ADVANCE INDICATOR FOR VEHICLES TO AVOID ROAD ACCIDENTS

A PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report "**SMART INDICATOR FOR VECHILES TO AVOID ROAD ACCIDENTS**" is the bonafide work of "**BOOPATHI S, KAVIYA S, DEEPIKA T** and **RANJITH B S"** who carried out the project work under my supervision.

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ABSTRACT

In the present modern world, most of the people are using the roadways for transportation purposes. The utilization of roadways increases by one side, on the other side the road accidents are also escalating. The current assessment shows that the reasons for the road accidents are not obeying the traffic rules, inappropriate usage of indicators while turning right or left while driving the vehicles and so on. In peak hours and in traffic times people are speeding up with their vehicle and forgot to turn off their indicator. This leads to an accident while sudden turning and braking without a proper indication. In order to overcome these types of difficulties, an automatic turning off bike indicators is proposed. User can turn off automatically and manually.

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LIST OF ABBREVATIONS

ABBREVATIONS	EXPANSIONS
CORS	Cross Origin Resource Sharing
GIS	Geographic Information System
GND	Ground
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communication
I2C	Inter Integrated Circuit
IDE	Integrated Development Environment
LED	Light Emitting Diode
RGB	Red Green Blue
SCL	Serial Clock
SDA	Serial Data
SMS	Short Message Service
SRAM	Static Random Access Memory

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In all country's roadways are at most vital for the citizens to move from one place to another place for their personal, official and business work purposes. With the usage of roadways, the farmers can easily sell their products into market, factories can transport their goods to retail shops and public can easily move from one place to another place without any difficulty. Regions or Countries can function easily with adequate road facilities. Roadways in India are most tarnished in the world, so that every year 1.5 lakh citizens lost their lives due to their lack of knowledge in traffic rules. The central government previously failed to take the essential steps however now government has taken strong efforts to reduce the traffic offenses. Vehicle turn indicator signals are usually well known in the art. In most of the automotive two wheelers, the turning direction of the vehicle can be activated by the operator by make use of turn signals. Usually, the turning signal is controlled by the switches which are very sensitive to turning of the steering column of the vehicle and generally available in the nature of flashing illumination. The indicator unit available in the two-wheeler is in activated signaling condition while the steering wheel remains unmoved or continues to move in the direction of the turn. The steering column of the mechanical catch is released, when the steering wheel is moved in the direction opposite to the direction of the turn, which causes the cancellation of turn signal. Now-a-days people who are driving their vehicles on the roadways are not properly using their vehicle's indicator while turning. In peak hours and in traffic times people are rushing with their vehicle and forgot to use their indicator this leads to an accident while sudden turning and braking without a proper indication. In order to overcome these types of difficulties, an automatic turning off bike indicators system is proposed.

1.2 OBJECTIVES

1.2.1 MAIN OBJECTIVES

- To reduce the road accidents which occurs due to improper indication.
- To ensure safer ride.

1.2.2 SPECIFIC OBJECTIVES

- To reduce the usage of indicator in unnecessary situations.
- To avoid confusing other road users by improper usage of indicator.

CHAPTER 2

LITERATURE REVIEW

K. Divakara Murthy et.al designs a semi-automatic signal indicator for two-wheeler. In this project, the authors presented a semi-automatic mechanism of indication of signal lights of a two-wheeler. The system is used to prevent the accidents which may happened due to negligence of traffic rules, due to the laziness shown by the drivers at the time of turning on roads etc. The system is semi-automatic and incurs high cost. It is not fully automatic and also the navigation system is not established. Zechun Huang et.al. developed a GPS vehicle positioning monitoring system which is integrated with CORS and mobile GIS [2]. They design and implemented a method for vehicle direction, examination of vehicle position and control system and all are merged with CORS service network and Mobile GIS. The system also surveys the feature of spatial and attributes data associated with the vehicle positioning control. Prawat Chaiprapa et.al. Proposed a Google map-based website for a real time GPS vehicle tracking system. The authors developed a vehicle tracing methodology which utilizes a global positioning system (GPS) technology. The proposed module is used to collect the spot of the vehicle. Then the location information is forwarded into microcontroller. Then the microcontroller using Internet Connection and General Packet Radio Service (GPRS) displays the position of the vehicle in a real-time mode on the website map. Since the system uses both the Internet and GPS technology causes difficulty in low network area. Dr. Khalifa et.al. design a vehicle tracking using web-based GPS-GPRS. The authors implemented a vehicle tracking system using web-based GPS-GPRS technology. [4]. The process authorizes enterprises holders to examine the present and past locality of the intended vehicle on Google Map [3] with the aid of recordings. The current locality of the vehicle was acquired by GPS device which is integrated in the intended vehicle and the site coordinates are sent via GPRS service to GSM

network. [10][12] Mahesh Kadibagil and Guruprasad H S developed a Position detection and tracking system for vehicle. The system consists of self-directed position recognition and tracking which capture the friends and family member's location with the help of GPS and standard web technology [5]. This methodology consists of a web client, a repository, a mobile client and a map service. The mobile client is utilized to identify the location of family members or friends if they are coming around the user's area of directions then the mobile client conveys a Popup SMS to user. These location particulars can be post to the server and the same particulars can be controlled and observed using the web client by other users. Li Liu, et.al. implemented a navigation system which is android phone-based group communication model. The authors developed a technology for navigation and group transmission system using Android mobile operating system [6][10]. The system supplies a friendly group communication policy between friends in order to promptly communicate and a real-time positioning, navigation and path planning capabilities with the help of GPS. [8] Kai Qin et.al designs an intelligent bus movement and station reporting system. In this system the location information is passed to the control center which uses the GPS functionality. The hardware division of the system integrates voice chip also. The software part finds the station reporting system.

CHAPTER 3

SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

The manual mode is operated by the individual whose is riding the bike. The rider can turn on/off the bike indicators whenever the rider needs to turn on/off (depends up on the situation). Usually, the manual mode of operation is the thumb operated one, already the switch to turn on/off the bike indicators is fixed in the bike's handle itself. Some models of bikes have a different specification like to turn on the right indicator of the bike, the control of that indicator will be on the right side of the bike's handle and vice versa. The bike riders have to use the indicators to inform other road users when they intend to change the direction. To use the bike indicators in right time, have to give the plenty of time to other road users to react and adapt to the signal. Once the turn is completed make sure the indicators are cancelled otherwise it may confuse other road users.

3.2 DRAWBACKS OF EXISTING SYSTEM

- The bike riders are forgot to turn off the indicator in the right time.
- Confusing the other road users by not turning off the bike indicators in the right time and vice versa.
- Number of accidents are increased.

3.3 PROPOSED SYSTEM

In the present modern world, most of the people are using the roadways for transportation purposes. The utilization of roadways increases by one side, on the other side the road accidents are also escalating. The current assessment shows that the reasons for the road accidents are not obeying the traffic rules, inappropriate usage of indicators while turning right or left while driving the vehicles and so on. In peak hours and in traffic times people are speeding up with their vehicle and forgot to turn off their indicator. This leads to an accident while sudden turning and braking without a proper indication. In order to overcome these types of difficulties, an automatic turning off bike indicators is proposed.

3.4 ADVANTAGES OF THE PROPOSED SYSTEM

- It is found to have better performance in most cases to avoid accidents in road ways.
- Automatic turn off indicator will be useful when user forget turn off after the turn over.
- The implementation cost is very low.
- The power consumption is low because the sensor starts working when the indicator starts working.

CHAPTER 4

SYSTEM SPECIFICATION

4.1 HARDWARE REQUIREMENTS

- ADXL345 ACCELEROMETER SENSOR,
- ARDUNIO BOARD,
- 8x8 MARTIX LIGHT,
- JUMPER WIRES,
- RESISTORS,
- BREAD BOARD.

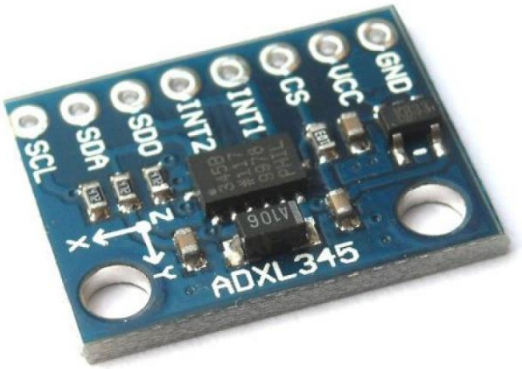


Figure 4.1 ADXL345 ACCELEROMETER SENSOR

Figure 4.2 ADXL345 8x8 MARTIX LIGHT

Figure 4.3 JUMPER WIRES

Figure 4.4 RESISTER

ADXL345 is easy to interface because of its digital nature. But its programming is difficult as it works on the SPI/I2C protocol. ADXL345 can measure static and dynamic accelerations and suitable for mobile applications. Also, these sensors are laboratory calibrated and don't require any further calibrations.

Inertial sensors are used to detect linear and rotational motion of an object. There are two types of inertial sensors – accelerometers that detect linear acceleration and gyroscopes that detect rotational motion. Accelerometers and gyros are widely used in

several applications, including aerospace, military, automotive, mobile phones, and consumer electronics.

For example, in mobile phones, gyroscope and accelerometer sensors are used for screen rotation, gaming, virtual reality, and augmented reality applications. In automobiles, accelerometer and gyroscope are used for detection vehicle rollover, airbag release control, ABS, active suspension, traction control, and seat belt control. Many military applications like smart ammunition, flight control, etc. also make use of these sensors. In aerospace applications, these sensors are used for measuring microgravity and monitoring the movement and rotation of equipment/devices.

ADXL345 is a small 3-axis accelerometer that a dynamic range of +/-16g with 13-bit resolution, the maximum bandwidth of 3200Hz, and a maximum data transfer rate of 3200 times a second. It is a digital accelerometer sensor and outputs digital values of acceleration in three axes. The sensor outputs data formatted as 16-bit two's complement that is accessible via SPI or I2C interfaces. This sensor is ultra-low power and consumes only 23 uA in measurement mode and 0.1 uA in standby mode.

ADXL345 Arduino Connections:

Connect A4 pin (SDA) of Arduino -> SDA pin of adxl345

Connect A5 pin (SCL) of Arduino -> SCL pin of adxl345

Connect GND of Arduino -> GND pin of adxl345

Connect 5V of Arduino -> Vcc of adxl345

ADXL345 Arduino Code Explanation

For this ADXL345 Arduino project, we need two libraries for the ADXL345 Sensor.

1. Adafruit ADXL345
2. Adafruit Unified sensor

An 8x8 LED matrix contains 64 LED (Light Emitting Diodes) which are arranged in the form of a matrix, hence the name LED matrix. These matrixes can be made by circuiting 64 LEDs; however, that process is time consuming.

The dot-matrix modules most of the time comes in red led. It is easy to attach with an Arduino board as compared to an RGB led display.

If we look at a piece of the 8x8 dot matrix, it contains 16 pins in which 8 pins used for rows and 8 for columns. That's mean in rows and column a total of 64 LEDs. We start from Pin # 1 to pin # 8. Pin number 1 is R5 (Row-5) and Pin number 8 is R3(Row-3) at the downside.

At the upper side From Pin 9 (Row-1) to Pin 16 (column-1) located. But a newbie always confuses and starts from zero, because we know the picture/diagram. often, we get from some source, also we have to sort out which one +VE and -VE. might be an expert can understand from common cathode/anode type.

Interface dot matrix with Arduino

First setting up the matrix circuit, as per the connection given in the picture diagram. start the Arduino IDE to program the Arduino UNO board. Arduino IDE is available at Arduino official site. For this circuit, it does not need resistance at all. Just connect wires as per the instruction.

4.2 SOFTWARE REQUIREMENTS

- Arduino IDE 1.8.19

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Active development of the Arduino software is hosted by GitHub. See the instructions for building the code. Latest release source code archives are available here. The archives are PGP-signed so they can be verified using this gpg key.

Arduino designs, manufactures, and supports electronic devices and software, allowing people around the world to easily access advanced technologies that interact with the physical world. Our products are straightforward, simple, and powerful, ready to satisfy users' needs from students to makers and all the way to professional developers.

Arduino's mission is to enable anyone to enhance their lives through accessible electronics and digital technologies. There was once a barrier between the electronics, design, and programming world and the rest of the world. Arduino has broken down that barrier.

Over the years, our products have been the brains behind thousands of projects, from everyday objects to complex scientific instruments. A worldwide community, comprising students, hobbyists, artists, programmers, and professionals, has gathered around this open-source platform, their contributions adding up to an incredible amount of accessible knowledge.

Our vision is to make Arduino available to everyone, whether you are a student, maker or professional, which is why we now have three segments to our business. These segments work together as an ecosystem with a shared mindset: we started with Maker, and that has evolved into Education and PRO solutions.

CHAPTER 5

SOFTWARE DESCRIPTION

5.1 FRONT END

The software's primary objective is to encourage programming for beginners. In order to achieve this objective, the program offers multiple important functionalities. For instance, it lets users share project information with stakeholders. Moreover, users can create schematic modifications and internal layouts as per their specific requirements.

Arduino IDE comes with comprehensive guides explaining the installation process. As such, you don't need to have hardcore technical skills to get started with the tool. The multiple tutorials available in the program help understand the software's framework.

When it comes to ease of use and convenience, Arduino IDE has been one of the top-rated programs in this category. While it conducts complex processes, the tool doesn't use a lot of system resources.

Interface:

Arduino IDE is easy-to-use coding software, making it simpler for beginners to get started with programming. In simple terms, it's a text processor with coding specific functions. An important function is auto-formatting, which can be quite helpful for people who don't understand how to format code. With a single click of the mouse, you can arrange the code in an understandable format. Additionally, the program features multiple templates, which can be for complex sketches in the text processor.

Community support:

The best part about using Arduino IDE is the community-driven system. With an active user base, it becomes easier to find creations from experienced programmers. Moreover, you can find various troubleshooting tips and feedback on your coding skills. The focus on the community is clearly noticeable in the programming environment's interface, which integrates the forums in the layout. Users can upload

the code directly to the forums, letting them conveniently obtain feedback and tips.

Features:

Compared to other similar programs, Arduino IDE performs as an on-premise application as well as a comprehensive online editor. The coding software comes with advanced functionalities, including board module options, direct sketching, online sharing, integrated libraries, etc.

Comparison Arduino and Arduino Uno:

Arduino boards use SRAM (Static Random-Access Memory). The Mega 2560 has the most SRAM space with 8 kB, which is 4x more than the Uno, and 3.2x more than the Micro. With more SRAM space, the Arduino has more space to create and manipulate variables when it runs.

CHAPTER 6

PROJECT DESCRIPTION

6.1 SELECTION OF SOFTWARE

Arduino IDE 1.8.19

6.2 PROJECT DESCRIPTION

User can turn off automatically and manually. Let's discuss this in detail with 3 cases.

Case: 1

This case is applicable for the two wheelers. Till today while driving, people are turning on/off the indicators manually. The bike riders forgot to use the indicators in the right time. This resulted in many accidents. As per my project, let's fix a "BIKE INDICATOR" which works AUTOMATICALLY. This indicator will sense the angle of the handlebar in bike and navigates automatically by doing the work of indication.

Manually rider have to turn on the indicator but the indicator will turn off automatically. This sensor will sense the angle and turns off automatically once the turning angle retains to normal angle. It will be turning off automatically after crossing (approx."10 meters) of indication. This will result with a safety ride.

Case: 2

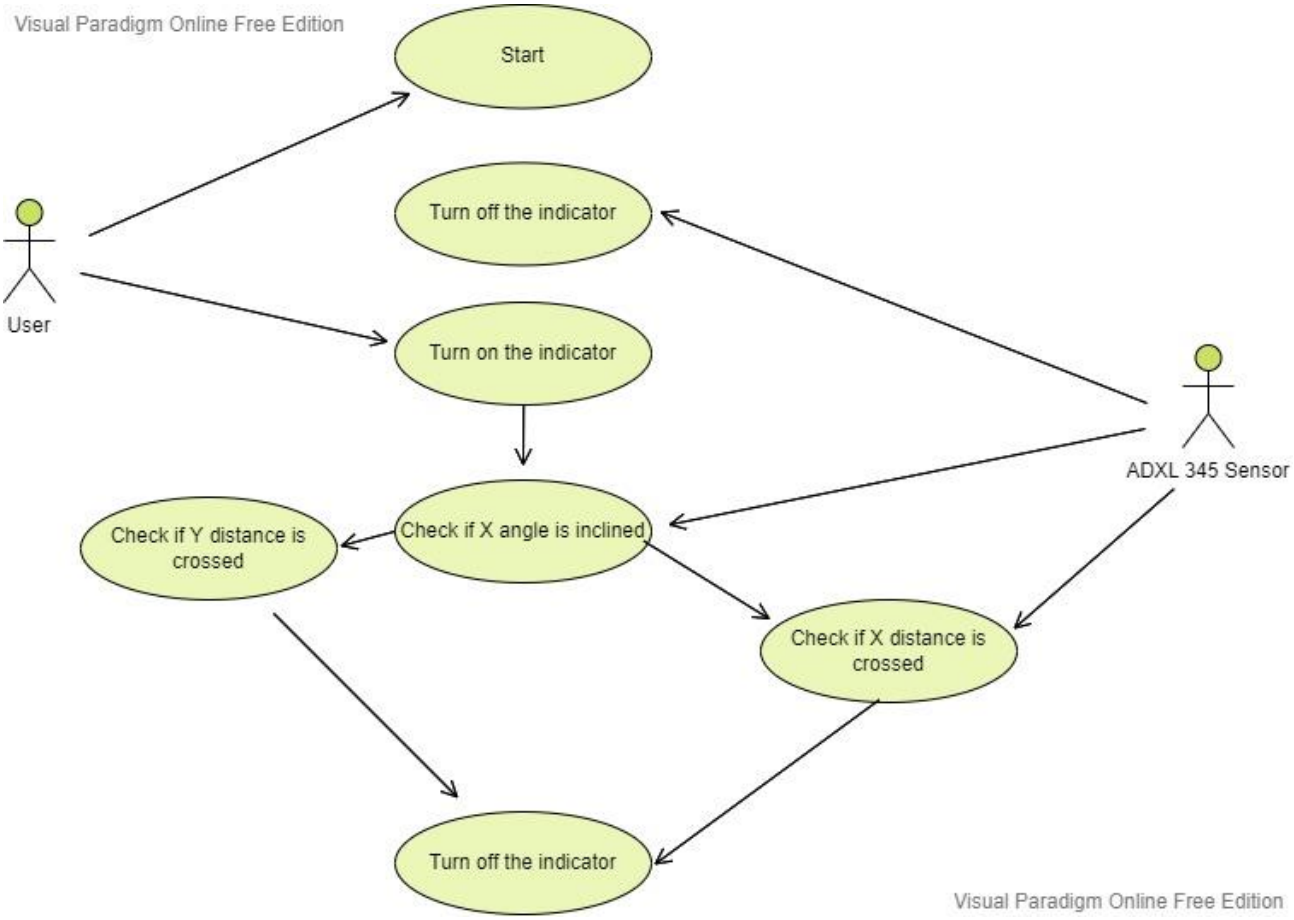
While starting ride for an urgent work most of the people fails to check whether indicator is in on or off. In some cases, indicator of the bike which is in rest may turn on. Person who is going to start the same bike again may fail to check the indicator. As a solution our "SMART INDICATOR" will turn off the indicator automatically once the bike gets started. This is will sure help the person to avoid terrific accidents. Emergency works could be easily done here after

without the pressure of checking indicators.

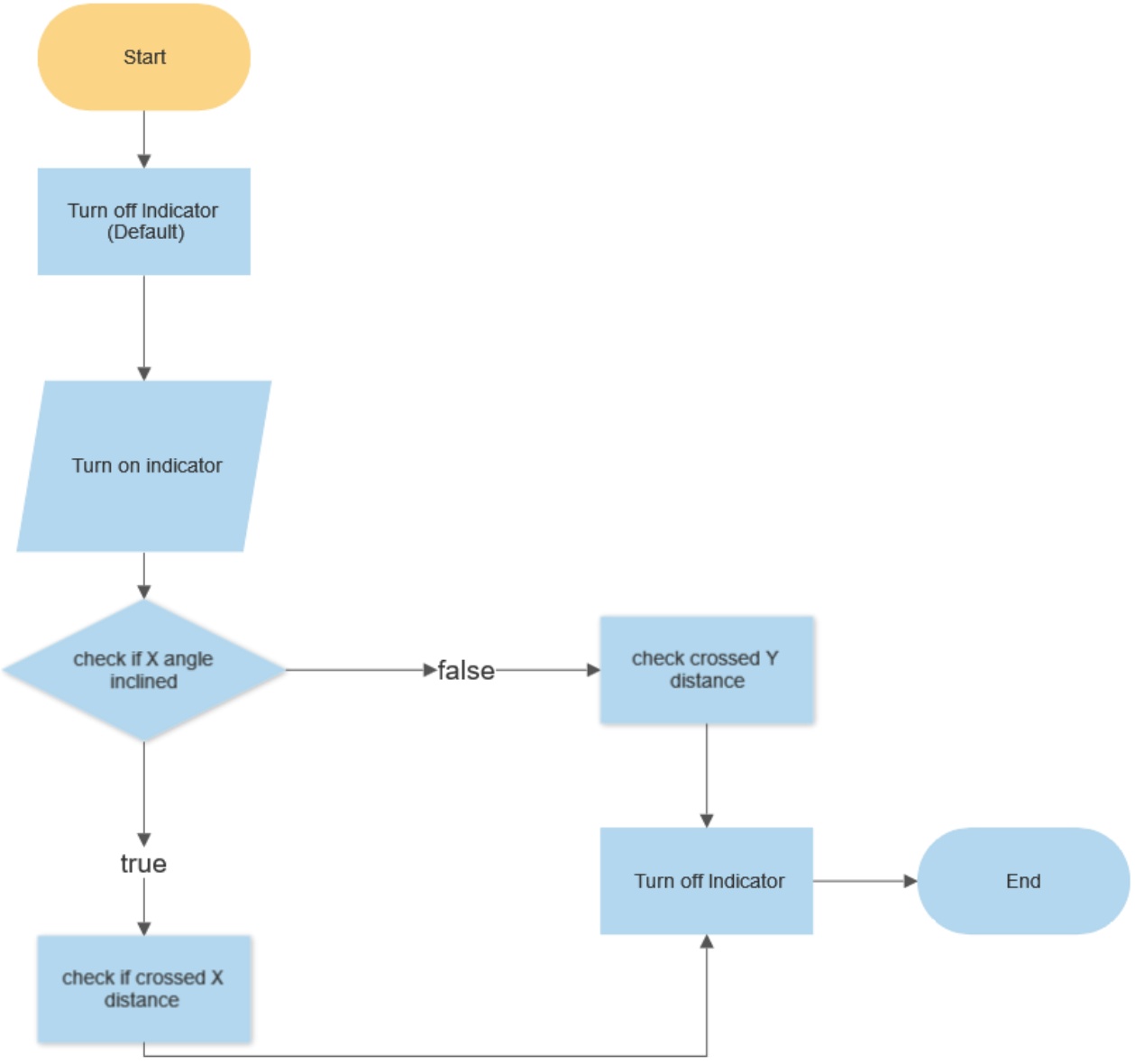
Case: 3

This is applicable for all vehicles. At highways most of vehicles like lorry, trucks even cars fail to turn off the indicators. Often those indicators are turned 'on ' especially travelling on highway roads. This may result in heavy accidents. As per our project, in this case when a vehicle's steering or handle bar is in same position continuously moving for (approx. 500 meters) this indicator will be turned off automatically. Our "SMART INDICATOR" will sense the travelling distance and position of the steering or handle bar.

6.3 USE CASE DIAGRAM



6.4 ` DATA FLOW DIAGRAM



CHAPTER 7

SYSTEM TESTING

Testing is the process of executing the program with the intent of finding errors. During testing, the program to be tested and executed with a set of test cases and the output of the program for the test cases is evaluated to determine the program is performing as it is expected. Error is the testing fundamental and is defined as the difference between the actual output of a software and a correct output i.e., difference between the actual and ideal testing is usually relied upon to detect these faults in the coding phase for this, different levels of testing are used which performs different tasks and aim to the test different aspects of the system.

GOALS OF TESTING

The testing is a perfect synthesis of the goals of the testing. If the results delivered by the system are different from the expected ones in just one case, in this unequally shows that the system is incorrect: by contrast, a correct behavior of the system on a finite number of cases does not guarantee correctness in the general case. For instance, could have built a program that behaves properly for even integer numbers but not odd numbers. Clearly, any number of tests with even input values will face to show the error.

Testing should be based on sound and systematic techniques so that, after testing and may have a better understanding of the product's reliability. Testing should help locate errors, not just detect their presence.

The result of testing should not be viewed as simply providing a Boolean answer to the question of whether the software works properly or not. Testing should be repeatable, i.e., tests should be arranged in such a way that separating the same experiment-supplying the same input data to the same piece of code – produces the same results.

Finally testing should be accurate this will increase the reliability oftesting. Here observe that the accuracy of the testing activity depends on the level of precision and may be even formality of software specifications. Tests should be organized in a way that helps to isolate errors. This information can then be used in debugging.

TESTING METHODOLOGIES

Unit Testing

In its different modules are tested against the specifications produced during design for the modules. It is essential for verification of the code produced during the code phase and the goal is to test the internal logic of the module.

Integration Testing

The goal here is to see if the modules can be integrated properly, the emphasis being on testing interfaces between modules. After structural testing and functional testing and get error free modules these modules are to be integrated to get the required results of the system. After checking the module another module is tested and is integrated with the previous module.

System Testing

Here the entire software is tested. The reference document for this process is the requirement document and the goal is to see whether the software needs its requirements. The system was tested for various test cases with various inputs.

Black Box Testing

Here the structure of the program is not considered. Only the test cases are decided solely on the basis of the requirements or specification of the program or module and the internal details of the module or the program is not considered for the selection of test cases. This is also called “Black Box Testing” or “Functional Testing”.

White Box Testing

It is considered with testing the implementation of the program. The intention of the structural testing is not to exercise all the different input and output conditions but to exercise the different programming and data files used in the program. This testing is also called “White Box Testing” or Structural Testing.

CHAPTER 8

SYSTEM IMPLEMENTATION

When the initial design was done for the system, the client was consulted for the acceptance of the design so that further proceedings of the system development can be carried on. After the development of the system a demonstration was given to them about the working of the system. The aim of the system illustration was to identify any malfunction of the system. Implementation is the process of converting a new or revised system design intoan operational one when the initial design was done by the system; a demonstration was given to the end user about the working system. This processis uses to verify and identify any logical mess working of the system by feeding various combinations of test data. After the approval of the system by both end user and management the system was implemented.

System implementation is made up of many activities. The major activities are as follows

Coding

Coding is the process of whereby the physical design specifications created by the analysis team turned into working computer code by the programming team.

Testing

Once the coding process is beginning and proceed in parallel, as each program module can be tested.

Documentation

It is result from the installation process, user guides provide the information of how the use the system and its flow.

CHAPTER 9

CONCLUSION AND FUTURE ENHANCEMENT

CONCLUSION

In the proposed system, an automatic turning off vehicle indicator system is developed. Thus, it would help the people during the rush hours and also it would helpful during the emergency situation. This project is used to turn off the bike indicators (both right and left). The Bike indicators are controlled before the aprox.100 meters of the way to the fixed destination. The main motto of the project is to reduce the number of road accidents which occurs due to improper usage of bike indicators. It is a portable system and also it receives the power from the bike battery itself.

SCOPE FOR FUTURE ENHANCEMENTS

Future studies could be conducted to improve the performance and accuracy practically.

APPENDICES

APPENDIX-1

```
void setup() {
  // initialize digital pin 13 as an output.
  pinMode(13, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(13, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);              // wait for a second
  digitalWrite(13, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);              // wait for a second
}
```

For this **ADXL345 Arduino** project, we need two **libraries** for the **ADXL345 Sensor.**

1. Adafruit ADXL345
2. Adafruit Unified sensor

ADXL345 Arduino Code

```
#include <Wire.h>
#include <Adafruit_Sensor.h>
#include <Adafruit_ADXL345_U.h>
Adafruit_ADXL345_Unified accel = Adafruit_ADXL345_Unified();
void setup(void)

{
   Serial.begin(9600);
   if(!accel.begin())
```

```
  {
    Serial.println("No valid sensor found");
    while(1);
  }
}
void loop(void)
{
  sensors_event_t event;
  accel.getEvent(&event);
  Serial.print("X: "); Serial.print(event.acceleration.x); Serial.print("  ");
  Serial.print("Y: "); Serial.print(event.acceleration.y); Serial.print("  ");
  Serial.print("Z: "); Serial.print(event.acceleration.z); Serial.print("  ");
  Serial.println("m/s^2 ");
  delay(500);
}
```

Source Code for Displaying 8×8 LED

```
unsigned char i;
unsigned char j;

int Max7219_pinCLK = 11;
int Max7219_pinCS = 10;
int Max7219_pinDIN = 12;

unsigned char disp1[19][8]={
  0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
  0x00, 0x00, 0x00, 0x00, 0x40, 0x00, 0x00, 0x00,
  0x00, 0x00, 0x00, 0x40, 0x40, 0x00, 0x00, 0x00,
  0x00, 0x00, 0x80, 0x40, 0x40, 0x00, 0x00, 0x00,
```

```
  0x00, 0x80, 0x80, 0x40, 0x40, 0x00, 0x00, 0x00,
  0x40, 0x80, 0x80, 0x40, 0x40, 0x00, 0x00, 0x00,
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  0x60, 0x90, 0x88, 0x44, 0x44, 0x08, 0x90, 0x60,
  0x60, 0x90, 0x88, 0x44, 0x44, 0x88, 0x90, 0x60,
};

void Write_Max7219_byte(unsigned char DATA)
{
  unsigned char i;
  digitalWrite(Max7219_pinCS,LOW);
  for(i=8;i>=1;i--)
  {
    digitalWrite(Max7219_pinCLK,LOW);
    digitalWrite(Max7219_pinDIN,DATA&0x80);
    DATA = DATA<<1;
    digitalWrite(Max7219_pinCLK,HIGH);
  }
}

void Write_Max7219(unsigned char address,unsigned char dat)
```

```
{
  digitalWrite(Max7219_pinCS,LOW);
  Write_Max7219_byte(address);
  Write_Max7219_byte(dat);
  digitalWrite(Max7219_pinCS,HIGH);
}

void Init_MAX7219(void)
{
  Write_Max7219(0x09, 0x00);
  Write_Max7219(0x0a, 0x03);
  Write_Max7219(0x0b, 0x07);
  Write_Max7219(0x0c, 0x01);
  Write_Max7219(0x0f, 0x00);
}
void setup()
{
  pinMode(Max7219_pinCLK,OUTPUT);
  pinMode(Max7219_pinCS,OUTPUT);
  pinMode(Max7219_pinDIN,OUTPUT);
  delay(50);
  Init_MAX7219();
}

void loop()
{
  for(j=0;j<19;j++)
  {
    for(i=1;i<9;i++)
```

```
      Write_Max7219(i,disp1[j][i-1]);
    delay(500);
  }
}
```

APPENDIX-2

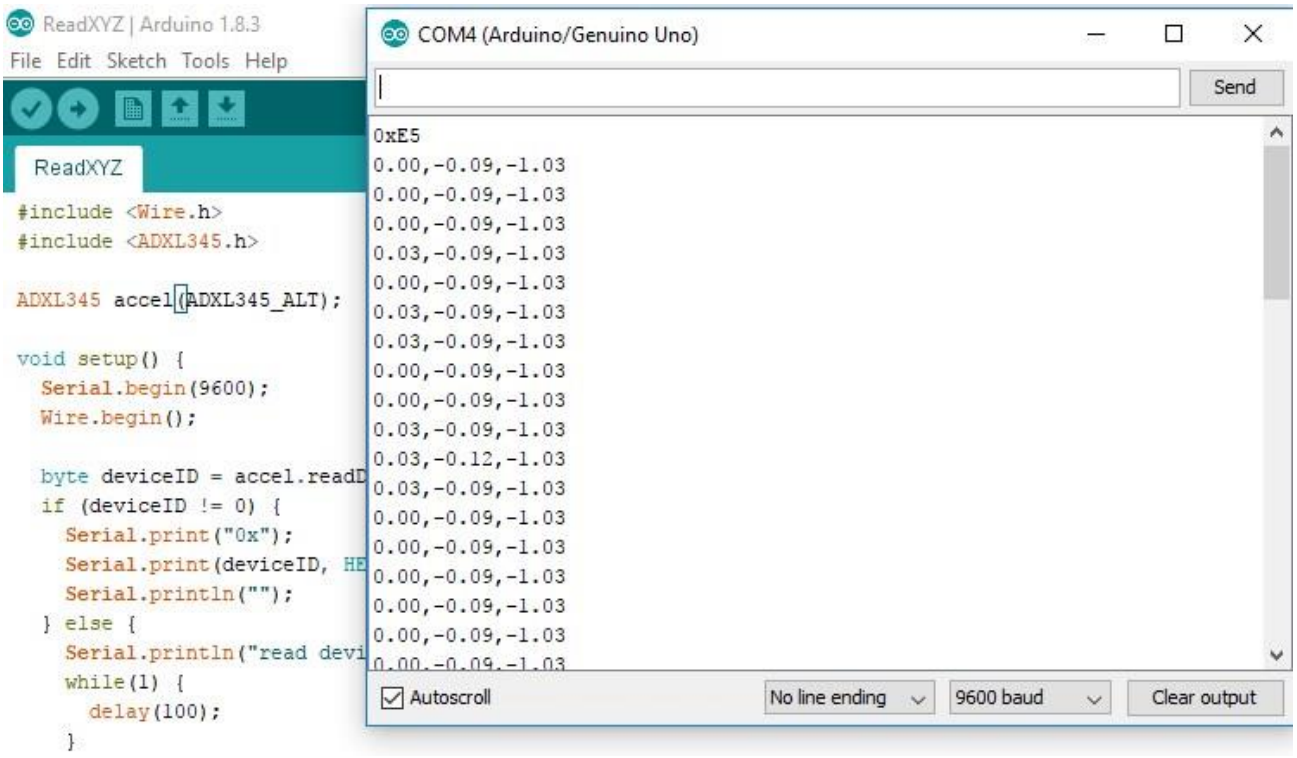

Figure9.1 ADXL345 ACCELEROMETER Code

Figure 9.2 Blinking code

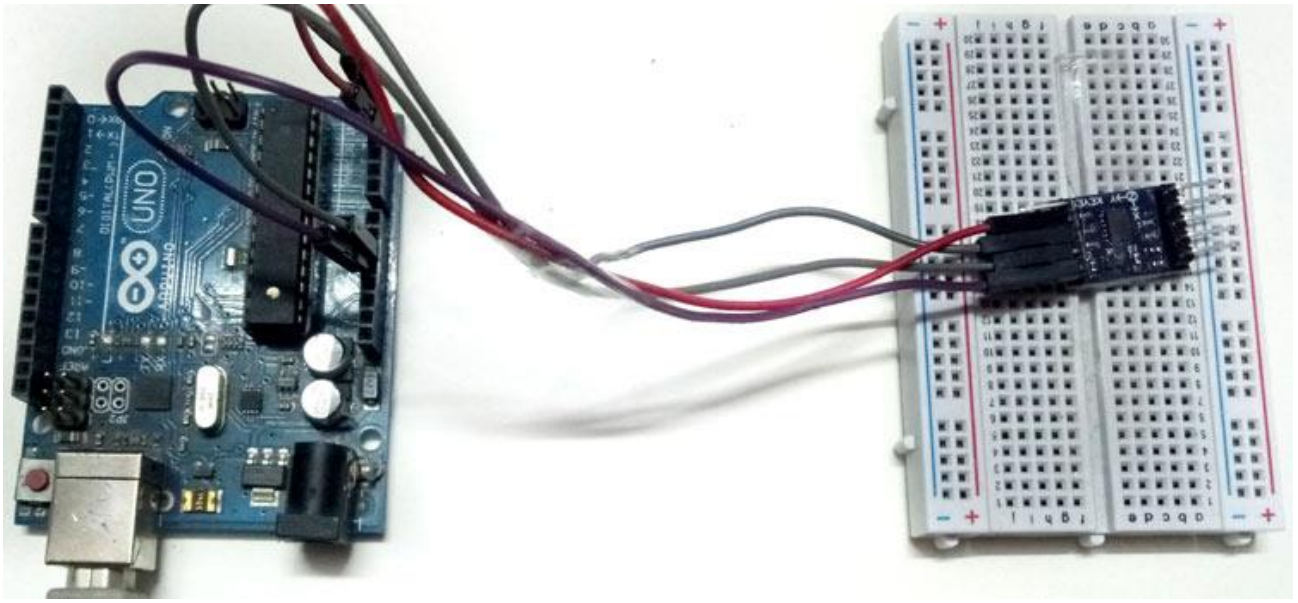

Figure 9.3 ADXL345 connecting with Arduino

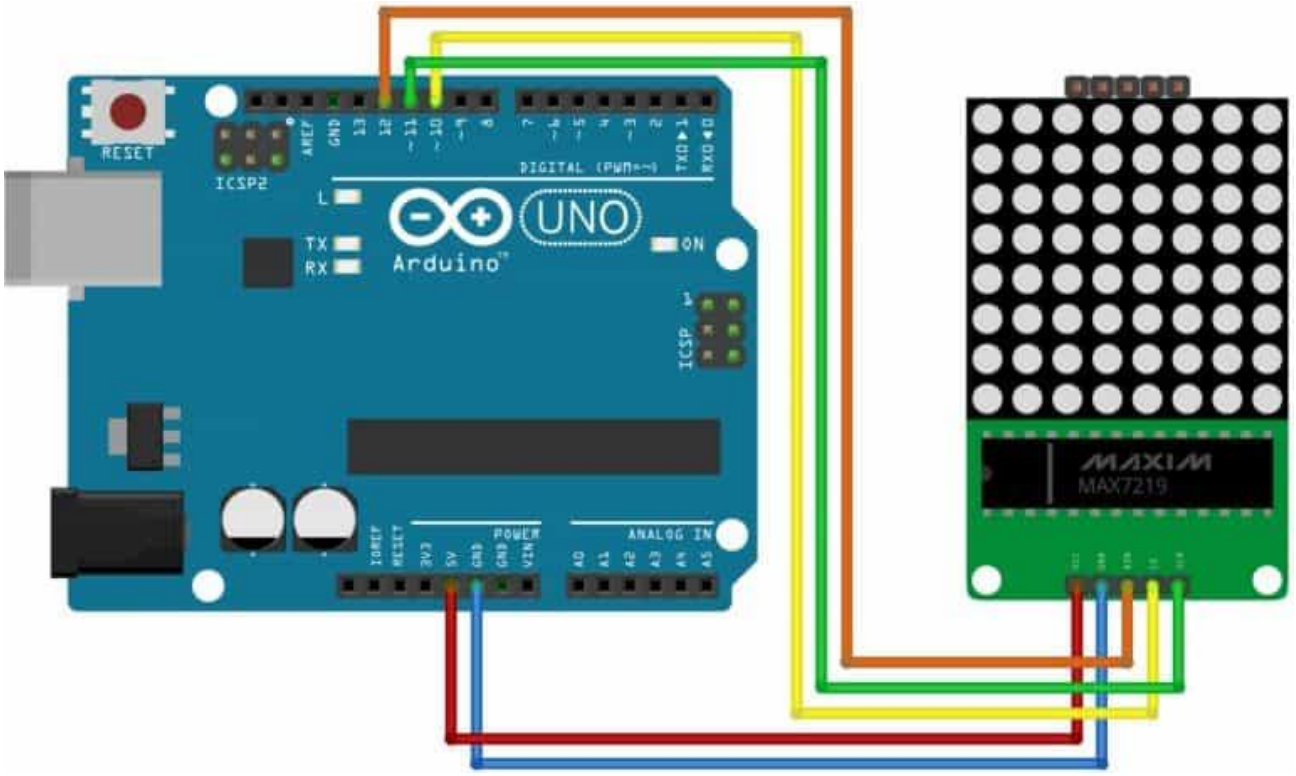

Figure 9.4 8×8 LED matrix display with Arduino

REFERENCES

1. Divakara Murthy K , Harshitha V and Pedapudi Ashok 2017 Design of Semi-Automatic Signal Indicator For Two Wheeler International Journal of Current Engineering and Scientific Research 4(5) 72-75
2. Kai Qin, Jianping Xing, Gang Chen, Linjian Wang and Jie Qin 2008 The Design of Intelligent Bus Movement Monitoring and Station Reporting System IEEE International Conference on Automation and Logistics 2822-2827.
3. Karthik Murugesan and Usha Subramaniam 2020 Characterization and experimental validation of a semi-empirical fuel cell model for investigating the water dynamics on the electrical behavior of a 5KW Ballard stack system using Nafion 117 polymer membrane Journal of Renewable and Sustainable Energy 12(2) doi: 10.1063/1.5121609
4. Khalifa A. Salim and Ibrahim Mohammed Idrees 2013 Design and Implementation of Web-Based GPS-GPRS Vehicle Tracking System International Journal of Computer Science & Engineering Technology 3(12) pp. 443-448.
5. Li Liu, Yanfang Jing , Zengxiao Chi, JianBang Chen and Chao Ma 2012 Design and Implementation of Android Phone Based Group Communication and Navigation System IEEE International Conference on Consumer Electronics, Communications and Networks 3174-3177.
6. Mahesh Kadibagil and Guruprasad H S 2014 Position Detection and Tracking System International Journal of Computer Science and Information Technology and Security 40 67-73.
7. Prabhu Ram Nagarajan, Vibin Mammen Vinod, Mekala V and Manimegalai M 2020 A Fast And Energy Efficient Path Planning Algorithm For Offline Navigation Using Svm Classifier International Journal of Scientific & Technology Research 19(1) 2082-2086.
8. Selvakarthi D, Sivabalaselvamani D, Nivetha V Pratheep S Pravin S and Thiyaneshwaran S R 2020 A Novel Approach Using Sensor Technologies For

Enhancing Accident Safety Assistance System In Different Environments International Journal of Scientific & Technology Research 9(2) 2130-2134.

9. Usha S , Kuppuswami S , Karthik.M 2018 A new enhanced authentication mechanism using session key agreement protocol Cybernetics and Information Technologies 18(4) 61-74.
10. Xu Bin and Guo Bingxuan 2007 Implementation of Vehicle Navigation System Based On MobilE GIS Geospatial Information 5 83-85.
11. Yuan G, Zhang Z and ShangGuan W 2008 Research and Design of GIS in Vehicle Monitoring System International Conference on Internet Computing in Science and Engineering. 223-228.
12. ZechunHuang , Dingfa Huang, Zhu Xu and Zhigen Xu 2011 GPS Vehicle Positioning Monitoring System Integrated with CORS and Mobile GIS International Conference of Environmental Science and Information Application Technology (Elsevier) 10 2498-2504.
13. Zhang Jinming and Fu Yongheng 2007 Design And Implementation of GPS/GPRS-Based Location Information Service System Bulletin of Surveying and Mapping 11 30-33.
14. Zhanqiang Zhai and Shaohua Cai 2004 GPRS/GPS/GIS Based Vehicle Navigation And Monitoring System Bulletin Of Surveying And Mapping 34-36.
15. Zhenglong Yan and Zhengjiang Chen 2008 Design and implementation of vehicle monitoring system based on GIS/GPS/GSM/GPRS Journal of Northwest University (Natural Science Edition), 38(1) 127-130.

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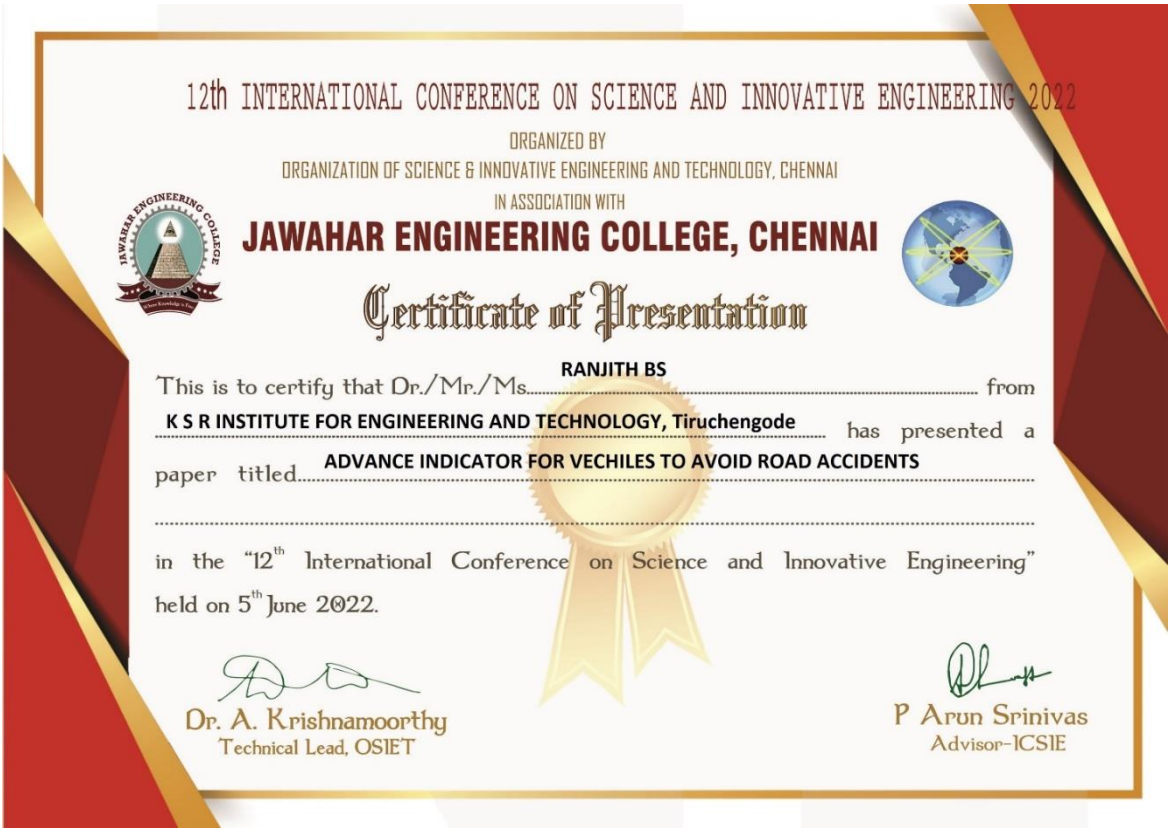

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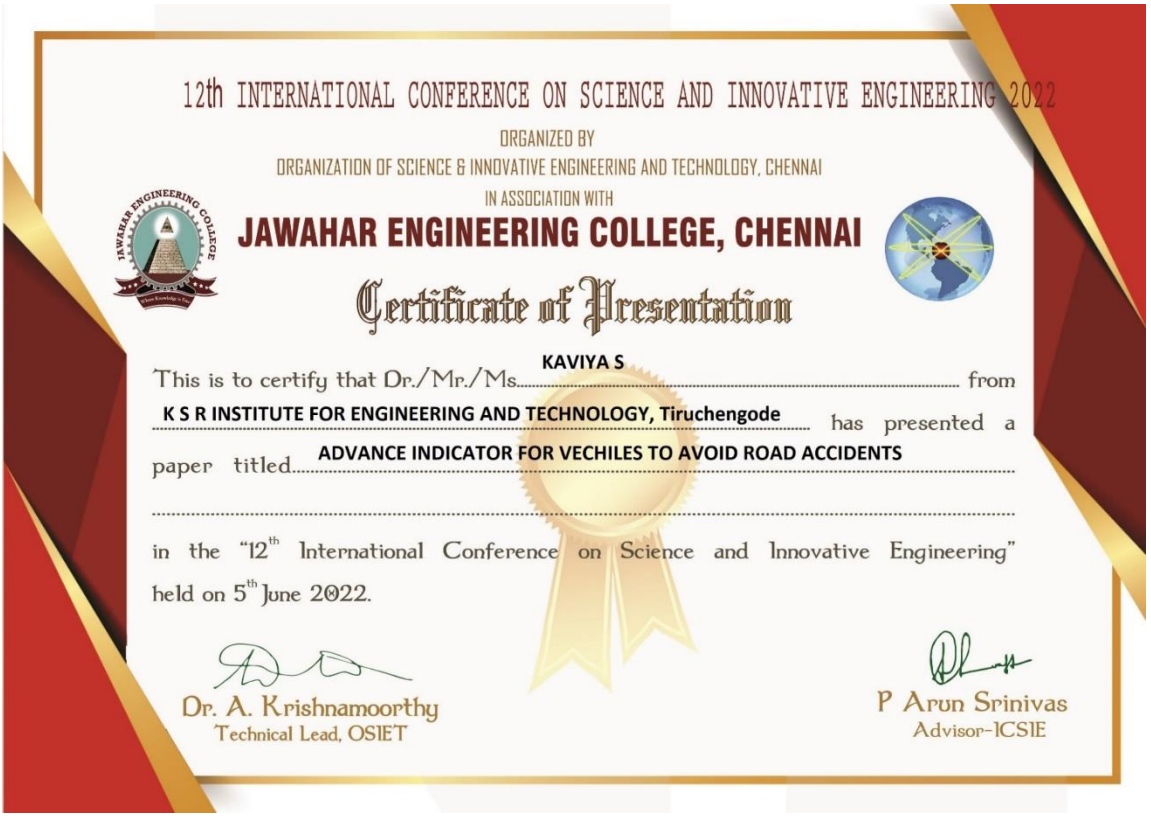

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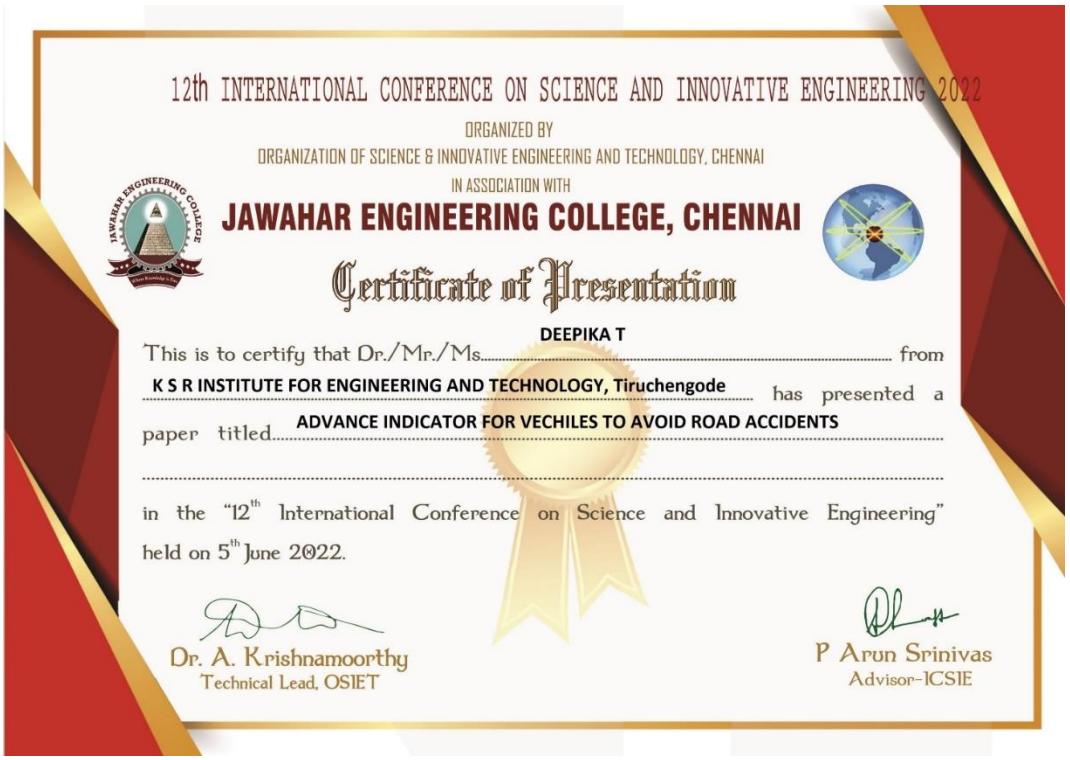
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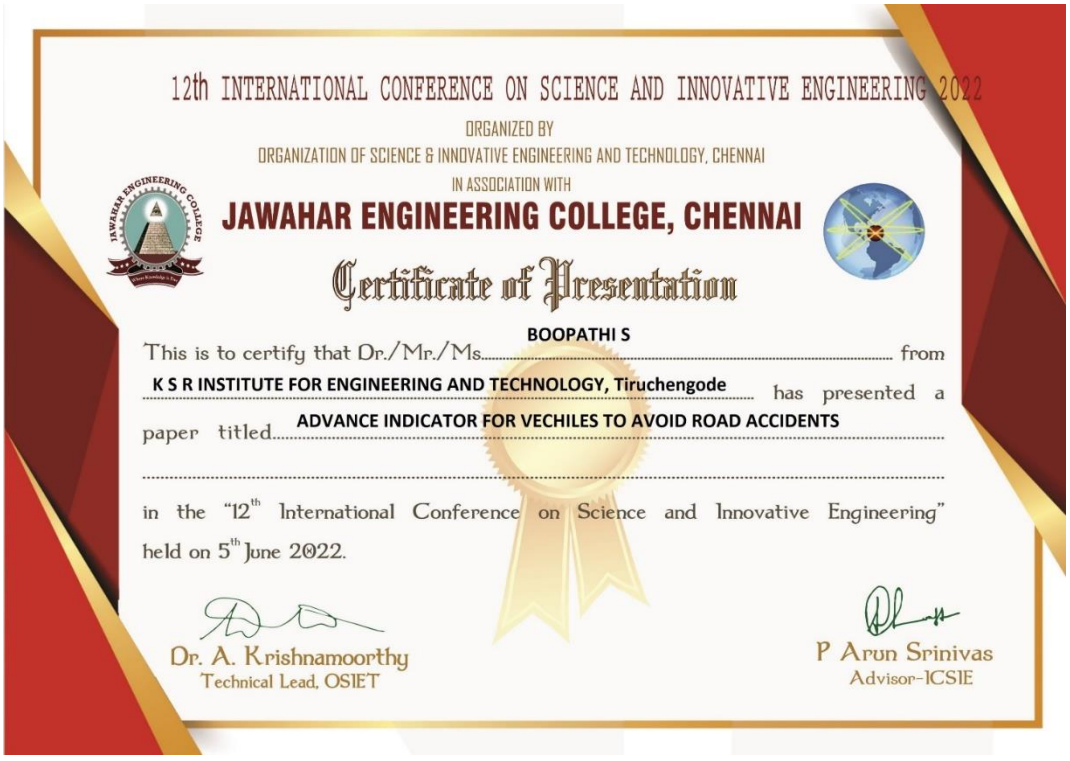
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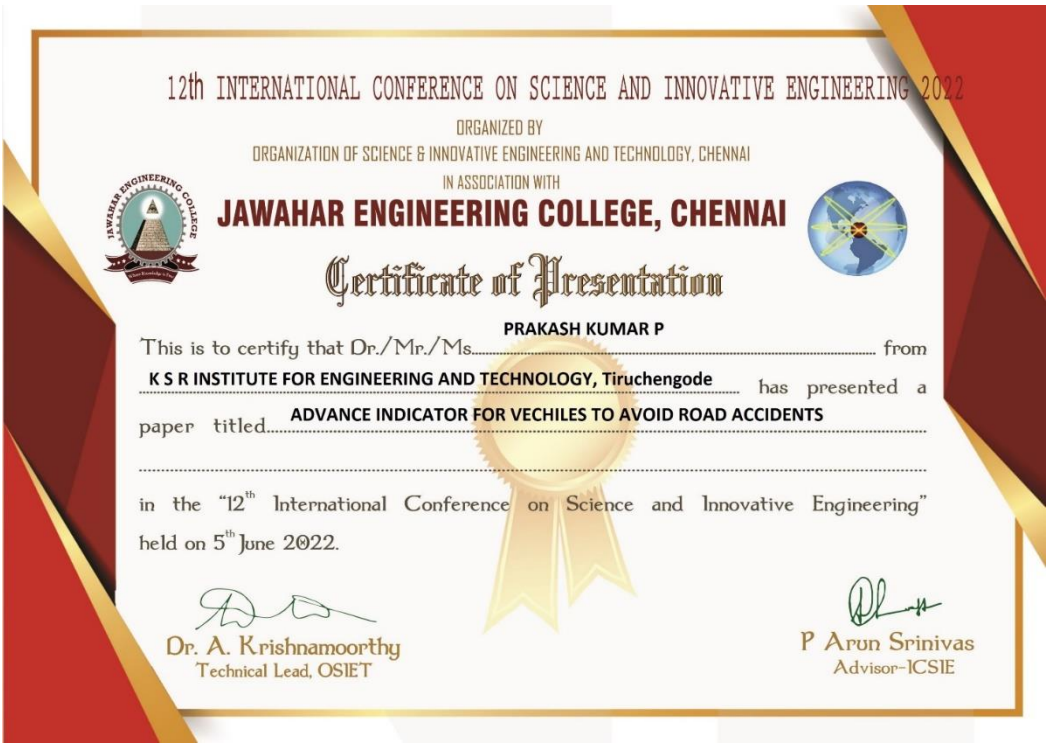

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