Smart Bus Control and Monitoring System

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Abstract—**The smart bus control and monitoring system is developed with an aim to make human driving safer and to overcome the accidents. In cities thousands of people commute in buses. And many of them travel by standing on the footboard, which risks their own life. The project is developed by integrating load sensor and eye blink sensor with Arduino board. The load sensor is attached to the footboard of the vehicle which detects the presence of the passenger. If the passenger stands on the footboard above the programmed time, the bus gradually stops. The eye blink sensor detects the drowsiness of the driver. When the driver's eyes are closed more than the programmed time, it alerts the driver with buzzer. We sincerely hope our system, will reduce the manual failures and ensure the passengers safety**

Keywords—load sensor; eyeblink sensor; Arduino board etc.

I. INTRODUCTION

Smart bus control and monitoring system is an automated accident prevention system to prevent the accidents occurring due to footboard travelling in buses. A major portion of the population depends upon the public transport system especially buses for their daily commute and a large number of accidents take place almost every day. Every year a large number of passengers die due to accidents take place almost every day. A typical bus of public transport can comfortably house 70 passengers at an instant (i.e., 45 sitting passengers and 25 standing passengers). However the buses are loaded beyond their safe load capacity especially during peak hours and become dangerous to travel. Footboard travelling has become a usual scenario in major cities. In India during 2017, totally 41,830 bus accidents was reported in which 10,743 casualties were identified. The safety of the passengers could have been ensured if there was a proper mechanism to prevent accidents in the buses. With the help of load sensor placed on the footboard, the presence of passenger is detected. If the passenger stands above the programmed time then it gradually makes the vehicle to stop. The eye blink sensor is used to detect the drowsiness of driver. It alerts the driver with a buzzer if the driver's eye is closed more than the programmed

time. This involves measure and control of eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eyes. The IR receiver is used to receive the reflected infrared rays of eyes. If the eye is closed means the output of the IR receiver is high otherwise the IR receiver output is low. This is to know the eyes closing and opening position. Thus
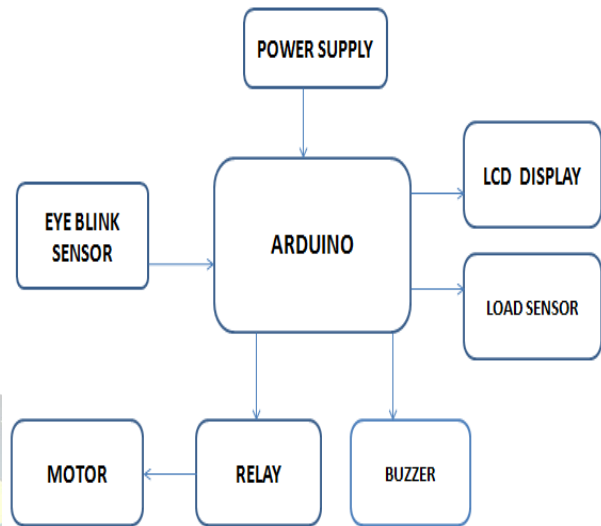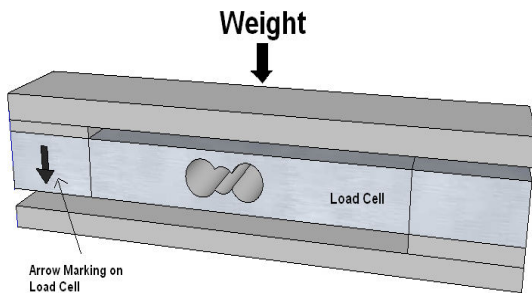
the smart bus control and monitoring system project involves load sensor and eye blink sensors to prevent the bus accidents occurring in day to day life.

II. DESCRIPTION

A. Detecting the Passengers on footboard

The first step and basic function of this system is to detect the passenger presence on the footboard. For detecting the passenger on the footboard, load sensor is employed.

The load sensors are more effective for detecting passenger presence on the footboard. We are interfacing 40 Kg load cell to the arduino using HX711 Load cell amplifier module.HX711 is a precision 24-bit analog to-digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor. The input multiplexer selects either Channel A or B differential input to the low-noise programmable gain amplifier (PGA). Channel A can be programmed with a gain of 128 or 64, corresponding to a full-scale differential input voltage of ±20mV or ±40 mV respectively, when a 5V supply is connected to AVDD analog power supply pin. Channel B has a fixed gain of 32. On chip power supply regulator eliminates the need for an external supply regulator to provide analog power for the ADC and the sensor. Clock input is flexible. It can be from an external clock source, a crystal, or the on-chip oscillator that does not require any external component. On-chip power on-reset circuitry simplifies digital interface initialization. There is no programming needed for the internal registers. All controls to the HX711 are through the pins.

B. Detection of drowsiness using Eye blink sensor

This project involves controlling accident due to unconscious through eye blink. Here one eye blink sensor is fixed in vehicle where if anybody loses conscious, indicate the driver through alarm. This project involves measure and controls the eye blink using the IR sensor. The IR transmitter is used to transmit the IR rays in our eye .The IR receiver is used to receive the reflected rays of our eye. If the eye is closed, the output of IR receiver is high otherwise the IR receiver output is low. This output is given to arduino, to indicate the alarm.

C. Arduino microcontroller circuit working

The arduino microcontroller is the processing circuit which controls the system with the help of load and eye blink sensor as input .The microcontroller is programmed to detect the passenger presence with the load sensor and to detect the blinking of eyes using eye blink sensor .The micro controller gradually stops the motion of the bus when the passenger remains stationary in the footboard .It also alarms the driver when he is in the drowsy state with the help of the Eye blink sensor.

Design of the smart bus control and monitoring system :

The Smart bus control and monitoring system consists of

a) Load sensor

b) eye blink sensor

c) arduino board

The schematic representation of the smart bus control and monitoring system in given in Fig .

III.WORKING

The primary function of this system is to detect the presence of the passengers on the footboard of the bus .The load cell - HX711 is used to detect the weight of the passengers in the foot board .It is displayed in the LCD display present in the system .If the weight measured is constant for more than 5 minutes , the bus will stop its working .

The system also detects the blinking of the driver's eye using the eye blink sensor .The eye blink sensor is an IR sensor where the IR transmitter is used to transmit the IR rays in our eye and the IR receiver is used to receive the reflected rays of our eye. If the eye is closed more than the programmed time then it alerts the driver with buzzer. Thus this system involves load sensor and eye blink sensor to ensure the passenger safety.

IV. CONCLUSION

The Smart bus control and monitoring system is definitely a promising system that assures the safety of bus passengers and ensure a very safe and comfortable journey. The system is designed in such a manner that the system can be easily installed on buses and affordable. The system is very efficient in preventing the footboard travelling in buses and also effectively detects the eye blink of the driver if the driver's eye is closed than the programmed time. We sincerely hope our system can save many precious lives in their day to day commutation.

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