Project Report On

SMART STEERING WHEEL

SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE
OF

BACHELOR OF ENGINEERING
IN
ELECTRONICS ENGINEERING

BY

HIMANSHU GUPTA
YASH KHANDELWAL
PINKESH PANCHAL

UNDER THE GUIDANCE OF
MR. HEMANT KASTURIWALE

Assistant Professor - ELECTRONICS DEPARTMENT

UNIVERSITY OF MUMBAI
DEPARTMENT OF ELECTRONICS ENGINEERING
Batch-Year 2017-18

THAKUR TRUSTS
Zagdu Singh Charitable Trust's (Regd.)
THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY
(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai*)
Institute Accredited by National Assessment and Accreditation Council (NAAC), Bangalore#
Programmes Accredited by National Board of Accreditation (NBA), New Delhi**
A - Block, Thakur Educational Campus, Shyamnarayan Thakur Marg, Thakur Village, Kandivali (East), Mumbai - 400 101.
Tel.: 6730 8000 / 8106 / 8107
Fax : 2846 1890
Email : tcet@thakureducation.org
Website : www.tcetmumbai.in • www.thakureducation.org
tcet
ISO 9001:2015 Certified
*Permanent Affiliated UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (w.e.f. A.Y. 2015-16) • Electronics Engineering (w.e.f. A.Y. 2017-18)
**1st time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (3 years w.e.f. 16-09-2011)
**2nd time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology • Electronics Engineering (3 years w.e.f. 01-07-2016)
1st cycle of Accreditation : • "A" Grade for 5 years (w.e.f. 30-10-2017)

THAKUR TRUSTS
Zagdu Singh Charitable Trust's (Regd.)
THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY
(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai*)
Institute Accredited by National Assessment and Accreditation Council (NAAC), Bangalore#
Programmes Accredited by National Board of Accreditation (NBA), New Delhi**
A - Block, Thakur Educational Campus,
Shyamnarayan Thakur Marg, Thakur Village,
Kandivali (East), Mumbai - 400 101.
Tel.: 6730 8000 / 8106 / 8107
Fax : 2846 1890
Email : tcet@thakureducation.org
Website : www.tcetmumbai.in • www.thakureducation.org
tcet
ISO 9001:2015 Certified
*Permanent Affiliated UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (w.e.f. A.Y. 2015-16) • Electronics Engineering (w.e.f. A.Y. 2017-18)
**1st time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (3 years w.e.f. 16-09-2011)
**2nd time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology • Electronics Engineering (3 years w.e.f. 01-07-2016)
1st cycle of Accreditation : • "A" Grade for 5 years (w.e.f. 30-10-2017)

CERTIFICATE

This is to certify that **Himanshu Gupta, Yash khandelwal, Pinkesh Panchal** are bonafide students of Thakur College of Engineering and Technology, Mumbai. They have satisfactorily completed the requirements of the B.E project as prescribed by University of Mumbai while working on **"Smart Steering Wheel".**

Signature **Dr. Sandhya Save** **(Professor & HOD)**	**Signature** **Dr. Sandhya Save** **(Professor &HOD)**	**Signature** **Dr. B. K. Mishra** **(Principal)**

Internal Examiner **(Name and Signature with Date)**	**External Examiner** **(Name and Signature with Date)**

Dr. Kamal Shah **(Dean R&D)**	**Dr. Deven Shah** **(Vice Principal)**	**Dr. B.K. Mishra** **(Principal)**

Thakur College of Engineering and Technology
Kandivali(E), Mumbai-400101.

PLACE: Mumbai

DATE: (College seal)

ACKNOWLEDGEMENT

This project cannot be entirely created by an individual. The timely completion of this project on **'Smart steering wheel'** has been possible because of my teacher and project guide Mr. Hemant Kasturiwale who provided us with guidance and motivation throughout its making. We also thank him for giving us an opportunity to create this project.

We are also thankful to Dr. Sandhya Save (Electronics Department, HOD) for her guidance and to our parents for providing all possible resources to gain best possible knowledge.

Finally we would like to thank Dr. B.K., Mishra (Principal), Dr. Deven Shah (Vice Principal), Dr. Kamal Shah (Dean R&D), and our college Thakur College of Engineering and Technology for providing us with a platform and the necessary facilities to make this project.

SIGNATURE &NAME OF STUDENTS:

Himanshu Gupta

Yash Khandelwal

Pinkesh Panchal

ABSTRACT

Smart Steering Wheel is an integrated system designed to ease and automate the process of tracking important parameters like driving posture, Pulse rate of the driver, etc. with assisting the driver for better and safe driving, helping in preventing accidents.

This will be done with the help of features like smart steering, parameter tracking, drowsiness detection, etc. Smart steering is cover made to be wrapped around the steering wheel which will correct the driver’s hand position while driving, which can be further modified to provide features like panic assist. Drowsiness detector is a camera mounted in such a way that it constantly faces the driver and has a good view of the driver’s eyes. It will keep a track of the driver’s eyes, warning him if he seems unfit to drive due to drowsiness.

Further advancements can be made to this project with the help of better access to technology, and more hands on time with an actual car, making the device more and more efficient and helpful

CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1

Introduction

1.1 Background

In 1879, Karl Benz was given was granted a patent for his first engine, and in1885the first car was created. Since then, there has been numerous advancements in the automobile industry. A number of features like Power Steering, Air conditioner, Music System, were introduced in a car. Also, numerous safety features like Safety Belt, Air Bags, Antilock Brakes, Traction Control, Electronic Brake Distribution, Electronic Stability Control, etc. were introduced to make driving safe.

However, although these features assisted the driver and make driving more easy and fun, they didn't stop accidents as there are various other areas left untapped which needs monitoring and caution. Drivers sometimes tend to be careless and reckless while driving, taking wrong decisions on the road resulting in major accidents. They also need to keep a regular check on engine oil, tyre pressure, engine coolant, etc. Also, car theft is increasing day by day and the car owners and the insurance companies suffer a lot due to this.

Our Smart Steering Wheel helps caution the driver, keep check on the essential parameters of the car, and prevent major accidents by assisting the driver. Smart Steering Wheel will serve as an integrated module which can be installed in any car to help drivers be careful resulting in saving a lot of money of the owner as well as the insurance companies. It will also help prevent some major wrong decisions and in turn save a lot of lives.

1.2 Motivation

Nearly1.3 million people die in road crashes each year, on average 3,287 deaths a day. An additional 20-50 million are injured or disabled. More than half of all road traffic deaths occur among young adults ages 15-44. Road traffic crashes rank as the 9th leading cause of death and account for 2.2% of all deaths globally. Road crashes are the leading cause of death among young people ages 15-29, and the second leading cause of death worldwide among young people ages 5-14.Each year nearly 400,000 people under 25 die on the world's roads, on average over 1,000 a day. Over 90% of all road fatalities occur in low and middle-income countries, which have less than half of the world's vehicles. Road crashes cost USD $518 billion globally, costing individual countries from 1-2% of their annual GDP. Road crashes cost low and middle-income countries USD $65 billion annually, exceeding the total amount received in developmental assistance. Unless action is taken, road traffic injuries are predicted to become the fifth leading cause of death by 2030.

The leading causes of road accidents are:

1. Distracted Driving
2. Speeding
3. Drunk Driving
4. Reckless Driving
5. Night Driving
6. Drowsy Driving
7. Tire Blowouts

1.3 Scope

There can be more features added to the current system to enhance it and cover a wider spectrum in terms of safety. Such features include:

1. GPS Tracker:
   This feature enables the owner of the car to track his car at every moment. This will help in tracking the car in the parking lot, warn and control the driver in regards with the speed of the car. It will also help new drivers, especially their parents, to track them and get record of their speeds and driving performance.
2. Alcohol Detector:

   An alcohol detector can be placed on the steering wheel or somewhere near the driver, so that he can make sure he is not under influence while driving, and also, the car can be programmed in such a way that the car won't start if alcohol is detected. This will help reduce one of the major cause of car crashes.

3. Panic Assist:

   While driving, if the car skids, due to oil spill, rain, etc. the driver goes in a state of panic. This may lead him to move steering in unexpected way and in rapid motion. Panic Assist will detect this movement and harden the movement of the steering resulting in smooth movement of the car and balancing and stabilizing of the car.

Chapter 2

Proposed Work

2.1 Problem Definition

The Smart Steering Wheel is used to correct and inculcate a good driving habit. It basically works on a pressure applied by the driver on the steering wheel. It senses the positions of hands on the steering wheel and if either of one hand is missing on the steering wheel for 5 to 7 seconds, then it will alert the driver. This project also detects the pulse rate of driver and if any readings found above the threshold reading, then it will alert the driver. A dizziness detection system is also ben provided to alert the driver incase if dizziness.

2.2 Literature Review

2.2.1 History

The automobile industry has spent a significant amount of resources in recent years to develop new features aimed at driver drowsiness detection. Moreover, independent companies have also recognized that this market might grow and become profitable and have developed products whose goals are comparable, but work independently of the vehicle's brand or model.

2.2.2 Related Papers

Table2.1:Literature Survey

S.NO.	IEEE PAPER SUBJECT	PUBLISHED BY	PUBLISHED IN THE YEAR	PUBLISHED AT
1.	Vigilance Measurement System Through analysis of visual and emotional driver's signs using wavelet networks	Ines Teyeb, OlfaJamai, MouradZaied	2016	IEEE A & E Systems Magazine
2.	Statistical analysis of DMV crash data	Wenting Tong, Paul Cherian, Jianzhe Liu	2016	Spectrum.ieee.org

2.3 BLOCK DIAGRAM

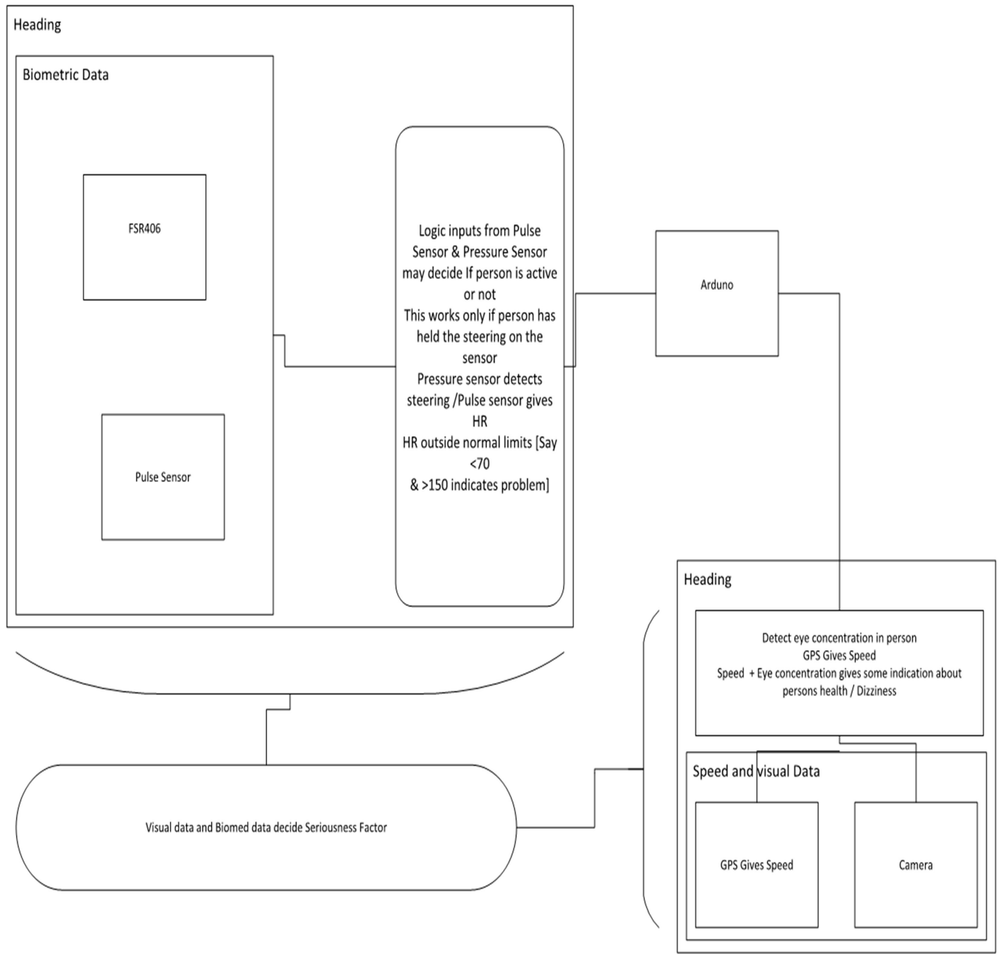

Fig 2.1 Block Diagram of System

Chapter 3
Analysis and Planning

3.1 Project Preparation

❖ Problem definition stage

The Smart Steering Wheel is used to correct and inculcate a good driving habit. It basically works on a pressure applied by the driver on the steering wheel. It senses the positions of hands on the steering wheel and if either of one hand is missing on the steering wheel for 5 to 7 seconds, then it will alert the driver. This project also detects the pulse rate of driver and if any readings found above the threshold reading, then it will alert the driver. A dizziness detection system is also ben provided to alert the driver in case of dizziness.

❖ Designing block diagram

The designing of the block diagram plays a very important role as it visually describes the system as a whole displaying the significant elements of the system. The diagram below is the block diagram of the project.

❖ Implementing circuits and components

This is the actual implementation of each block. At this stage we have designed each block separately and finally integrated them into the complete working system.

❖ Developing flowcharts for software

To get the logical flow of the software the development of flowchart is having a prominent role. So we have to analyze the complete system and organize the flowchart in such a manner that one can understand the complete working of the software.

3.2 PROJECT PLANNING

- Project Idea
- Feasibility check
- Project Title finalization
- Initial research
- First Presentation to Faculty
- Component purchasing
- General layout and block diagram
- Hardware implementation
- Software Compatibility
- Second Presentation to Faculty
- Bluebook preparation

3.3 SCHEDULING:

Table3.1:Scheduling

Week	Work Planned	Work Done	Percentage (%)
27/07/17 to 31/07/17	Selection of Group and finalization of Domain.	Group Selected and Domain name is Embedded System and Industrial Automation	2%
03/08/17 to 07/08/17	Selection of topics based on the Domain.	Smart Steering Wheel	4%
10/08/17 to 14/08/17	Research on the selected topics	Research has been done on the various projects in industrial automation domain.	5%
17/08/17 to 21/08/17	Presentation on the selected topics and finalization of topic.	Topic selected is Smart Steering Wheel.	7%
24/08/17 to 28/08/17	Doing literature survey by finding IEEE papers on Smart Steering Wheel	Found at least 3 IEEE papers.	10%
07/09/17 to 11/09/17	Given presentation-1	Presenting the entire idea of how to go about the whole	14%

		project.	
14/09/17 to 18/09/17	Presenting our project on standard IDC platform	Presenting the entire idea of how to go about the whole project.	16%
21/09/17 to 25/09/17	Studied current scenario	Studied various technologies available in the market.	16%
28/09/17 to 02/10/17	Testing of components	Tested pressure sensors and IR sensors.	20%
05/10/17 to 09/10/17	Presentation-2	Presenting the entire idea of how to go about the whole project.	25%
12/10/17 to 16/10/17	Preparation of Blue Book.	Half the topics are done.	27%
19/10/17 to 23/10/17	Preparation of Blue Book.	Blue Book Report has been made and the Hard copy of the same has been created.	30%
09/11/17 to 13/11/17	Further planning	Improvising on ideas	38%
16/11/17 to	Searching a feasible GPS module for the	Module search for getting it	46%

20/11/17	circuit	worked	
23/11/17 to 27/11/17	Analysis	Analyzing various sensors and gps modules and finding the best one	50%
21/12/17 to 25/12/17	Purchasing hardware components	Hardware components to be purchased and tested.	55%
11/01/18 to 15/01/18	Implementing the code for interfacing it with Arduino	Coding to be done and interfaced with Arduino	60%
18/01/18 to 22/01/18	Analysis	Analyzing errors in the code and correcting them	65%
25/01/18 to 05/02/18	Code implementation	Code implementation for integration on Arduino and receiving and transmitting nodes	75%
08/02/18 to 12/02/18	Hardware implementation	Implementation of hardware	80%
15/02/18 to 19/02/18	Configuration of hardware components	Configuration of Arduino, transmitting & receiving node	85%
22/02/18 to 26/02/18	Analysis	Analyzing the output with the help of trial & error method	90%

29/02/18 to 04/03/18	Black Book (P23)	Preparation of Black Book	100%
27/07/17 to 31/07/17	Selection of Group and finalization of Domain.	Group Selected and Domain name is Embedded System and Industrial Automation	2%
03/08/17 to 07/08/17	Selection of topics based on the Domain.	Smart Steering Wheel	4%
TOTAL			**100% out of 100%**

3.4 Gantt Chart

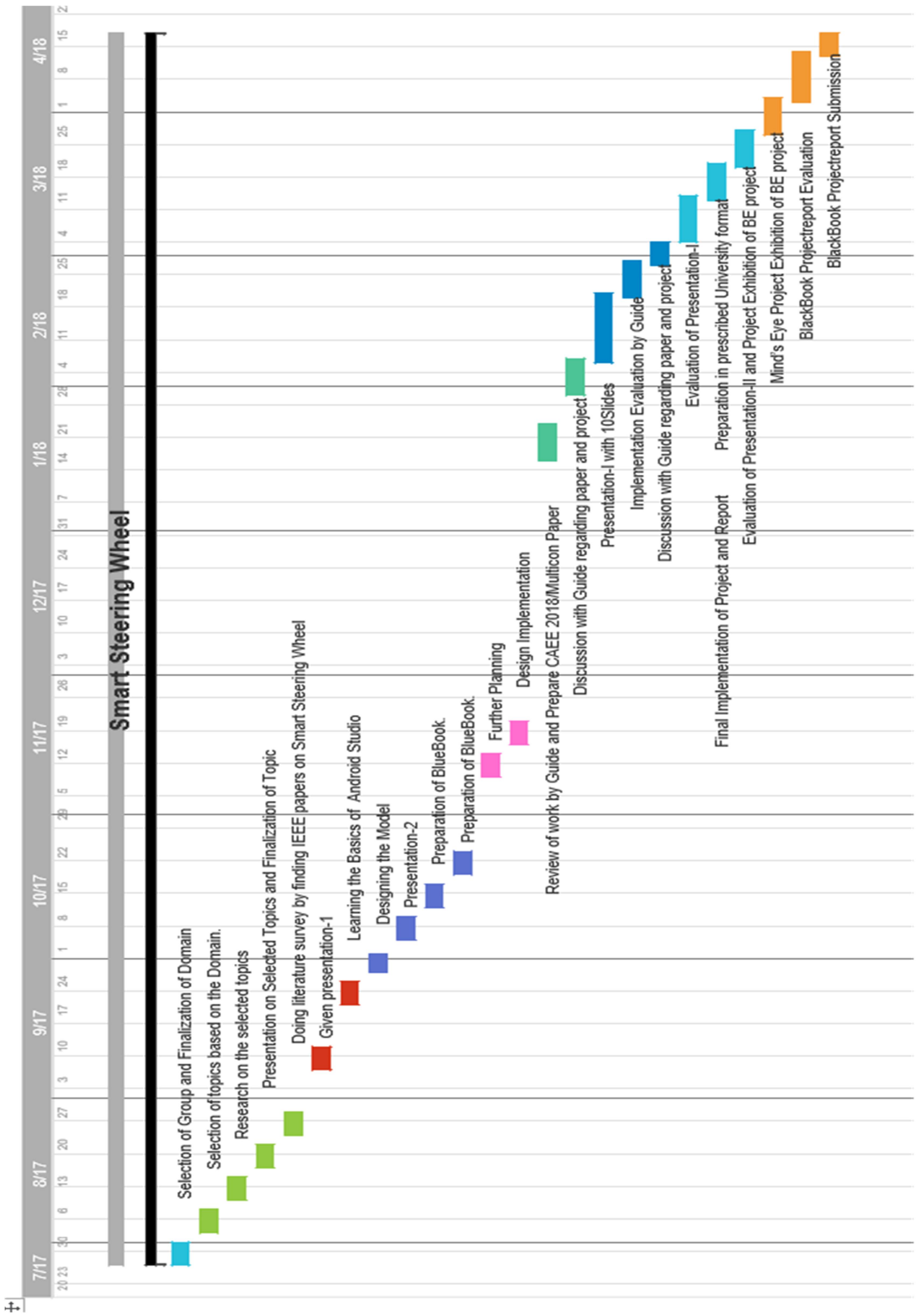

Fig 3.1 Gantt Chart

Chapter 4

Design and Implementation

4.1 Working Principle

The smart steering wheel works on the principle of real time recording and displaying of the data parameters which are sensed in an analogue manner by the two sensors being used to measure the respective parameters. The sensors used in the Pulse Sensor sense the input in the analogue manner and this sensed data is passed on to a arduino which converts the analogue input into a digital output with the program written in the arduino. The entire set-up is placed on steering wheel. The mobile phone is been placed on the front of the driver such that his eyes can be easily detected and monitored. The Force Sensor is been placed on the steering wheel such that it will detect pressure that is applied by the hands and if it does not experience any pressure then a buzzer will buzz to alert the driver.

Fig 4.1: Smart steering wheel

4.2 Hardware and Software Components

Table no.4.1: Hardware Requirement

Item	Name	Quantity
1	Wires	1
2	Arduino UNO (For testing)	1
3	Force sensor	1
4	Pulse sensor	1

The software required were Android studio, Arduino ide

4.2.1 Arduino Uno

Fig 4.2 Arduino Uno

The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins. It is programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

General Pin Descriptions

- **LED**: There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.
- **VIN**: The input voltage to the Arduino/Genuino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- **5V**: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.
- **3V3**: A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND**: Ground pins.
- **IOREF**: This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.
- **Reset**: Typically used to add a reset button to shields which block the one on the board.

Special Pin Description

Each of the 14 digital pins and 6 Analog pins on the Uno can be used as an input or output, using pinMode(),digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm. A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.The Uno has 6 analog inputs, labelled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function.

In addition, some pins have specialized functions:

- **Serial**: pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- **External Interrupts**: pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- **PWM(Pulse Width Modulation):** 3, 5, 6, 9, 10, and 11 Can provide 8-bit PWM output with the analogWrite() function.
- **SPI(Serial Peripheral Interface)**: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.

4.2.2: Force Sensor (FSR 406)

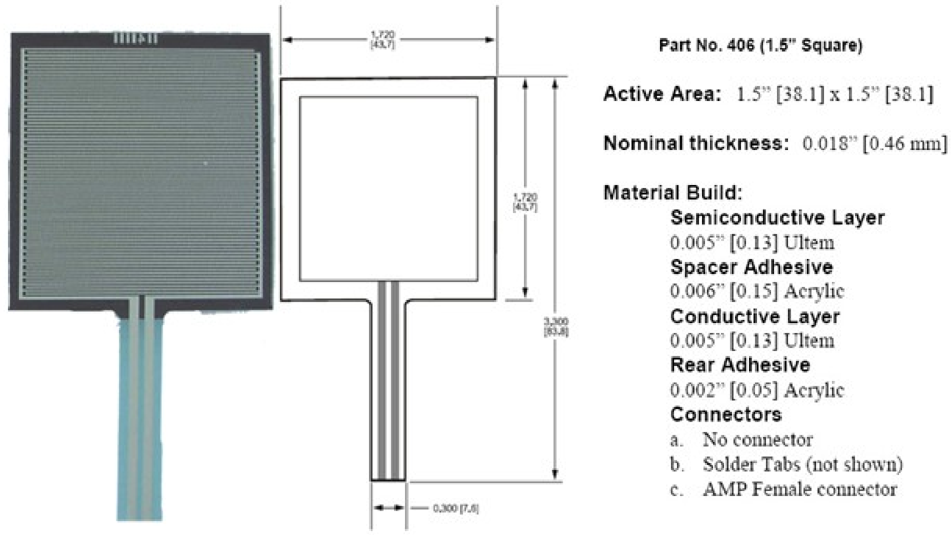

Fig 4.3: FSR 406

Description:

Interlink Electronics FSR™ 400 series is part of the single zone Force Sensing Resistor™ family.

Force Sensing Resistors, or FSRs, are robust polymer thick film (PTF) devices that exhibit a decrease in resistance with increase in force applied to the surface of the sensor. This force sensitivity is optimized for use in human touch control of electronic devices such as automotive electronics, medical systems, and in industrial and robotics applications.

The standard 406 sensor is a squaresensor 43.69mm in size. Custom sensors can be manufactured in sizes ranging from 5mm to over 600mm FSRs are two-wire devices with a resistance that depends on applied force. For specific application needs please contact Interlink Electronics support team. An integration guide is also available. For a simple force-to-voltage conversion, the FSR device is tied to a measuring resistor in a voltage divider configuration (see Figure 3). The output is described by the equation: In the shown configuration, the output voltage increases with increasing force. If R_{FSR} and R_M are swapped, the output swing will decrease with increasing force.

The measuring resistor, R_M, is chosen to maximize the desired force sensitivity range and to limit current. Depending on the impedance requirements of the measuring circuit, the voltage divider could be followed by an op-amp.

The FSR 406 model is a single-zone Force Sensing Resistor® optimized for use in human touch control of electronic devices such as automotive electronics, medical systems, and in industrial and robotics applications. FSRs are two-wire devices. They are robust polymer thick film (PTF) sensors that exhibit a decrease in resistance with increase in force applied to the surface of the sensor. It has a 39.6mm square active area and is available in 4 connection options. Interlink Electronics FSR 400 series is part of the single-zone Force Sensing Resistor family.

A family of force vs. V_{OUT} curves is shown on the graph below for a standard FSR in a voltage divider configuration with various R_M resistors. A (V+) of +5V was used for these examples. Force-sensing resistors consist of a conductive polymer, which changes resistance in a predictable manner following application of force to its surface.[5] They are normally supplied as a polymer sheet or ink that can be applied by screen printing. The sensing film consists of both electrically conducting and non-conducting particles suspended in matrix. The particles are sub-micrometre sizes, and are formulated to reduce the temperature dependence, improve mechanical properties and increase surface durability. Applying a force to the surface of the sensing film causes particles to touch the conducting electrodes, changing the resistance of the film. As with all resistive based sensors, force-sensing resistors require a relatively simple interface and can operate satisfactorily in moderately hostile environments. Compared to other force sensors, the advantages of FSRs are their size (thickness typically less than 0.5 mm), low cost and good shock resistance. A disadvantage is their low precision: measurement results may differ 10% and more.

Features

- Actuation force as low as 0.1N and sensitivity range to 10N.

- Easily customizable to a wide range of sizes
- Highly repeatable force reading; as low as 2% of initial reading with repeatable actuation system
- Cost effective
- Ultra thin; 0.45 mm
- Robust; up to 10 million actuations
- Simple and easy to integrate

Applications

- Detect and qualify press - Sense whether a touch is accidental or intended by reading force
- Use force for UI feedback - Detect more or less user force to make a more intuitive interface
- Enhance tool safety - Differentiate a grip from a touch as a safety lock
- Find centroid of force - Use multiple sensors to determine centroid of force
- Detect presence, position, or motion - Of a person or patient in a bed, chair, or medical device
- Detect liquid blockage - Detect tube or pump occlusion or blockage by measuring back pressure
- Detect proper tube positioning
- Many other force measurement applications

4.2.3 Pulse Sensor

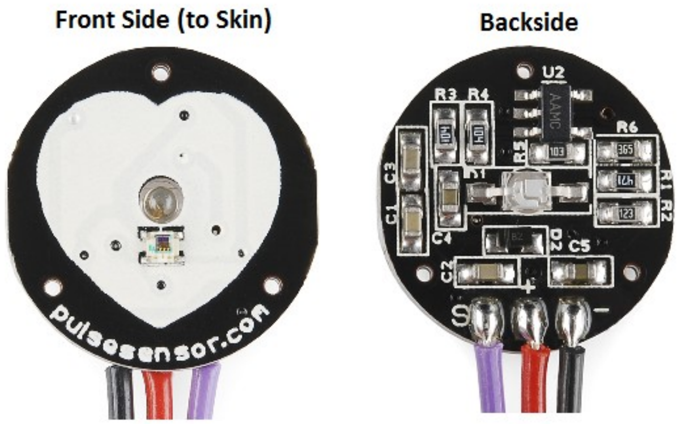

Fig 4.4: Pulse Sensor

Description

Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart rate data into their projects. The sensor clips onto a fingertip or earlobe and plugs right into Arduino. It also includes an open-source monitoring app that graphs your pulse in real time. Pulse Sensor adds amplification and noise cancellation circuitry to the hardware. It's noticeably faster and easier to get reliable pulse readings. Pulse Sensor Amped works with either a 3V or 5V Arduino. The Pulse Sensor can be connected to arduino, or plugged into a breadboard.The front of the sensor is the pretty side with the Heart logo. This is the side that makes contact with the skin. On the front you see a small round hole, which is where the LED shines through from the back, and there is also a little square just under the LED. The square is an ambient light sensor, exactly like the one used in cellphones, tablets, and laptops, to adjust the screen brightness in different light conditions. The LED shines light into the fingertip or earlobe, or other capillary tissue, and sensor reads the light that bounces back. The back of the sensor is where the rest of the parts are mounted.

Specification

- Diameter = 0.625" (~16mm)
- Overall thickness = 0.125" (~3mm)
- Working Voltage = 3V to 5V
- Working Current = ~4mA at 5V
- Indicator LED

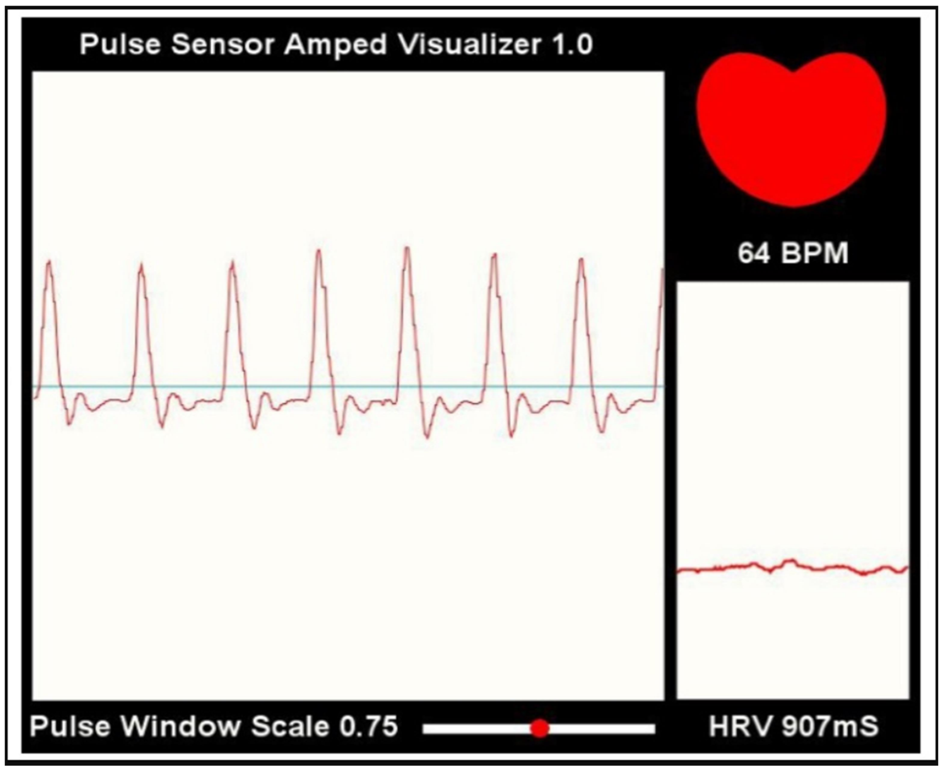

Fig 4.5: Output of pulse sensor

4.3 Flow chart

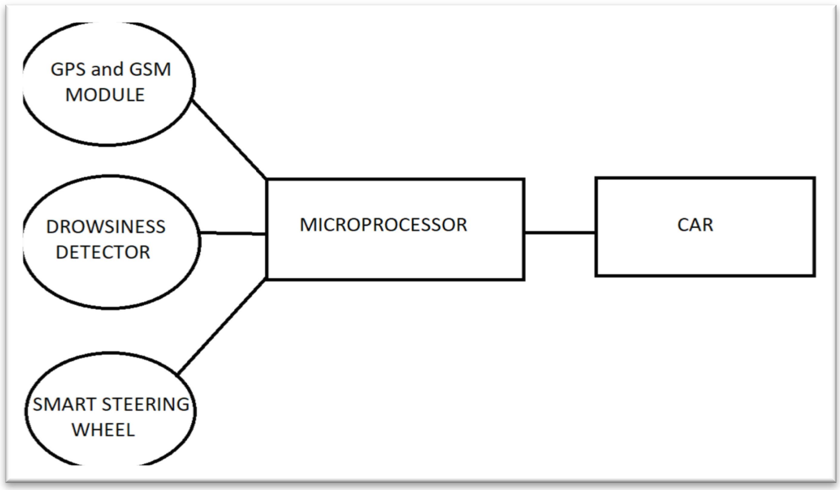

Fig 4.5 : Flow-Chart of Smart steering wheel

4.4 Implementing Stages

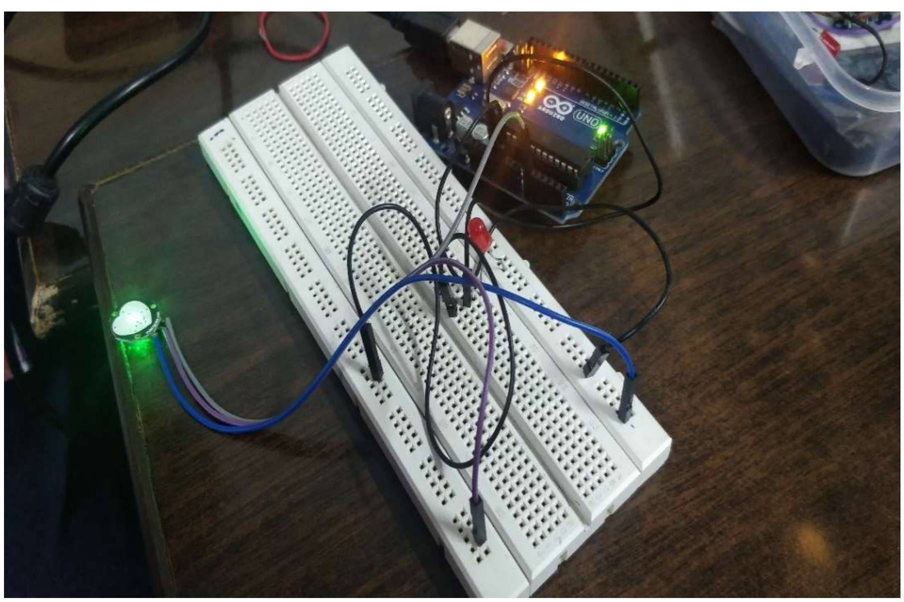

Fig.4.6:Implementation of Pulse Sensor

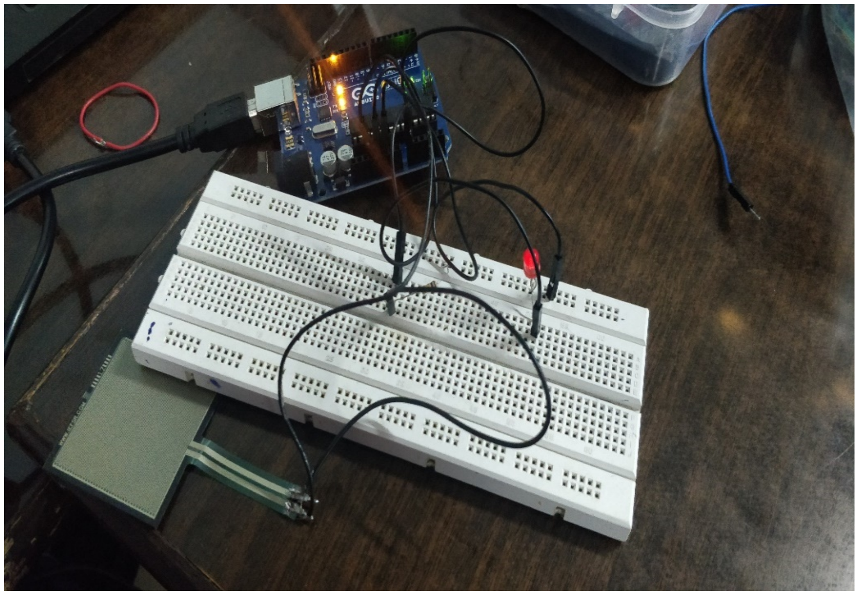

Fig.4.7: Implementation of FSR

Chapter 5

Result and Discussion

Pulse sensor will detect pulse when a finger is placed on it and it will also show the heart rate by blink of the LED. The Force Sensor when no hands are placed on it will blink an LED and when the hands are placed LED will not blink. This LED can be replaced by the buzzer. The mobile placed on front will detect the eye ratio and displays it on the screen and when the ratio is less than 0.35 then it will alert the driver to Open his eyes.

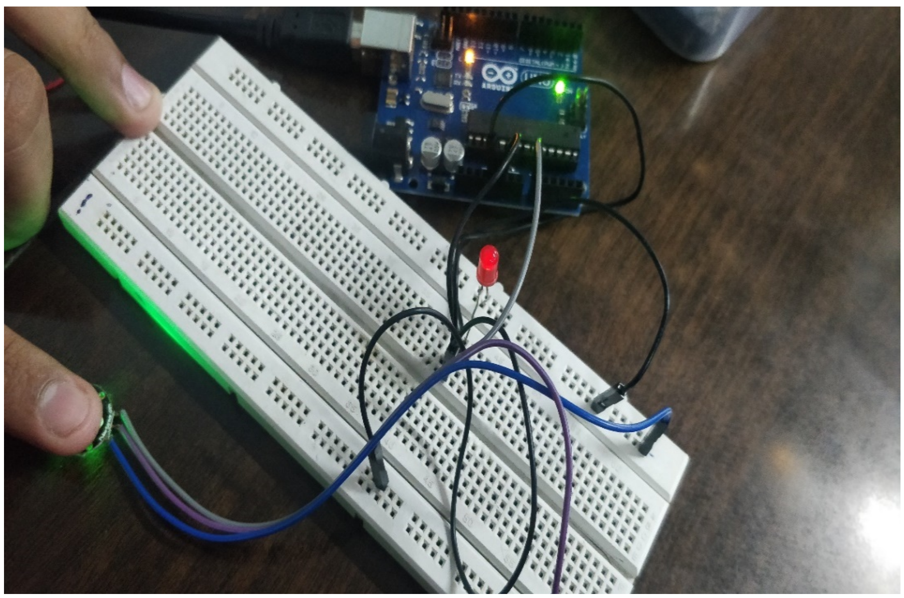

Fig.5.1: Working of Pulse Sensor

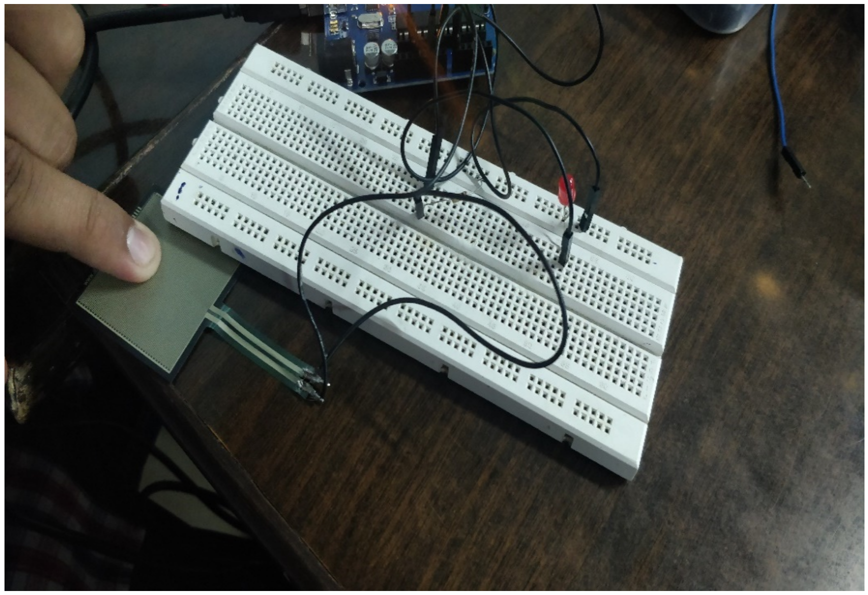

Fig.5.2: Working of FSR

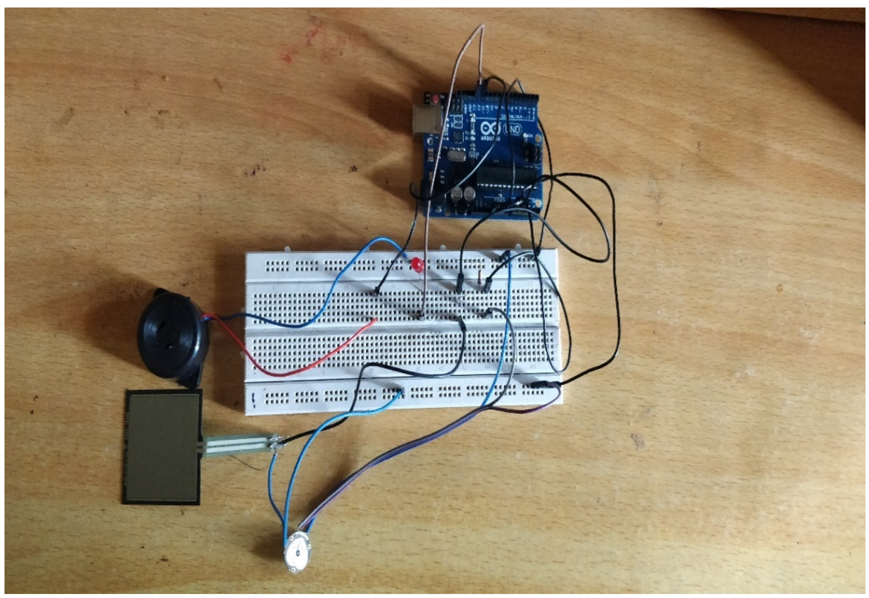

Fig.5.3: Implementation of Complete Circuit

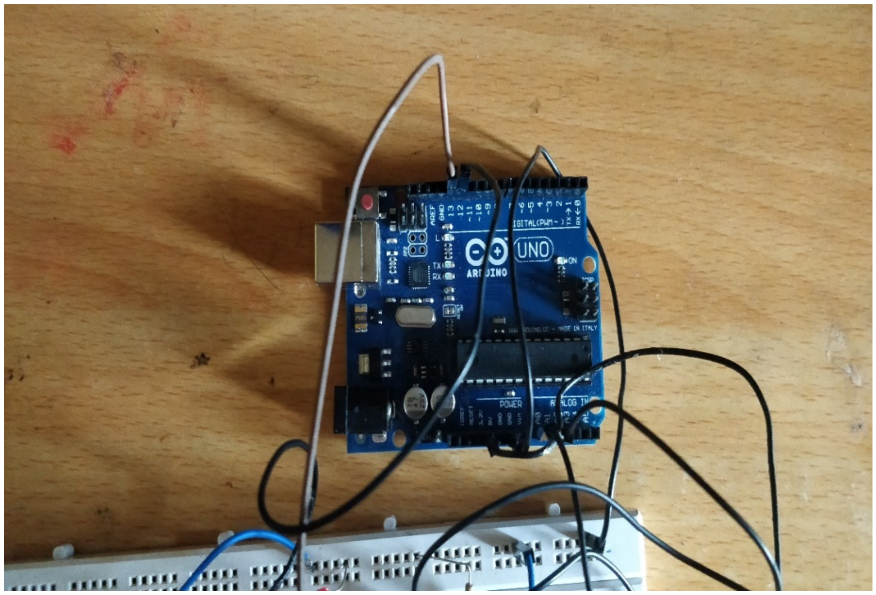

Fig.5.4:Connections on Arduino

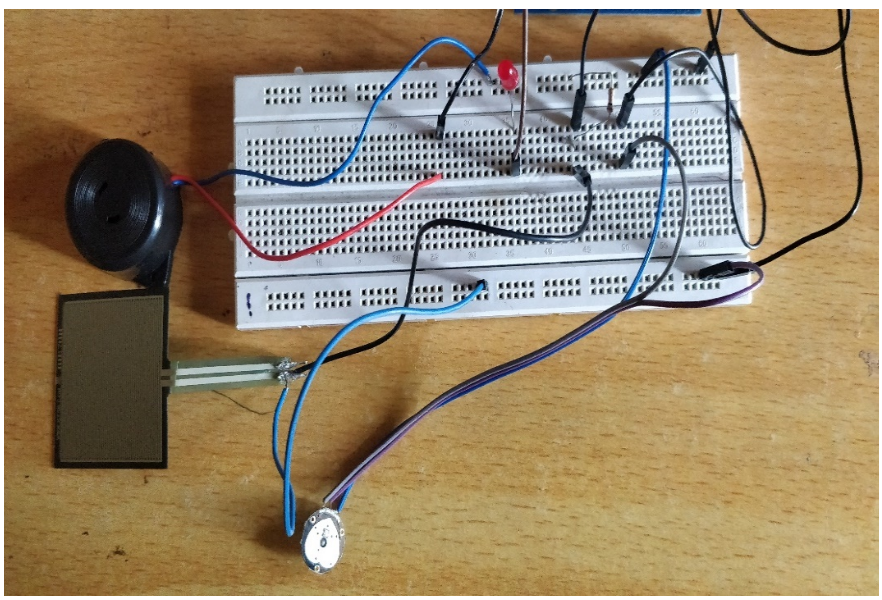

Fig.5.5 : Connections on Bread Board

Fig.5.6: Drowsiness App (Eyes Open)

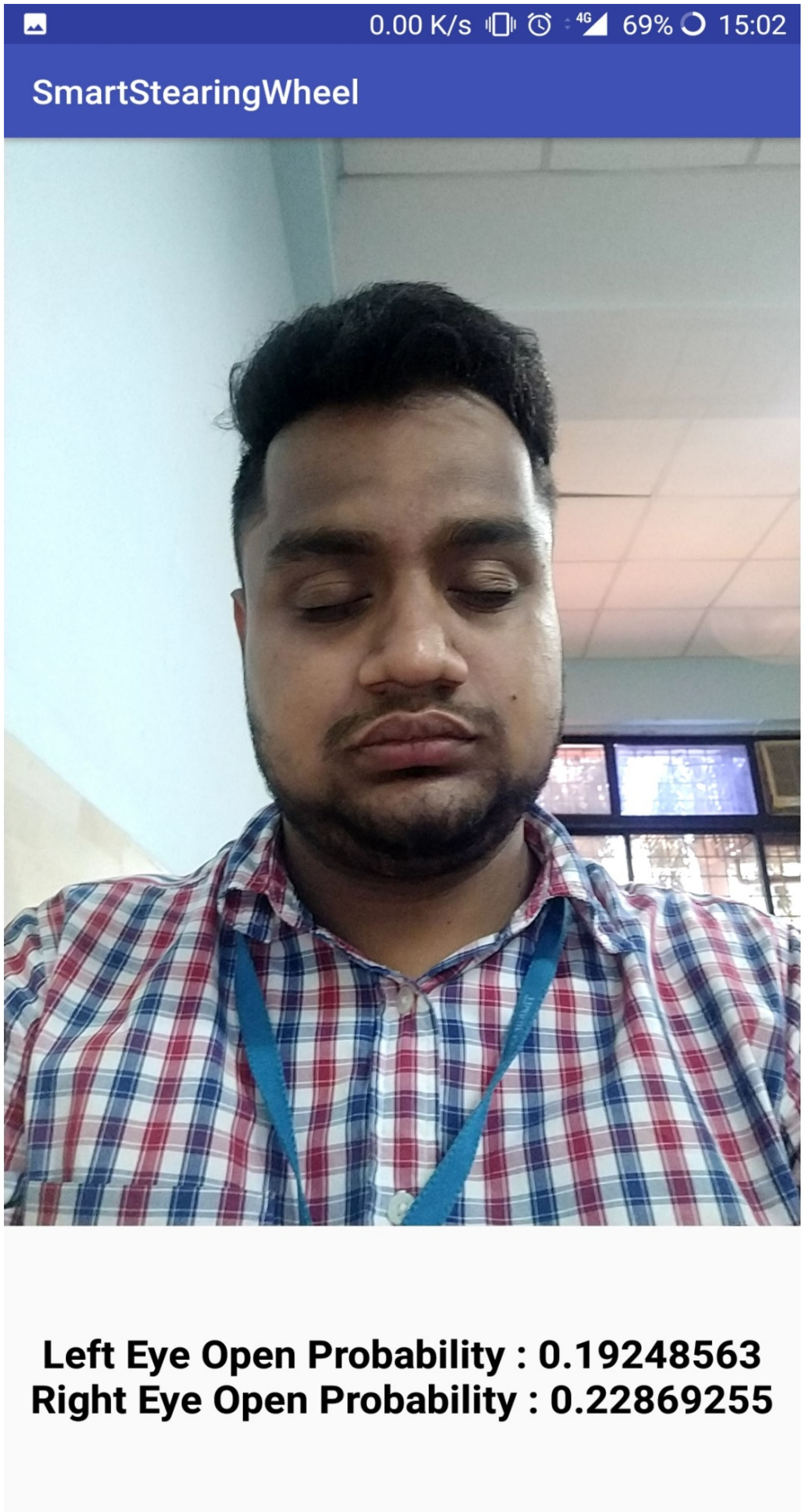

Fig.5.7: Drowsiness App (Eyes Closed)

The above images demonstrate the working of the said features of the Smart Steering Wheel. These were clicked during the testing and implementation of the project.

As we can see, the pulse sensor was implemented on bread board, and was tested along with it. It recorded and displayed the pulse of the person whose finger was appropriately on the sensor.

The FSR was implemented and tested on the bread board too. The FSR recorded and displayed the pressure applied by the user on the steering wheel. It also indicated when there was not enough pressure being applied on the steering wheel.

The Drowsiness detecting app kept monitoring the driver’s eyes continuously, and based on the level of eyes which were open, it indicated whether the driver felt drowsy or not and asked the driver to open his/her eyes.

Chapter 6

Conclusion and Future scope

Conclusion

Thus after referring IEEE and various other research papers, we concluded with development in latest automotive techniques. In Smart steering wheel, each formation is done by the local known conditions which are determined by the pre-described sensors. Smart Steering Wheel can help revolutionize the current automobile and insurance industry by providing details via an automated process. The parameters which were ignored or not monitored on a more frequent basis will be monitored on a regular basis.

We can see that the pulse sensor works very well to trace and monitor the pulse rate of the driver, hence indicating if he faces any problems while driving. If his pulse rate goes above a certain preset threshold or below a certain preset threshold, it will indicate the driver that it is dangerous to proceed, and the driver should park the car instead.

Also, the FSR helps monitor the hand posture continuously and corrects him if he goes wrong, enabling him to have complete control over the steering wheel at all times. The sensor senses the pressure put on it by the driver, and will buzz if it senses pressure less than the set threshold value.

Drowsiness detector monitors the driver's eyes at all time and indicates if it closes for a long time. Hence indicating that the driver is drowsy.

Also, the safety and caution features will decrease the no. of accidents by at least 30%. This will decrease the annual death rates due to car crashes from 3287 to 2300 a day, which in turn will help save 3,60,255 lives a year which is more than the population of the entire Maldives.

Also if the device is put under an automated manufacturing line for mass production, it is estimated to cost under 10,000 retail, which isn't a lot considering a device of this capability.

FUTURE SCOPE

This project when integrated in ONION 2 hardware can enable integration of much more features giving a higher clock speed and less delay as compared to basic Arduino.

Lora WAN is soon coming to India, and TATA will be the provider. With integration of that technology, the need for an extra GPS and GPRs module will be eliminated, and the module will save more power. LoRaWAN is a media access control (MAC) protocol for wide area networks. It is designed to allow low-powered devices to communicate with Internet-connected applications over long range wireless connections. LoRaWAN can be mapped to the second and third layer of the OSI model. It is implemented on top of LoRa or FSK modulation in industrial, scientific and medical (ISM) radio bands.

APPLICATION:

Smart Steering Wheel will have the following applications:

1. Regular Cars: Since the device is cheap and easy to install it can be implemented on any car.
2. Taxi Services: The application helps while a long and a monotonous drive.
3. Learning Schools: It will be used to correct the hand position of the new drivers.
4. Government Run Vehicles
5. Insurance Companies (For Monitoring Purposes)

Reference

REFERENCE

[1] Stephan Muhlbacher-Karrer, Ahmad Haj Mosa, Lisa-Marie Faller, Mouhannad Ali, Raiyan Hamid, Hubert Zangl and Kyandoghere Kyamakya “A Driver State Detection System in IEEE Transactions on Instrumentation and Measurement2017.

[2] Wenting Tong, Paul Cherian and Jianzhe Liu “Statistical analysis of DMV crash data” at Systems and Information Engineering Design Symposium (SIEDS), 2016.

[3] Ines Teyeb, OlfaJamai, and MouradZaied “Vigilance measurement system through analysis of visual and emotional driver's signs using wavelet networks” at `Intelligent Systems Design and Applications (ISDA), 2015 15th International Conference 2016.

[4] Mohammad Amin Assari, Mohammad Rahmati “Driver drowsiness detection using face expression recognition” at Signal and Image Processing Applications (ICSIPA), 2011. IEEE International Conference on 2011

[5] J.F. Coughlin, “Disruptive Demographics, Design, and the Future of Everyday Environments,” Design Management Rev., vol. 18, no. 2, 2007, pp. 53–59.

[6] E. Aarts and B. de Ruyter, “New Research Perspectives on Ambient Intelligence,” J. Ambient Intelligence and Smart Environments, vol. 1, no. 1, 2009, pp. 5–14.

[7] G. Abowd et al., “Living Laboratories: The Future Computing Environments Group at the Georgia Institute of Technology,” Proc. 2000 Conference on Human Factors in Computing Systems (CHI 2000), ACM Press, 2000, pp. 215–216.

[8] J.F. Coughlin and J. Pope, “Innovations in Health, Wellness, and Aging- in-Place: Development of a Consumer-Centered Approach to Intelligent Home Services,” IEEE Eng. in Medicine & Biology, July/ Aug. 2008, pp. 47–52.

[9] W.J. Haddon, “A Logical Framework for Categorizing Highway Safety Phenomena and Activity,” J. Trauma, vol. 12, no. 3, 1972, pp. 193– 207.

[10] L. Andreone et al., “Beyond ContextAwareness: Driver-Vehicle- Environment Adaptively. From the COMUNICAR Project to the AIDE Concept,” Proc. IFAC 16th World Congress, Elsevier, 2006.

[11] J. Qiang, Z. Zhiwei, and P. Lan, “RealTime Nonintrusive

Monitoring and Prediction of Driver Fatigue," IEEE Trans. Vehicular Technology, vol. 53, no. 4, 2004, pp. 1052–1068. 15. B. Mehler et al., "The Impact of Incremental Increases in Cognitive Workload on Physiological Arousal and Performance in Young Adult Drivers," Transportation Research Record: J. Transportation Research Board, vol. 2138, 2009, pp. 6–12.
[12]. C. Ramon et al., "An Integrated Platform to Assess Driver's Physiological and Functional States," Proc. 30th Ann. Int'l IEEE EMBS Conf., IEEE Press, 2008, pp. 506–509.

[13]. B. Mehler, B. Reimer, and J.F. Coughlin, "Physiological Reactivity to Graded Levels of Cognitive Workload across Three Age Groups

Appendix

Arduino UNO

Pin Descriptions

1.1.1 VCC

Digital supply voltage.

1.1.2 GND

Ground.

1.1.3 Port B (PB7:0) XTAL1/XTAL2/TOSC1/TOSC2

Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port B pins that are externally pulled low will source current if the pull-up resistors are activated. The Port B pins are tri-stated when a reset condition becomes active, even if the clock is not running.

Depending on the clock selection fuse settings, PB6 can be used as input to the inverting Oscil-lator amplifier and input to the internal clock operating circuit.

Depending on the clock selection fuse settings, PB7 can be used as output from the inverting Oscillator amplifier.

If the Internal Calibrated RC Oscillator is used as chip clock source, PB7..6 is used as TOSC2..1 input for the Asynchronous Timer/Counter2 if the AS2 bit in ASSR is set. The various special features of Port B are elaborated in ”Alternate Functions of Port B” on page 82 and ”System Clock and Clock Options” on page 26 .

1.1.4 Port C (PC5:0)

Port C is a 7-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The PC5..0 output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port C pins that are externally pulled low will source current if the pull-up resistors are activated. The Port

C pins are tri-stated when a reset condition becomes active, even if the clock is not running.

1.1.5 PC6/RESET

If the RSTDISBL Fuse is programmed, PC6 is used as an I/O pin. Note that the electrical char-acteristics of PC6 differ from those of the other pins of Port C.

If the RSTDISBL Fuse is unprogrammed, PC6 is used as a Reset input. A low level on this pin for longer than the minimum pulse length will generate a Reset, even if the clock is not running. The minimum pulse length is given in Table 28-3 on page 318. Shorter pulses are not guaran-teed to generate a Reset.

The various special features of Port C are elaborated in ”Alternate Functions of Port C” on page 85.

1.1.6 Port D (PD7:0)

Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port D pins that are externally pulled low will source current if the pull-up resistors are activated. The Port D pins are tri-stated when a reset condition becomes active, even if the clock is not running.

Program for Pulse Sensor and Force Sensor interfacing

```
int PulseSensorPurplePin = 0;
int LED13 = 13;
int fsrAnalogPin = 1;
int LEDp12 = 12;
int fsrReading;


int Signal;
int Threshold1 = 450;
int Threshold2 = 550;


void setup() {
 pinMode(LED13,OUTPUT);
 pinMode(LED12, OUTPUT);
  Serial.begin(9600);
}
void loop() {
 fsrReading = analogRead(fsrAnalogPin);
 Serial.print("Analog reading = ");
 Serial.println(fsrReading);
 if (fsrReading<=300)
 {
     digitalWrite(LEDpin,HIGH);


 }
     else {
```

```
   digitalWrite(LEDpin,LOW);
  }
 delay(10);
 Signal = analogRead(PulseSensorPurplePin);
 Serial.println(Signal);
   if(Signal > Threshold1 && Signal < Threshold2 )
   {
     digitalWrite(LED13,HIGH);
   }
   else {
     digitalWrite(LED13,LOW);
   }
delay(10);
}
```

Program for Application

```
package com.example.jainil.smartstearingwheel;

import android.Manifest;
import android.content.pm.PackageManager;
import android.speech.tts.TextToSpeech;
import android.support.v4.app.ActivityCompat;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.util.Log;
import android.util.SparseArray;
import android.view.SurfaceHolder;
import android.view.SurfaceView;
import android.widget.TextView;
import android.widget.Toast;
```

```
import com.google.android.gms.vision.CameraSource;
import com.google.android.gms.vision.Detector;
import com.google.android.gms.vision.face.Face;
import com.google.android.gms.vision.face.FaceDetector;
import com.google.android.gms.vision.text.TextBlock;

import java.io.IOException;
import java.util.Locale;

public class MainActivity extends AppCompatActivity {

    private static final String TAG = "Main Activity";
    CameraSource mCameraSource;
    TextView mTextView;
    SurfaceView mCameraView;
    TextToSpeech textToSpeech;
    private static final int requestPermissionID = 8080;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        mTextView = findViewById(R.id.text_view);
        mCameraView = findViewById(R.id.surfaceView);

        textToSpeech
= new TextToSpeech(getApplicationContext(), new TextToSpee
ch.OnInitListener() {
            @Override
            public void onInit(int status) {
                if(status != TextToSpeech.ERROR) {

                    textToSpeech.setLanguage(Locale.ENGLISH);
                } else if (status == TextToSpeech.ERROR) {
                    Toast.makeText(MainActivity.this, "Error TTS",
Toast.LENGTH_SHORT).show();
                }
```

```
            textToSpeech.speak("Drowsiness Detection Started ",
TextToSpeech.QUEUE_FLUSH, null);
        }

      });
      startSource();
   }

   private void startSource() {

      //Create the TextRecognizer
      FaceDetector faceDetector =
            new FaceDetector.Builder(getApplicationContext())
                  .setTrackingEnabled(false)
                  .setLandmarkType(FaceDetector.ALL_LANDMA
RKS)
                  .setClassificationType(FaceDetector.ALL_CLASS
IFICATIONS)
                  .build();
      if (!faceDetector.isOperational()) {
         Log.w(TAG, "Detector dependencies not loaded yet");

      } else {

         //Initialize camerasource to use high resolution and set
Autofocus on.
         mCameraSource
= new CameraSource.Builder(getApplicationContext(),
faceDetector)
               .setFacing(CameraSource.CAMERA_FACING_FR
ONT)
               .setRequestedPreviewSize(1280, 1024)
               .setAutoFocusEnabled(true)
               .setRequestedFps(15f)
               .build();

         /**
          * Add call back to SurfaceView and check if camera
permission is granted.
          * If permission is granted we can start our cameraSource
and pass it to surfaceView
```

```
            */
           mCameraView.getHolder().addCallback(new SurfaceHol
der.Callback() {
               @Override
               public void surfaceCreated(SurfaceHolder holder) {
                   try {
                       if (ActivityCompat.checkSelfPermission(MainAct
ivity.this, Manifest.permission.CAMERA) !=
PackageManager.PERMISSION_GRANTED) {
                           ActivityCompat.requestPermissions(MainActivi
ty.this,
                                   new String[]{Manifest.permission.CAME
RA},
                                   requestPermissionID);
                           return;
                       }
                       mCameraSource.start(mCameraView.getHolder())
;

                   } catch (IOException e) {
                       e.printStackTrace();
                   }
               }

               @Override
               public void surfaceChanged(SurfaceHolder
holder, int format, int width, int height) {
               }

               /**
                * Release resources for cameraSource
                */
               @Override
               public void surfaceDestroyed(SurfaceHolder holder) {
                   mCameraSource.stop();
               }
           });

           //Set the TextRecognizer's Processor.
           faceDetector.setProcessor(new Detector.Processor<Face>
```

```
() {
            @Override
            public void release() {
            }

            /**
             * Detect all the text from camera using TextBlock and
the values into a stringBuilder
             * which will then be set to the textView.
             * */
            @Override
            public void receiveDetections(Detector.Detections<Fac
e> detections) {
                final SparseArray<Face> items =
detections.getDetectedItems();
                if (items.size() != 0 ){

                    mTextView.post(new Runnable() {
                        @Override
                        public void run() {

                            Face face = items.valueAt(0);

                            String text = "Left Eye Open Probability : " +
face.getIsLeftEyeOpenProbability() +
                                    "\nRight Eye Open Probability :
"+face.getIsRightEyeOpenProbability();
                            mTextView.setText(text);
                            if(face.getIsRightEyeOpenProbability()<0.35
 && face.getIsLeftEyeOpenProbability()<0.35)
                            {
                                textToSpeech.speak("Open your eyes",
TextToSpeech.QUEUE_FLUSH, null);

                            }

                        }
                    });
                }
            }
        }
```

Smart Steering Wheel

Pinkesh Panchal,
Student, BE Electronics,
TCET, Mumbai, India.
pinkeshpanchal77@gmail.com

Yash Khandelwal,
Student, BE Electronics,
TCET, Mumbai, India.
yashkhandelwal12345@gmail.com

Himanshu Gupta,
Student, BE Electronics,
TCET, Mumbai, India.
mr.himanshu96@gmail.com

***Abstract--* Smart Steering Wheel is an integrated system designed to ease and automate the process of tracking important parameters of the car, with assisting the driver for better and safe driving, helping prevent accidents. This will be done with the help of features like smart steering, drowsiness detection, GPS tracking, alcohol detection etc. Smart steering is a cover made to be wrapped around the steering wheel which will correct the driver's hand position while driving, which can be further modified to provide features like panic assist. Drowsiness detector is a camera attached on the steering wheel which will keep a track of the driver's eyes, and warn him if he seems unfit to drive due to drowsiness. Further advancements can be made to this project with the help of better access to technology, and more hands on time with an actual car, making the device more efficient.**

I. INTRODUCTION

Smart Steering Wheel is an integrated system designed to ease and automate the process of tracking important parameters of the car like engine oil health, tyre pressure, coolant health etc. with assisting the driver for better and safe driving, helping in preventing accidents.

This will be done with the help of features like smart steering, parameter tracking, drowsiness detection, GPS tracking, alcohol detection, etc. Smart steering is cover made to be wrapped around the steering wheel which will correct the driver hand position while driving, which can be further modified to provide features like panic assist. Drowsiness detector is a camera attached on the steering wheel that continuously monitor the state of the driver and also notify the driver when he/she is not fit to drive.

Further advancements can be made to this project with the help of better access to technology, and more hands on time with an actual car, making the device more and more efficient and helpful.

Nearly 1.2 million people die in road crashes each year, on average 3,286 deaths a day. An additional 20-60 million are injured or disabled. More than half of all road traffic deaths occur among young adults ages 15-45. Road traffic crashes rank as the 9th leading cause of death and account for 2.1% of all deaths globally. Road crashes are the under 30 die on the world's roads, on average over 1,000 a day. Over 90% of all road fatalities occur in low and middle-income countries, which have less than half of the world's vehicles. Road crashes cost USD $519 billion globally, costing individual countries from 1-2% of their annual GDP. Road crashes cost low and middle-income countries USD $65 billion annually, exceeding the total amount received in developmental assistance. Unless action is taken, road traffic injuries are predicted to become the fifth leading cause of death in a decade.

The leading causes of road accidents are:

1. Distracted Driving
2. Speeding
3. Drunk Driving
4. Reckless Driving
5. Night Driving
6. Drowsy Driving
7. Tire Blowouts

II. LITERATURE SURVEY

In 1879, Karl Benz was given was granted a patent for his first engine, and in 1885, the first car was created. Since then, there has been numerous advancements in the automobile industry. A number of features like Power Steering, Air conditioner, Music System, were introduced in a car. Also, numerous safety features like Safety Belt, Air Bags, Antilock Brakes, Traction Control, Electronic Brake Distribution, Electronic Stability Control, etc. were introduced to make driving safe.

There are a lot of road accidents happening across the world. The main reasons for the accidents are one hand driving, drinking and driving, driving while feeling drowsy. Such accidents are not only dangerous for the driver but also for the co- passengers and also for other people in the vicinity. So we have designed a steering wheel cover and drowsiness detection eyewear which will help reduce accidents. However, although these features assisted the driver and make driving more easy and fun, they didn't stop accidents as there are various other areas left untapped which needs monitoring and caution. Drivers sometimes tend to be careless and reckless while driving; taking wrong decisions on the road resulting in major accidents. They also need to keep a regular check on engine oil, tyre pressure, engine coolant, etc. Also, car theft is increasing day by day and the car owners and the insurance companies suffer a lot due to this.

Our Vehicle management system helps caution the driver, keep check on the essential parameters of the car, and prevent major accidents by assisting the driver. Vehicle Management system will serve as an integrated module which can be installed in any car to help drivers be careful resulting in saving a lot of money of the owner as well as the insurance companies. It will also help prevent some major wrong decisions and in turn save a lot of lives. The paper on Vigilance measurement system through analysis of visual and emotional driver's signs using wavelet networks presented by Ines Teyeb, OlfaJamai, MouradZaied in the year2016 describes the Basic working of dizziness tracker was understood. The values of readings to be coded and the distance to be maintained between the lamp and eyes are understood. The paper on Statistical analysis of DMV crash data presented by Wenting Tong, Paul Cherian, Jianzhe Liu in the year 2016 describes Stats were used in introduction and used to explain motivation. The paper on A Driver State Detection System presented by Stephan Muhlbacher-Karrer, Ahmad Haj Mosa, Lisa-Marie Faller, Mouhannad Ali, Raiyan Hamid, Hubert Zangl and KyandoghereKyamakya in the year 2017 describes Pressure monitoring. The synchronization of each component with the main system was seen.

III. PROJECT WORK

Software Requirements:

1. Opencv + Haarcascade: Open CV-Python is a Python wrapper for the original Open CV C++ implementation. Open CV-Python makes use of Numpy, which is a highly optimized library for numerical operations with MATLAB-style syntax. All the Open CV array structures are converted to and from Numpy arrays.

A. Hardware Requirements:

1. Camera: A camera is an optical instrument for recording or capturing images, which may be stored locally, transmitted to another location, or both. The images may be individual still photographs or sequences of images constituting videos or movies. The camera is a remote sensing device as it senses subjects without any contact. The word camera comes from camera obscura, which means "dark chamber" and is the Latin name of the original device for projecting an image of external reality onto a flat surface. The modern photographic camera evolved from the camera obscura. The functioning of the camera is very similar to the functioning of the human eye. A camera may work with the light of the visible spectrum or with other portions of the electromagnetic spectrum. A still camera is an optical device which creates a single image of an object or scene and records it on an electronic sensor or photographic film. All cameras use the same basic design: light enters an enclosed box through a converging lens/convex lens and an image is recorded on a light-sensitive medium (mainly a transition metal-halide). A shutter mechanism controls the length of time that light can enter the camera. Most photographic cameras have functions that allow a person to view the scene to be recorded, allow for a desired part of the scene to be in focus, and to control the exposure so that it is not too bright or too dim. A display, often a liquid crystal display(LCD), permits the user to view scene to be recorded and settings such as ISO speed, exposure, and shutter speed.

2. A movie camera or a video camera operates similarly to a still camera, except it records a series of static images in rapid succession, commonly at a rate of 24 frames per second. When the images are combined and displayed in order, the illusion of motion is achieved

3. Arduino Uno: Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board.

4. Microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License or the GNU General Public License , permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment based on the Processing language project. The Arduino Uno can be programmed with the Select "Arduino/Genuino

The ATmega328 on the Arduino Uno comes preprogrammed with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol. The Arduino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center- positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector.

The board can operate on an external supply from 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may become unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.The ATmega328 has 32 KB (with 0.5 KB occupied by the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM Arduino/Genuino Uno has a number of facilities for communicating with a computer, another Arduino/Genuino board, or other microcontrollers. The ATmega328 provides UART TTL serial communication, which is available on digital pins 0 and 1. An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The 16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino Software (includes a serial monitor which allows simple textual data to be sent to and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer.

MEMS Pressure Sensor: In less than 20 years, MEMS (micro electro-mechanical systems) technology has gone from an interesting academic exercise to an integral part of many common products. But as with most new technologies, the practical implementation of MEMS technology has taken a while to happen. The design challenges involved in designing a successful MEMS product (the ADXL2O2E) are described in this article by Harvey Weinberg from Analog Devices.

In early MEMS systems a multi-chip approach with the sensing element (MEMS structure) on one chip, and the signal conditioning electronics on another chip was used.

IV. WORKING

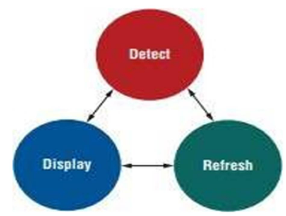

Fig 1.Working Triangle

Here we are using a camera which will be used to detect the state of the driver. It's been done by image processing which is given from the camera mounted on the steering wheel. When the camera detects dizzy state of state of the driver then it sounds an alarm to bring driver to its normal state. A pressure sensor is been used to hand position of the driver.

V. METHODOLOGY

Our system works to help the driver to attain great concentration while driving. For the same purpose we have implanted a drowsiness detection system, which detects the dizziness of the driver with the help of the image processing through the camera which is been placed on the steering wheel. This system continuously monitors driver's state and alerts him when he/she is feeling dizzy while driving. This system consists of the camera, a raspberry pi which processes the video and detects when eyes of the driver are closed. When the eyes of the driver are closed for more than 3 seconds then the system raises an alarm.

Another system which consists of pressure sensor is placed on the steering wheel to detect the position of hands of driver. When hands of the driver are not on the steering wheel for more than five second then a buzzer will make noise.

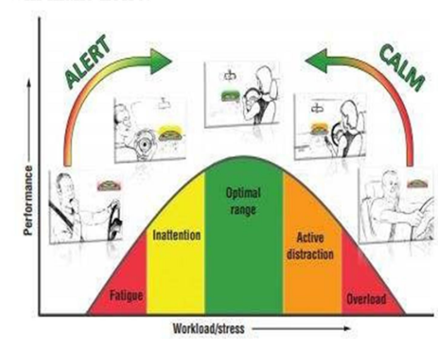

Fig 2: Performance graph

VI. Block Diagram

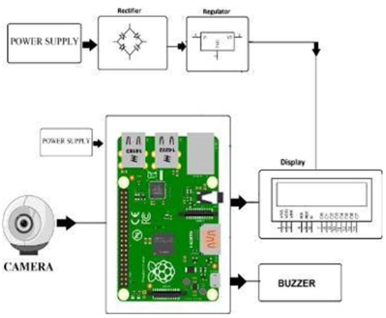

Fig 3. Block diagram of dizziness detector

VII. SCOPE OF PROJECT

There can be more features added to the current system to enhance it and cover a wider spectrum in terms of safety. Such features include:

A. GPS Tracker:

This feature enables the owner of the car to track his car at every moment. This will help in tracking the car in the parking lot, warn and control the driver in regards with the speed of the car. It will also help new drivers, especially their parents, to track them and get record of their speeds and driving performance.

B. Alcohol Detector:

An alcohol detector can be placed on the steering wheel or somewhere near the driver, so that he can make sure he is not under influence while driving, and also, the car can be programmed in such a way that the car won't start if alcohol is detected. This will help reduce one of the major causes of car crashes.

C. Panic Assist:

While driving, if the car skids, due to oil spill, rain, etc. the driver goes in a state of panic. This may lead him to move steering in unexpected way and in rapid motion. Panic Assist will detect this movement and harden the movement of the steering resulting in smooth movement of the car and balancing and stabilizing of the car.

VIII. CONCLUSION

Smart Steering Wheel can help revolutionizes the current automobile and insurance industry by providing details via an automated process. The parameters which were ignored

IX. EXPECTED RESULT

The objective to help driver concentrate and drive safely by minimizing his distractions and assisting him in various areas is achieved. Dizziness tracker will check consciousness of the driver, judging whether he is fit to drive or not. And the hand posture corrector will help driver adjust his hand posture making his driving more safe.

REFERENCES

[1] Stephan Muhlbacher-Karrer, Ahmad Haj Mosa, Lisa-Marie Faller, Mouhannad Ali, Raiyan Hamid, Hubert Zangl and Kyandoghere Kyamakya "A Driver State Detection System in IEEE Transactions on Instrumentation and Measurement2017.

[2] Wenting Tong, Paul Cherian and Jianzhe Liu "Statistical analysis of DMV crash data" at Systems and Information Engineering Design Symposium (SIEDS), 2016.

[3] Ines Teyeb, OlfaJamai, and MouradZaied "Vigilance measurement system through analysis of visual and emotional driver's signs using wavelet networks" at `Intelligent Systems Design and Applications (ISDA), 2015 15th International Conference 2016.

[4] Mohammad Amin Assari, Mohammad Rahmati "Driver drowsiness detection using face expression recognition" at Signal and Image Processing Applications (ICSIPA), 2011. IEEE International Conference on 2011

[5] J.F. Coughlin, "Disruptive Demographics, Design, and the Future of Everyday Environments," Design Management Rev., vol. 18, no. 2, 2007, pp. 53–59.

[6] E. Aarts and B. de Ruyter, "New Research Perspectives on Ambient Intelligence," J. Ambient Intelligence and Smart Environments, vol. 1, no. 1, 2009, pp. 5–14.

[7] G. Abowd et al., "Living Laboratories: The Future Computing Environments Group at the Georgia Institute of Technology," Proc. 2000 Conference on Human Factors in Computing Systems (CHI 2000), ACM Press, 2000, pp. 215–216.

[8] J.F. Coughlin and J. Pope, "Innovations in Health, Wellness, and Aging-in-Place: Development of a Consumer-Centered Approach to Intelligent Home Services," IEEE Eng. in Medicine & Biology, July/ Aug. 2008, pp. 47–52.

[9] W.J. Haddon, "A Logical Framework for Categorizing Highway Safety Phenomena and Activity," J. Trauma, vol. 12, no. 3, 1972, pp. 193–207.

[10] L. Andre one et al., "Beyond Context Awareness: Driver- Vehicle-Environment Adaptively. From the COMUNICAR Project to the AIDE Concept," Proc. IFAC 16th World Congress, Elsevier, 2006.

[11] J. Qiang, Z. Zhiwei, and P. Lan, "RealTime Nonintrusive Monitoring and Prediction of Driver Fatigue," IEEE Trans. Vehicular Technology, vol. 53, no. 4, 2004, pp. 1052–1068. 15. B. Mehler et al., "The Impact of Incremental Increases in Cognitive Workload on Physiological Arousal and Performance in Young Adult Drivers," Transportation Research Record: J. Transportation Research Board, vol. 2138, 2009, pp. 6–12.

[12]. C. Ramon et al., "An Integrated Platform to Assess Driver's Physiological and Functional States," Proc. 30th Ann. Int'l IEEE EMBS Conf., IEEE Press, 2008, pp. 506–509.

[13]. B. Mehler, B. Reimer, and J.F. Coughlin, "Physiological Reactivity to Graded Levels of Cognitive Workload across Three Age Groups:

Contact Information of Students in Group &Guide (Address /Mobile Number/Email ID)

Sr No.	Name	Class	Roll No.	Email id	Mobile No.	Address
1.	Mr. Hemant Kasturiwale	Professor		hemantkasturiwale@gmail.com	986948461	Thakur College of Engineering Technology, Kandivali(E)
2.	Himanshu Gupta	BE-ETRX	12	mr.himanshu96@gmail.com	9867605321	2002, Daffodil Tower, S.V. Road, Malad West.
3.	Yash Khandelwal	BE-ETRX	22	yashkhandelwal12345@gmail.com	9987296019	A-504, Sheetal Chayya Apt., S.V. Road, Malad West.
4.	Pinkesh Panchal	BE-ETRX	31	pinkeshpanchal77@gmail.com	8879597875	302D, Raja Ramdev Park, Bhayender East.

Zagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

• ISO 9001 : 2008 Certified • Accredited Programmes by National Board of Accreditation, New Delhi**

*Permanent Affiliated UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (w.e.f. A.Y. 2015-16) • Electronics Engineering (w.e.f. A.Y. 2017-18)
**1st time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (3 years w.e.f. 16-09-2011)
**2nd time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology • Electronics Engineering (3 years w.e.f. 01-07-2016)
1st cycle of Accreditation : • "A" Grade for 5 years (w.e.f. 30-10-2017)

A - Block, Thakur Educational Campus, Shyamnarayan Thakur Marg, Thakur Village, Kandivali (East), Mumbai - 400 101
Tel.: 022-6730 8000 / 8106 / 8107 Telefax: 022-2846 1890
Email: tcet@thakureducation.org Website: www.tcetmumbai.in www.thakureducation.org

Estd. 2001

Mind's Eye Project Competition 2018

TCET-R&D Cell Project Showcase 2018

Certificate of Participation

This is to certify that Mr./Ms. **GUPTA HIMANSHU** from **Electronics Department** has participated and presented project on **Vehicle Management System** in the **Mind's Eye Project Competition 2018** organized on Friday, April 13th 2018 at **Thakur College of Engineering & Technology**, Kandivali (E), Mumbai.

Dr. Kamal Shah	**Dr. Deven Shah**	**Dr. B. K. Mishra**
Dean - R & D	Vice-Principal	Principal

Zagdu Singh Charitable Trust's (Regd.)

THAKUR TRUSTS

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

• ISO 9001 : 2008 Certified • Accredited Programmes by National Board of Accreditation, New Delhi**

*Permanent Affiliated UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (w.e.f. A.Y. 2015-16) • Electronics Engineering (w.e.f. A.Y. 2017-18)
**1st time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (3 years w.e.f. 16-09-2011)
**2nd time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology • Electronics Engineering (3 years w.e.f. 01-07-2016)
1st cycle of Accreditation : • "A" Grade for 5 years (w.e.f. 30-10-2017)

A - Block, Thakur Educational Campus, Shyamnarayan Thakur Marg, Thakur Village, Kandivali (East), Mumbai - 400 101
Tel.: 022-6730 8000 / 8106 / 8107 Telefax: 022-2846 1890
Email: tcet@thakureducation.org Website: www.tcetmumbai.in www.thakureducation.org

tcet Estd. 2001

Mind's Eye Project Competition 2018

TCET-R&D Cell Project Showcase 2018

Certificate of Participation

This is to certify that Mr./Ms. **YASH KHANDELWAL** from **Electronics Department** has participated and presented project on **Vehicle Management System** in the **Mind's Eye Project Competition 2018** organized on Friday, April 13th 2018 at **Thakur College of Engineering & Technology**, Kandivali (E), Mumbai.

Dr. Kamal Shah	**Dr. Deven Shah**	**Dr. B. K. Mishra**
Dean - R & D	Vice-Principal	Principal

THAKUR TRUSTS ®

Lagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

• ISO 9001 : 2008 Certified • Accredited Programmes by National Board of Accreditation, New Delhi**

*Permanent Affiliated UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (w.e.f. A.Y. 2015-16) • Electronics Engineering (w.e.f. A.Y. 2017-18)
**1st time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology (3 years w.e.f. 16-09-2011)
**2nd time Accredited UG Programmes : • Computer Engineering • Electronics & Telecommunication Engineering • Information Technology • Electronics Engineering (3 years w.e.f. 01-07-2016)
1st cycle of Accreditation : • "A" Grade for 5 years (w.e.f. 30-10-2017)

A - Block, Thakur Educational Campus, Shyamnarayan Thakur Marg, Thakur Village, Kandivali (East), Mumbai - 400 101
Tel.: 022-6730 8000 / 8106 / 8107 Telefax: 022-2846 1890
Email: tcet@thakureducation.org Website: www.tcetmumbai.in www.thakureducation.org

tcet Estd. 2001

Mind's Eye Project Competition 2018

TCET-R&D Cell Project Showcase 2018

Certificate of Participation

This is to certify that Mr./Ms. **PINKESH PANCHAL** from **Electronics Department** has participated and presented project on **Vehicle Management System** in the **Mind's Eye Project Competition 2018** organized on Friday, April 13th 2018 at **Thakur College of Engineering & Technology**, Kandivali (E), Mumbai.

Dr. Kamal Shah	**Dr. Deven Shah**	**Dr. B. K. Mishra**
Dean - R & D	Vice-Principal	Principal

THAKUR TRUSTS

Zagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

Thakur Village, Kandivali (E), Mumbai - 400101.

tcet

Estd. 2001

ISO 9001 : 2015 Certified

NBA and NAAC Accredited

MEW 2018 Invention & Innovation

MULTICON-W 2018

A platform for Multiple Conferences and Workshops

9th National & International Conferences & Workshops

Certificate of Appreciation

CAEE 2018

This is to certify that ~~Dr.~~/Mr./~~Ms.~~ **YASH KHANDELWAL** has presented/published a **SHORT** length paper with the title **SMART STEERING WHEEL** in the **Conference on Advances in Electronics Engineering (CAEE 2018)** organized during February, 23rd & 24th, 2018 at Thakur College of Engineering and Technology.

(Dr. Sandhya Save)
Convenor

(Dr. Lochan Jolly)
Technical Chair

(Dr. B. K. Mishra)
Principal & Programme Chair

Philanthropic Partners

Platinum

Theem College of Engineering Boisar

Diamond

Anjuman - I - Islam's Kalsekar Technical Campus New Panvel

Technocrat Partners

MAHATMA GANDHI MISSION

Other Partners

KILLER Style

FREE PRESS Print Media

CARNIVAL Cinema

Collaborators

IJIREEICE

IARJSET

IOSR Journals International Organization of Scientific Research

i-manager Publications

IJSER

SAEINDIA

THAKUR TRUSTS

Zagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

Thakur Village, Kandivali (E), Mumbai - 400101.

tcet Estd. 2001

ISO 9001 : 2015 Certified

NBA and NAAC Accredited

MEW 2018 Invention & Innovation

MULTICON-W 2018

A platform for Multiple Conferences and Workshops

9th National & International Conferences & Workshops

Certificate of Appreciation

CAEE 2018

This is to certify that ~~Dr.~~/Mr./~~Ms.~~ PINKESH PANCHAL has presented/published a SHORT length paper with the title SMART STEERING WHEEL in the **Conference on Advances in Electronics Engineering (CAEE 2018)** organized during February, 23rd & 24th, 2018 at Thakur College of Engineering and Technology.

(Dr. Sandhya Save)	(Dr. Lochan Jolly)	(Dr. B. K. Mishra)
Convenor	Technical Chair	Principal & Programme Chair

Philanthropic Partners

Platinum: Theem College of Engineering, Boisar

Diamond: Anjuman - I - Islam's Kalsekar Technical Campus, New Panvel

Technocrat Partners

M. H. Saboo Siddik College of Engineering; Kalsekar Technical Campus; Theem College of Engineering; MGM College of Engineering and Technology

Other Partners

KILLER (Style); FREE PRESS – The Voice of Mumbai (Print Media); CARNIVAL (Cinema)

Collaborators

IJIREEICE; IARJSET; IOSR Journals – International Organization of Scientific Research; i-manager Publications; IJSER – International Journal of Scientific and Engineering Research; SAEINDIA

Zagdu Singh Charitable Trust's (Regd.)

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

Thakur Village, Kandivali (E), Mumbai - 400101.

THAKUR TRUSTS

tcet Estd. 2001

ISO 9001 : 2015 Certified

NBA and NAAC Accredited

MULTICON-W 2018

A platform for Multiple Conferences and Workshops

9th National & International Conferences & Workshops

NEW 2018 Invention & Innovation

CAEE 2018

Certificate of Appreciation

This is to certify that Dr./Mr./Ms. HIMANSHU GUPTA has presented/published a SHORT length paper with the title SMART STEERING WHEEL in the **Conference on Advances in Electronics Engineering (CAEE 2018)** organized during February, 23rd & 24th, 2018 at Thakur College of Engineering and Technology.

(Dr. Sandhya Save)
Convenor

(Dr. Lochan Jolly)
Technical Chair

(Dr. B. K. Mishra)
Principal & Programme Chair

Philanthropic Partners

Platinum: Theem College of Engineering, Boisar

Diamond: Anjuman - I - Islam's Kalsekar Technical Campus, New Panvel

Technocrat Partners: M. H. Saboo Siddik College of Engineering; Anjuman - I - Islam's Kalsekar Technical Campus; Theem College of Engineering; MGM College of Engineering and Technology

Other Partners: KILLER — Style; FREE PRESS, The Voice of Mumbai — Print Media; CARNIVAL — Cinema

Collaborators: IJIREEICE; IARJSET; IOSR Journals, International Organization of Scientific Research; i-manager Publications; IJSER, International Journal of Scientific and Engineering Research; SAEINDIA