p-ISSN: 2395-0072

STEP LOCK SYSTEM IN BUS USING IOT

Mrs. Y. Salini[1*], R. Bhavani[1], MD. Ayesha Begum[2], M. Gowthami[3], Y. Jahnavi[4]

[1]Assistant Professor, Dept. of CSE, Dhanekula Institute of Engineering and Technology, Andhra Pradesh, India.*
[1,2,3,4] Bachelor of Technology, Computer Science and Engineering, Dhanekula Institute of Engineering and Technology, Andhra Pradesh, India.

Abstract - *For their day-to-day Transportation, a large part of the population relies on public transport, particularly buses. In India an average of 200 people are killed daily as a result of a footboard accident published by India's Central Government. The Internet of Things concept will play an important role in building a system to avoid footboard accidents from occurring particularly during bus travel. Here we are introducing an IOT based Step Lock System in Bus, an Automatic Footboard accident prevention system to secure passenger safety when travelling in the buses. The System includes an IR Sensor, Ultrasonic Sensor, Sound Buzzer and LCD Display. The Ultrasonic Sensor is mounted to the side walls of the bus footboard to detect the presence of passengers. To detect the bus motion , the IR Sensor is attached to the front wheel of the bus. Thus when the bus is in motion condition and if the passengers are on footboard the Sensor signals are transmitted to the Arduino board, and the Sound Buzzer mechanism will be actuated by the Arduino board. This Buzzer alerts travelers not to be on Footboards. "STEP INTO BUS" is shown in a LCD and will be visible to passengers on the bus and mostly positioned to warn the passengers on the footboard. Without any human intervention, the entire system is programmed. The present system guarantees the passengers that they are secure by significally reducing the number of deaths.*

***Key Words*: Footboard, Arduino, Buzzer, Ultrasonic sensor, IR Sensor, LCD Display**

1. INTRODUCTION

A Significant number of passengers die each year from accidents caused by footboard travel in buses. Either driver or passenger's negligence may cause affliction. Thus passenger safety is assured by the implementation of an intelligent bus system. Footboard tracking and alerting in buses plays an important role in the everyday public transport systems. It is very important to monitor footboards in any transport system during the journey.

The fundamental goal of this project is to build an embedded framework for developing monitoring and alerting system for the bus footboard. Such a device will be controlled with pair of Sensors such as Ultrasonic Sensor, IR Sensor. The micro-controller collects data from the Sensors. Using the Ultrasonic Sensor mounted on the footboard, the Arduino micro-controller senses the dimension of the passenger. The relay warns the passengers not to stand on the bus foot step when the micro-controller receives a signal. So, we can easily monitor the physical parameters with the aid of these embedded control sensors.

Fig -1: Students standing on footboard of a Bus

2. EXISTNG PROBLEM

- A 16-year-old student travelled to velachery, Chennai in September 2010 on the footboard of an overcrowded MTC (Metropolitan Transport Corporation) bus. The teenager was crushed to death when he slipped and fell under the bus wheels.
- In another incident, a speeding bus was struck by a lorry on Rajiv Gandhi Salai, Chennai in December 2012, getting passengers hanging on the footboard.
- Although there are automatic doors, the failure of the bus drivers to close the door before starting the bus makes the automatic doors moot.

Fig -2: Passenger fell down from a moving Bus

3. PROPOSED SOLUTION

The main aim of this project is to develop a footboard monitoring and alert system in bus based on Arduino. We use Ultrasonic Sensor, an IR Sensor, a Buzzer, an LCD module that senses the physical parameters and monitors locally. To detect the presence of passengers, the Ultrasonic Sensor is

mounted to the side walls of the bus footboard. To detect the bus motion the IR Sensor is placed on the wheel. This detects whether the bus is in move or not. When the bus is in motion condition and the passengers are on the footboard, the sensor signals are sent to the Arduino and the Arduino board activates the Buzzer sound to alert passengers not be on footboards. "STEP INTO BUS" is displayed in LCD and this will be visible to the passengers on the bus and mostly placed to alert the passengers who stood on footboard. Entire system is automated without any human intervention.

4. BLOCK DIAGRAM

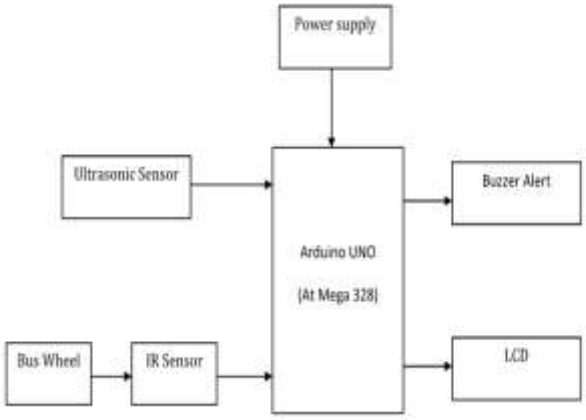

Fig -3: Block Diagram

4.1 Power Supply

It is intended to supply power to all of the above mentioned sections. It essentially consists of a transformer to step down to low voltage, followed by diodes, high current. Using diodes AC is changed to DC. The capacitor filter is used to filter a rippled DC produced. The voltage obtained by DC is regulated by means of a positive voltage regulator.

Fig -4: Power Supply

4.2 Microcontroller

The Arduino is ATMega 328 based micro-controller module. It has fourteen digital input/output pins(of which six can be used as PWM outputs), six analog inputs, a USB connection and a reset button. It contains everything you need to help the micro-controller, just attach it to a USB device for initialization.

Fig -5: Arduino

4.3 Ultrasonic Sensor

An Ultrasonic sensor is a sensor that uses Ultrasonic sound waves to gage the distance to an object. An Ultrasonic sensor sends and receives Ultrasonic pulses which relay back information on the proximity of an object. This sensor measures the distance to an object by calculating time lapses between the Ultrasonic waves being sent and received.

Fig - 6: Ultrasonic sensor

4.4 IR Sensor

This Sensor module has great adaptive capability of the ambient light, providing a pair of infrared transmitters and thus the receiver tube. The infrared emitting tube used to emit a particular frequency, which encounters an obstacle detection direction i.e. reflecting the surface, reflecting infrared back to the receiving tube, after processing the comparator circuit. The green LED illuminates the effective distance range 2~80cm working voltage of 3.3V-5V while the signal output is electrical(a low-level signal) by means of the potentiometer knob to control the detection distance. The sensor's detection range is often adjusted through the potentiometer.

Fig -7: IR Sensor

4.5 Buzzer

An audio signalling system is a buzzer which can be mechanical or electro mechanical. We use buzzer as output device in this project. The Buzzer beeps and warns the passengers whenever they are detected on footboard.

Fig -8: Buzzer

4.6 LCD Display

The LCD (Liquid Crystal Display) is an electronic display component used to produce a visual image. The 2*16 LCD display is a very simple module widely used in circuits. The 2*16 converts 16 characters per line of screen into 2 of those lines.

Fig -9: LCD Display

5. CONCLUSION

The Step Lock System in Bus is certainly a promising system that ensures bus passenger safety and ensures a very safe and comfortable travel. The system is designed to enable the system to be mounted easily on buses. The system's most important feature is that it is fully automatic.

REFERENCES

[1]. Kalivarathan et al., [2] developed a smart footboard accident prevention device using a passive infrared sensor to detect the passengers on the footboard. Once the presence of passengers is sensed on the footboard, the mechanism for disengaging the retarder and accelerator is operated and bus is allowed to slow down to rest. The deceleration of the bus causes both drivers and passengers traffic problems and discomforts.

[2]. Lu et al.,[3] developed a system for recording the number of passengers boarding the bus by ultrasonic detector at each stop. The ultrasonic detector consists of an ultrasonic transmitter and an ultrasonic receiver, which is connected via an analog-digital converter to the signal processing circuit.

[3]. Etrometa and Jannis[4] created a tool for the automatic detection and recording of passengers when boarding or deboarding the buses, using oscillator circuits for the automatic opening and closing of the bus doors.

[4]. Rohit et.,[5] developed a preventive method for footboard accidents using accelerator switches and pressure pad sensors.

[5]. Jayalakshmi et al.,[6] developed a road accident prevention system using various sensors such as LDR sensors, eye blink sensors, load sensors, load cells, and array sensor.

[6]. S.Rohit,shriram.k.VasudevanS.lokesh,K.AjeetandVineetnair,"Anintelligentandcosteffectivefootboard"InformatTECHNOLOGYjOURNAL,2013,Vol1,pp.2265-2268.

[7]. NishadVivekKumbhojkar&ChaitanyaAvadhutcintankuber, "Ultrasonic Automatic Collision Avoidance Device With Accelerator Pedal Disengagement Mechanism,"(Posted by Yuva Engineers on January 22),2014 Vol 1,pp.1-5.

[8]. LiliZhang, JinyanHu, SujanZhang, JianfengCheng, "Overload Control System Design of Bus".