

## ARM CORTEX BASED SMART TRANSPORTATION FOR USER SAFETY AND SECURITY OVER IOT

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### ABSTRACT

Nowadays we are using rental vehicles or multi-organization travel vehicles for transportation. Safety is important factor for the user as well as the car driver. The present technology improves safety the standards at a higher level. To provide the best safety factor to the user we proposed an IoT-Connected Smart Car Observation system that provides vital safety parameters. The proposed system is about driver safety s alerting the driver drowsiness; passenger set sanitization for every ride of a new person, monitor the driver health standards heart rate and temperature to know about the driver to the user before he chooses the ride. This system monitors the heartbeat, temperature, drowsiness of the driver, seat sanitization, car accident alerts. This proposed system is the best one to present safety to the user in the situation of the covid-19 pandemic situation. This provides the internet-connected. The entire driver data will be available in the smart car observations server then user will decide the ride for his safety.

**Keywords:** heart rate, temperature, IOT, Raspberry Pi, drowsiness, Safety, LCD.

### 1. INTRODUCTION

One of the serious issues is driver somnolence, and the abnormal state of the driver can lead to road accidents. In the eyes, mouth, etc, the detector system manages to detect facial architecture. According to the facts, the driver's somnolence causes 20 percent of car accidents, where the vision of the iris and the state of the eyes remain unpredictable. In the event of an emergency, system indicators should warn the driver if the driver is excessively distracted or his eyes are in pain and there are high chances for the driver to be drowsy. The goal of this paper is to increase the use of science and technology to protect the driver from serious accidents by avoiding the driver's lack of attention. Using steering wheel signs, distinction of alcohol and induced driving actions. Prediction on whether the driver is alcoholic or not. The warning is provided by the steering wheel's basic signals. The system for defining the sleepiness of the driver is all recent work. The safety and health of drivers are the priority of our framework. We built stuff on the internet hardware based on a car monitoring device. Reintegrated temperature, air, heart rate, eye blink sensors in the arm cortex m3 STM32 processor. The initial state of all the sensors on the LCD screen displays the calculated values. For wireless access to the data, the same data provided by the sensors will be sent to the IoT

server. All sensors and output modules were integrated. Eye blink sensor that gives the driver's status, an infrared sensor is used to weather the passenger is there or not, depending on the presence of the passenger, the seat will be sanitized for the next passenger's safety. This affects the fields to which the IoT server sends data. The cautioned device assists in collision avoidance thru the use of the usage of an advanced riding help machine (Adams) which makes excellent protection thru giving skills which incorporates lane changing indicators, Road internet traffic updates further to moreover assists with navigating. The records interacted the numerous nearby lorries in this device can be implemented to assess and studies any form of abrupt modifications in an automobile on the equal time as moving with the internet site visitors further to can alert the chauffeur to stay easy of website traffic crashes. The device finished a Lorry to automobile interaction system to keep away from head-to move lorry crashes, the device interacts the statistics at a totally excessive pace while the quantity of motors in its surrounding are more than one hundred fifty, After that basic overall performance of the 802.Eleven p is classed beneath further to causes the belief that the tool want to no tons much less than have the ability to deliver out 10 frameworks everyday with secondly of statistics to the neighboring car to avoid at once collisions in street intersection areas.

## **2. LITERATURE SURVEY**

. The majority of the drivers know about the guidelines that are to occur on street, yet it is a result of their indiscretion that street mishaps keep on being a piece of our country. It very well may be different reasons like over speeding, tanked driving, languor of the jumper, and interruptions to the driver, red light hopping, and many such reasons [1]. Vehicle security is vital. Our paper is equipped for making a high level framework that can assist with forestalling mishaps and lessen the danger of mishaps. In case there is a mishap, the following gear utilized is extremely valuable [2]. It can assist with finding a vehicle. The trackers are so safely fitted in the vehicle that even the cheat won't know about it. On the off chance that the individual is in a far off region where no assistance is accessible, it will be simpler to follow the individual [3]. A vehicle security framework is savvy and enjoys a benefit both for the explorer and the vehicle. Mechanized driving makes the chance of portability and diminishing accident. Based on the slant it will recognize mishaps utilizing an accelerometer. Different gadgets, sensors, machines associated in any capacity that can be gotten to distantly are alluded to as IoT or the Internet of Things [4]. The equipment layer comprises of gadgets like sensors; the correspondence layer is utilized to impart through conventions; the help layer has interfaces. To give security to the equipment layer, engineers added cryptographic codes that lead to wellbeing basic frameworks [5]. The security concerns identified with the equipment layer implement to give arrangements like giving validation, computerized marks, and traffic encryption. Keen items can convey straightforwardly through the cloud. The paper targets making a wellbeing gadget for vehicles utilizing IoT [6]. It presents an idea to improve the wellbeing of drivers and decrease the chance of mishaps by proposing a thought dependent on IoT. An Iris Scanner is utilized for persistent filtering of the driver's eyes. At whatever point

the driver closes his eyes for a more extended period, the scanner detects the tiredness and enacts the alert which will ring to make the driver mindful [7]. The caution framework will be added to the vehicle's music framework giving the driver a decision to running the wellbeing highlight. This paper utilizes the ideas of iris acknowledgment for laziness identification. A non-meddling framework is created to distinguish sleepiness which will utilize an alert to caution the driver. The eyes of the driver are confined from the entire picture of his face [8]. This confinement will assist with deciding their situation in the picture. This is finished by a picture handling calculation. [9] After the area of the eyes is discovered, tiredness will be recognized dependent on whether the eyes are in an open state or shut state. This framework isn't influenced by the degree of enlightenment behind the face being recognized consequently being effective from other past frameworks [10]. Collectively the IEEE 1609 own family contributors, IEEE 802.11p and the Culture of Automotive Engineers (SAE) J2735 create the crucial components of the currently proposed Wireless Access to in Vehicular Environment (WAVE) protocol pile [11] which affords the protocols from bodily diploma to software diploma for automobile communiqué. Although numerous protection-associated requirements (e.g., network spectrum, protection message format) have really been distinct, there live numerous elements of overall performance requirements, e.g., defining sending charge, ship strength manipulate, adaptive message charge manage that require to be investigated very well. There are widespread DSRC-related social and technological obstacles which have To be treated proceeding to big deployment [12]. A crucial need of V2V interaction is the truthful shipping of safety and safety messages. These messages are usually broadcast to surrounding Lorries utilizing DSRC/WAVE modern-day generation, based totally mostly on CSMA/CA inside the media advantage get entry to layer. Due to the multi-get right of entry to Wi-Fi community, numerous factors can create the put off or failing of the dissemination of safety and protection messages. The limited channel bandwidth to be had to switch the safety messages method that the shared radio networks can come to be fast crowded as vehicle density rises. In [13], experiments have clearly established that channel congestion can arise moreover in fairly number one net traffic situations. Network congestion is an important problem that causes behind schedule or stopped working messages delivery.

### **3. EXISTING SYSTEM**

The aim of our paper is to create driver assistance and vehicle safety system aimed at designing, constructing, and testing a vehicle safety system in all respects, with the aim of providing complete protection for the driver. The goal of the paper is to establish a "obstacle detection system for vehicles" capable of reducing the number of vehicle accidents that are growing. This existing system is much less secure in terms of driver health status, car safety, and information on clean seats. In order to avoid this, we are targeting a new proposed system for better security.

### **4. PROPOSED SYSTEM**

In this proposed method, after researching and taking into account the reality of many recently published articles, a low-cost, easy-to-install, and scalable safety monitoring and

Alerting system with IoT technology is being built. The block diagram is shown in this section.

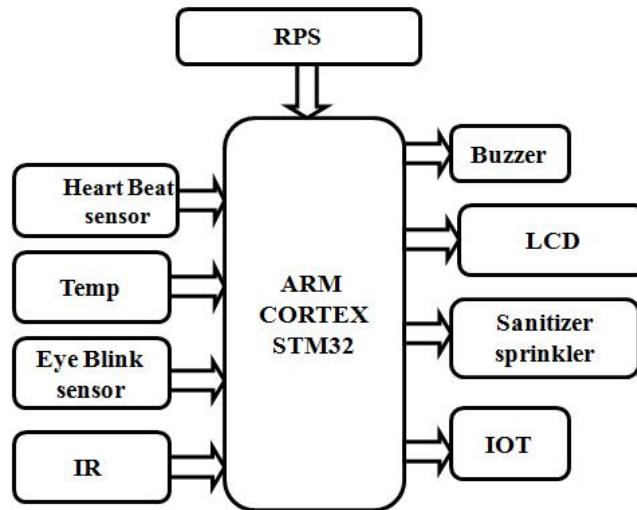


Fig1: Block diagram

We built stuff on the internet hardware based on a car monitoring device. Reintegrated temperature, air, heart rate, eye blink sensors in the arm cortex m3 STM32 processor. The initial state of all the sensors on the LCD screen displays the calculated values. For wireless access to the data, the same data provided by the sensors will be sent to the IoT server. All sensors and output modules were integrated. Eye blink sensor that gives the driver's status, an infrared sensor is used to weather the passenger is there or not, depending on the presence of the passenger, the seat will be sanitized for the next passenger's safety. This affects the fields to which the IoT server sends data.

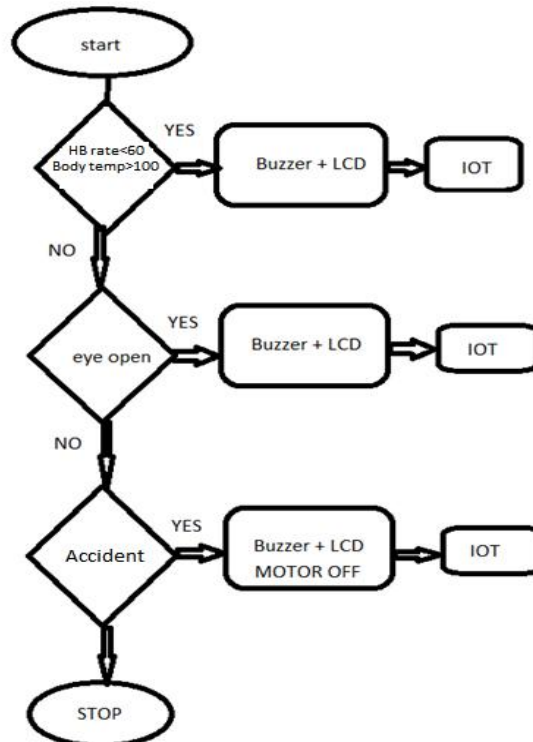


Fig2.Flowchart of proposed model

IoT is a server for open-source car observation. It can continually track the data and view it as a graph. The LCD monitors the temperature, the driver's heartbeat, the car safety, the eye blink sensor, the driver's health status as well as the car safety alerts on the LCD. The IoT has posted data on its car observation website. This website post has data on vibration, heartbeat, and temperature. We can monitor this web page anywhere in the world. This IoT based app is useful for a client who's booking a cab. Before booking, the user can monitor the health status of the car driver depending on whether the user can decide to drive. The LCD monitors the temperature, the driver's heartbeat, the safety of the car, the eye blink sensor, the driver's health status as well as the car safety alerts on the LCD. IoT has posted data on its car observation website. This website post has data on vibration, heartbeat, and temperature. We can monitor this web page anywhere in the world.

## 5. FUNCTIONAL MODULES

### A. Regulated Power Supply:

Regulated power supply is used to produce the required operating voltage for this proposed system. Normally this system is converts 230V ac voltage to the reuired 5V dc voltage for system operation.

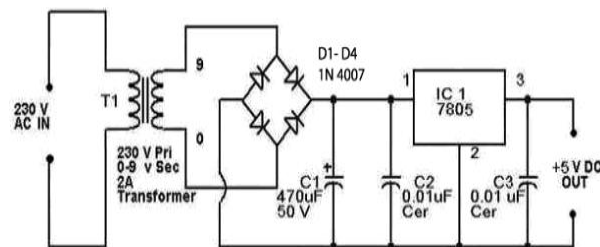


Fig.3. Regulated Power Supply

### B. STM 32-ARM CORTEX M2-PI PROCESSOR

Some of the most common microcontrollers used in a broad range of products are the STM32-ARM Cortex series. They also have an outstanding support base from many sites for creating micro-controllers. Small footprint, Flexible power supply: USB VBUS or external power supply (3.3V, 5V),LED user: LED1, One button: RESET, Port programming/debug,USB Micro-B connector

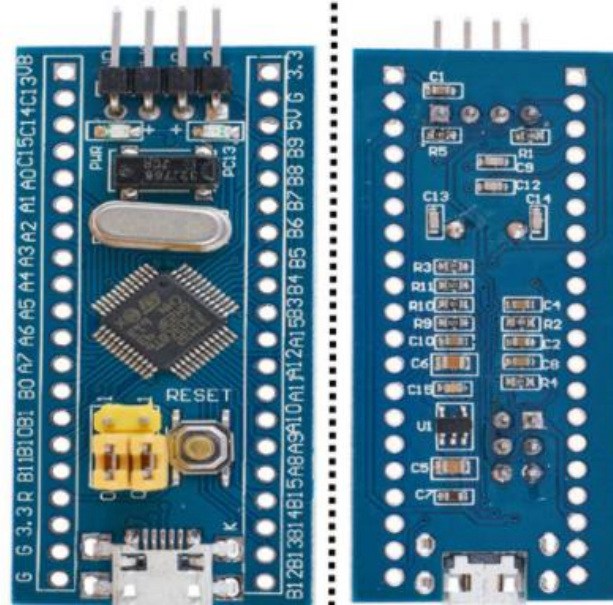


Fig.4. STM 32-ARM CORTEX M2

### C. TEMPERATURE SENSOR

LM35 is a concentrated circuit which gives the temperature a particular value (in C). To maintain a particular alignment at room temperature, it is not necessary to think about external synchronization, as it is internally balanced. For the LM-35 to be increased, no output voltage is necessary. LM-35 generates small, straightforward yields.

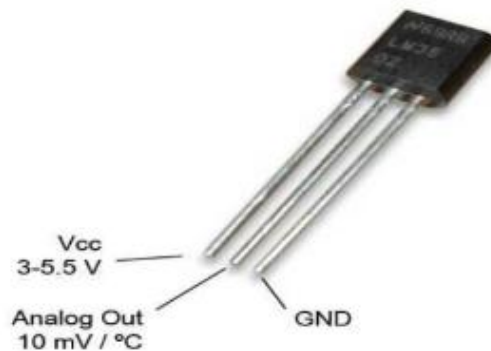


Fig.5. LM35 Sensor

### D. LCD Monitor:

Liquid Crystal Display used to display the parameters for status of the proposed system. This can display 32 characters having 2 columns. When each sensor is activated corresponding message will be displayed in 16\*2 LCD modules. In this we use four data pins using this pins we transfer the data from micro preprocessor to LCD.



Fig.6. 16X2 LCD

### E. Movement Sensor

The vibration sensor is used for the detection of earthquake warnings in the coal mine. The mercury switch here acts as a vibrating element capable of detecting any vibrations, alerting the buzzer automatically and displaying data at the same time in the LCD and IoT modules.



Fig.7. Movement Sensor

### F. LDR

#### IR SENSOR/EYE BLINK SENSOR:

IR Sensor is used to detect the person/person's eye continuously. If anyone is ready to interchange the eye position went to sleep automatically blown alarm or no one is in the back seat of the car automatically sprinkle the water.

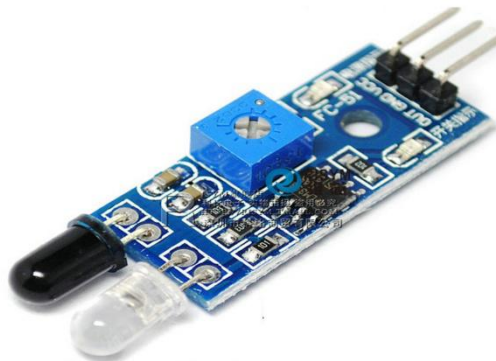


Fig.8.IR module

### G. IOT- Module:

Internet of things used for controlling any device or monitoring the device status through internet. This proposed system we use this IOT module for taking the all parameters data and post into the cloud called server. ESP8266 modules as IOT module it can operate

through wifi frequency concept.



Fig.9. ESP 8266

## H. Software

STM32 STEPS COMPILATION:POLY STM32F103C8 Blue Pill Board,SWD Programmer ST-LINK V2 or STM32Software-STM32cubeMX,Atollic – TrueSTUDIO, STM32 ST-LINK Utility

## 6. RESULTS AND DISCUSSION

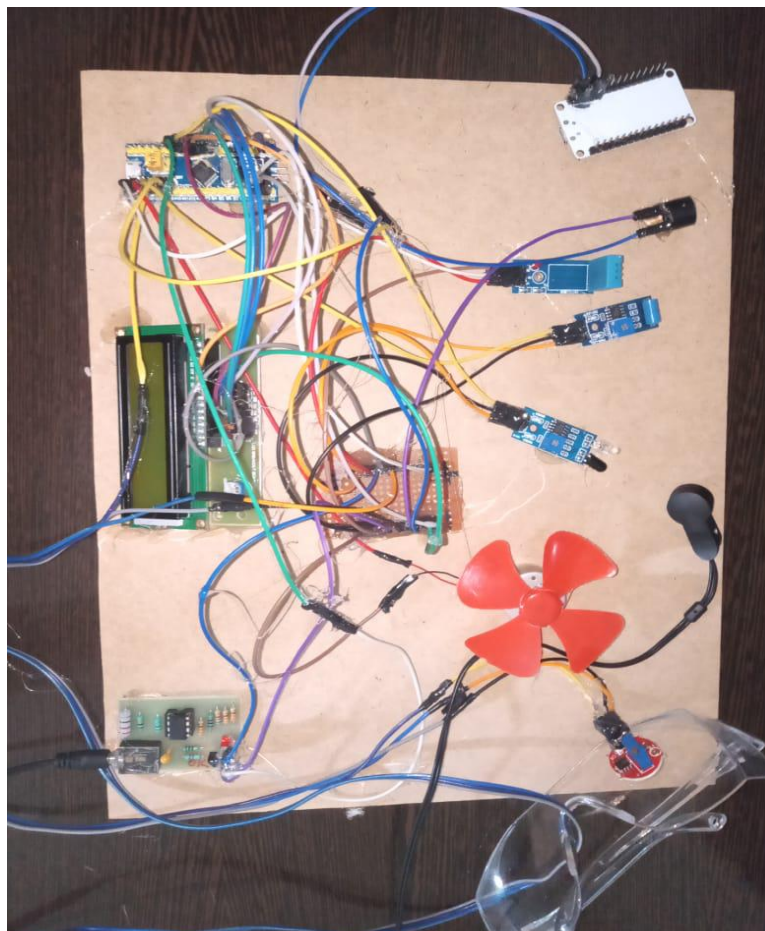




Fig10:output of the hardware setup

We built stuff on the internet hardware based on a car monitoring device. The M3 STM32 arm cortex processor combines temperature; air, heart rate, and eye blink sensors. As shown in Figure 12, the initial state of all the sensors shows the calculated values on the LCD screen. For wireless data access, the same data that the sensors produce will be sent to the IoT server. All the parameters of the driver safety system application system is monitor through LCD data display module. Each parameter is shown for status identification of the proposed system. In this first we check the driver health condition that is heart beat and body temperature if these parameters are abnormal then this system auto indicated to through alarm and iot server. LCD module displays the eye open or close data, vibration of the vehicle as well as other parameters. Of this smart transportation system. All the parameters displays in lcd and well in IOT.



Fig11: Car observation monitor

Figure 12 shows the data IoT has posted on its car observation website. This website post has data on vibration, heartbeat, and temperature. We can monitor this web page anywhere in the world. This IoT based app is useful for a client who's booking a cab. Before booking, the user

can monitor the health status of the car driver depending on whether the user can decide to drive.

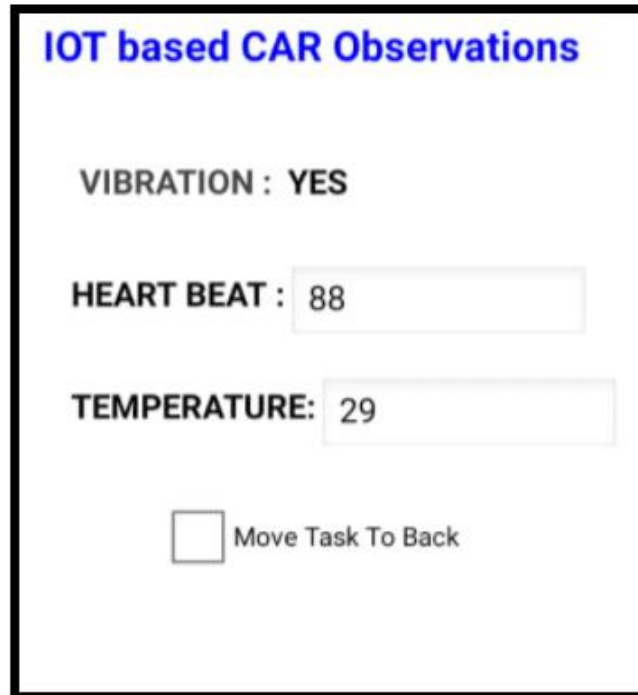


Fig12: driver data posted in IoT

## 7. CONCLUSION

We have developed internet hardware based on a car tracking device for passenger protection when we have rental cars. Both input and output modules, such as temperature, air, heart rate, eye blink sensors, incorporated into the m3 STM32 arm cortex processor have been integrated into this device. Eye blink sensor that gives the driver's status, the infrared sensor is used to weather the passenger is there or does not depend on the presence of the passenger, the seat will be sanitized for the next passenger's safety. It affects the fields that are sent to the IoT server for the data. IoT is a server for car observation that is open source. On its website for car observation, IoT has posted results. This website has information about vibration, heartbeat, and temperature. This website can be monitored anywhere in the world. This website has vibration, heartbeat, and temperature data. We can monitor this web page anywhere in the world.

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