



**CENTER FOR DEVELOPMENT OF
ADVANCED COMPUTING**

AUTOMATIC ACCIDENT DETECTION & RESCUE MANAGEMENT SYSTEM

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INTRODUCTION

The constant improvement of technology leading to civilization in search of better prospects as expected an implosion of transportation system is observed that increment in number of vehicles on road result in increased chance of vehicular accidents . The accidents must be reported immediately in order to provide quick and proper medical assistance because there is also rise in unreported accidents.



Sl. No.	Year	Number of Accidental Deaths					Percentage Share of 'Traffic Accidental Deaths' in Accidental Deaths due to 'Other Causes'
		Road Accidents	Railway Accidents	Railway Crossing Accidents	Total Traffic Accidents	Total Accidental Deaths due to 'Other Causes'	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2017	1,50,093	23,959	1,534	1,75,586	3,89,441	45.1%
2	2018	1,52,780	24,545	1,507	1,78,832	4,04,933	44.2%
3	2019	1,54,732	24,619	1,762	1,81,113	4,12,959	43.9%
4	2020	1,33,201	11,968	1,185	1,46,354	3,66,992	39.9%
5	2021	1,55,622	16,431	1,807	1,73,860	3,90,404	44.5%



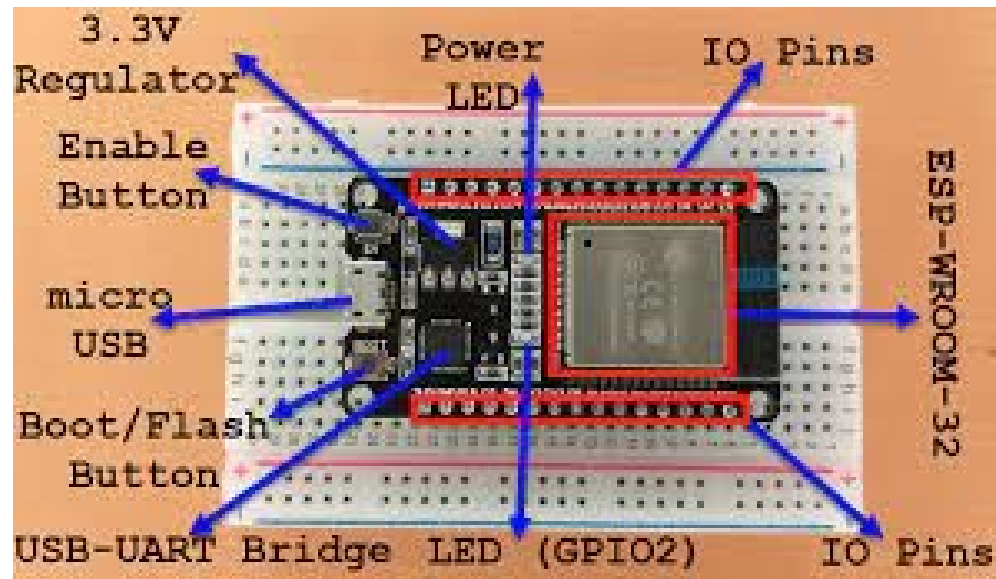
OBJECTIVES

- Detection of Accident as quickly as possible.
- Have minimum false detection.
- Immediately messaging current location an call for help.



HARDWARE & SOFTWARE USED

Why ESP32 ?



ESP32 WROOM



COMPONENTS

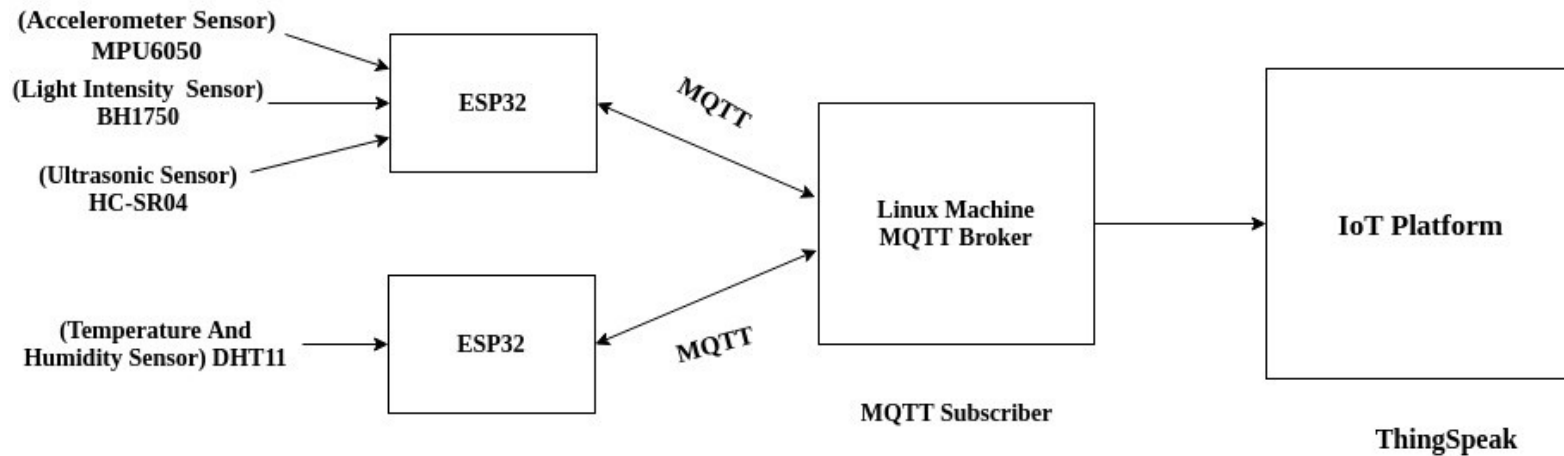
- 1x ESP32-WROOM-32
- 1x MPU-6050
- 1x SIM900A
- 1x HCSR-04
- 1x BH1750



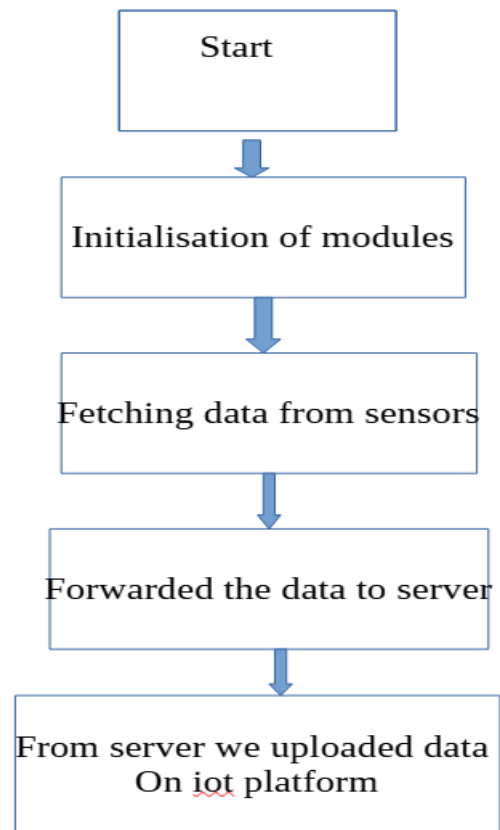
- 1x Buzzer
- 1x Display
- 1x Piezoelectric sensor



BLOCK DIGRAM



FLOW CHART



SOFTWARES

- IDE
 - Arduino IDE
 - Espressif IDE
- Protocols
 - MQTT
 - UART
- Operating system
 - FreeRTOS

OUTPUT

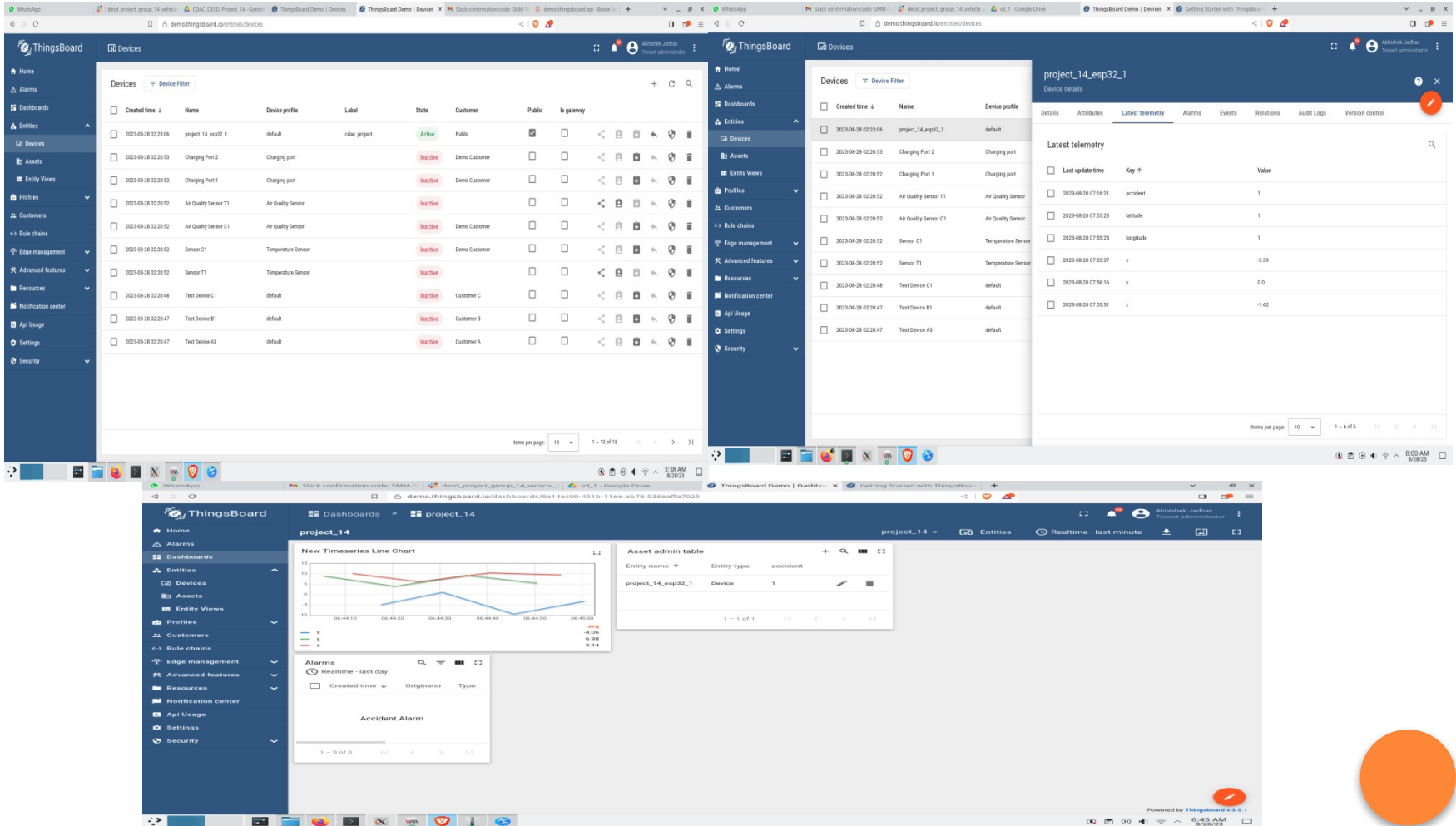
The screenshot displays a virtual machine environment with three main components:

- Terminal Window (Left):** Shows the execution of the `mosquitto_sub` command. The output consists of a series of `0.00` values, indicating the received data from the MQTT broker.
- Code Editor (Right):** Displays the source code for the `mqtt.ino` file. The code includes comments and function calls for publishing data to the MQTT broker. Key lines include:

```
141 Serial.println("%");
142 tsLastReport = millis();
143 }
144
145
146
147 // Convert the value to a char array
148 char rate[8];
149 dtostrf(heart_rate, 1, 2, rate);
150 Serial.print("heart_rate send to mqtt: ");
151 Serial.println(rate);
152 char spo2[8];
153 dtostrf(spo2, 1, 2, spo2);
154 Serial.print("spo2 sen to mqtt: ");
155 Serial.println(spo2);
156
157 float randomz=random()*100;
158 Serial.print("random_num to mqtt: ");
159 char randomzz[8];
160 dtostrf(randomz, 1, 2, randomzz);
161 Serial.println(randomzz);
162
163 //mqtt
164 client.publish("project_14/heart_rate", rate);
165 client.publish("project_14/spo2", spo2);
166 client.publish("project_14/random_num", randomzz);
167 }
168
169 }
```
- Serial Monitor (Bottom Right):** Shows the output of the code execution. The output includes the following data points:

```
Heart rate:0.00bpm / SpO2:0.00%
heart_rate send to mqtt: 0.00
spo2 sen to mqtt: 0.00
random_num to mqtt: 29.00
Heart rate:0.00bpm / SpO2:0.00%
heart_rate send to mqtt: 0.00
spo2 sen to mqtt: 0.00
random_num to mqtt: 0.00
Heart rate:0.00bpm / SpO2:0.00%
heart_rate send to mqtt: 0.00
spo2 sen to mqtt: 0.00
random_num to mqtt: 8.00
Heart rate:0.00bpm / SpO2:0.00%
heart_rate send to mqtt: 0.00
spo2 sen to mqtt: 0.00
random_num to mqtt: 52.00
```

OUTPUT



CONCLUSION

- Significant innovation in road safety and emergency response
- The AADRMS's capabilities significantly reduce response times, potentially saving lives and minimizing injuries.
- The AADRMS is a testament to our commitment to a safer future on the roads, where technology plays a pivotal role in safeguarding lives.



FUTURE SCOPE

- Incorporate machine learning algorithms to enhance the accuracy of accident detection by analyzing complex patterns from sensor data. This can improve the system's ability to differentiate between accidents and false positives.
- Develop algorithms that use historical accident data and real-time conditions to predict accident-prone areas. This proactive approach can enable authorities to take preemptive measures.
- Combine data from multiple sensors for more comprehensive accident detection. For instance, fusing accelerometer, GPS, and camera data can provide a holistic view of accidents.



THANK YOU !

