

Introduction for monitoring the following parameters of

[Life](#), [Emotions](#)



INTRODUCTION The design and implementation of an advanced system to track vehicle conditions and smart navigation tested successfully as presented in the earlier chapters of the thesis. The objectives of the present work aims at developing a system that would aid the driver/user in keeping track the vehicle parameters/conditions such as Fuel level, Engine temperature and Weather monitoring.

The work also in real time monitors the road and provides detected input if an obstacle is present and also accident identification and alert the driver/user. The prototype is designed to send an SOS whenever an accident is detected. The system also providing the security to the vehicle from intruders from the of vehicle and also security to the passengers through different verification tests of Finger, Face recognition and Alcohol detection to the driver before he is ready to drive the vehicle be restricted if he is drunken alcohol by controlling the Vehicle ignition control. The following are the main objectives to design and implement an advanced system to track the vehicle conditions and smart navigation.

- For monitoring the following parameters of the vehicle and intimate the user when the threshold is violated:
 - Fuel Level
 - Engine temperature
 - To determine the weather conditions of the driving terrain, that includes the temperature and humidity.
 - To alert the user about the presence of obstacle/pedestrians along the driving road.
 - To identify the occurrence of accident and send emergency message to pre-defined Mobile Station using GSM Technology.
 - To provide an advanced security to the vehicle against theft using Biometrics and safety and security to assist the driver through

Fingerprint, Face Recognition and Alcohol Detection. It also provides an advanced Head Up Display connectivity and aids in infotainment on advanced display of Samsung Galaxy Note pad which readily available with all users which reduces the cost of the system. The developed system is implemented and tested successfully by following the methodology as presented below.

7.2 Methodology

The system is being developed using Raspberry Pi and Arduino Uno/Arduino AT mega with GSM/GPS and Bluetooth Technology for data communication connected with different sensors already discussed in detail in chapter 3, Chapter 4 and chapter 5 and Chapter 6 of Integrated system.

7.2.1 Methodology for objective-1

To monitor the Fuel level of the vehicle using Ultrasonic sensor and whenever the fuel level falls below the threshold to be intimated to the driver/user.

7.2.2 Methodology for objective-2

To monitor the Engine temperature and weather condition of the driving terrain DHT11 using sensor.

7.2.3 Methodology for objective-3

Micro switches are mounted across the periphery of the car, each of them separated by an angle of 45 degree (hence a total of 8 micro switches). These detect the presence of pedestrians on road as well as occurrence of accident if any.

7.2.4 Methodology for objective-4

The security against theft/safety and security for the vehicle is provided using three levels of authentication. They are:

- The driver's finger print Verification (Biometric).
- The driver's Face Recognition and
- Alcohol Detection.

It also provides an advanced Head-Up

Display connectivity and aids in infotainment on advanced display using Samsung Galaxy Notepad which readily available with all users that reduces the cost of the system.

The developed system is implemented and tested successfully with the following procedure as presented below.

7. 3 Implementation of Hardware and Software of the System

The prototype system is developed using Raspberry Pi in conjunction with the Two Arduino AT Mega 2560 Microcontroller. The sensors are incorporated to the Arduino and the data fetched by the microcontroller is then transmitted to the Raspberry Pi (RPi) using the Bluetooth module HC-05. The Raspberry Pi processes the fetched values and then initiates the necessary actions with GSM/GPS Module for data communication to display all the information on an advanced Head-Up display using advanced Samsung Galaxy Notepad is a new feature of the system to display the information of system in real time.

7. 3. 1 Algorithm of the proposed work

The following are the algorithm steps for implementing the hardware of the system with developed software program as follows.

1. Initialize the sensors and check for various pre-defined parameters.
- 2.

To turn On the vehicle Ignition the following Authentication need to be satisfied:

- a. A Finger Print match
- b. Face Detection

3. The system checks for presence of Alcohol. If the Driver is found positive, the Ignition turns off, else the vehicle starts.

4. After the preliminary authentication, the vehicle conditions are to be retrieved before the vehicle accelerates.

The vehicle conditions such as, fuel level and the engine temperature are compared against the threshold. a. If the fuel is below threshold, a refuel display alert is shown. b. If the temperature is above the threshold, Engine cooling process is initiated.

5. Clearing the conditions of Step No. 2 to 4, vehicle movement is initiated.
6. The system constantly monitors the weather conditions and the details are displayed on the infotainment screen.
7. The system persistently monitors the presence of Pedestrians along the path, if found decelerates the vehicle, avoiding accidents.
- 8.

An accident if detected, the engine is decelerated and a SOS message is forwarded to pre-defined Mobile Stations. 9. Steps 3 to 8 are repeatedly and simultaneously carried out whenever the vehicle is in motion. The block diagram and experimental setup and flow chart of the proposed work is shown in figure 7. 1, 7.

2 and 7. 3 respectively which gives complete process of the system. Figure 7.

1 : The complete Block diagram of Vehicle Smart Navigation System

The connection details of all sensors used for the measurement and monitoring of vehicle conditions interfaced with Arduino AT mega 2560 microcontroller as shown in figure 7. 2. The second microcontroller board is used to transmit the values of the sensors to the Raspberry Pi processor through Blue tooth module to display all information on display of Samsung Galaxy Notepad through GSM/GPS technology which we already discussed in previous chapters of the thesis.

Figure 7. 2 : Experimental Setup of the proposed work of Vehicle Smart Navigationsystem Figure7. 3 : Flow chart of the Vehicle smart Navigation system7. 3 Results and Discussion

The objectives of the presentresearch work are satisfactorily realized. The developed prototype system to track the vehicle conditions and smartnavigation system has been implemented and tested successfully and the resultsare presented in below figures of 7. 4, 7. 5 and 7.

6 respectively on the Samsung GalaxyTab Used as the advanced display of the Navigation system. The developed systemis working steadily and consistently tested for many times. 1. The System measures and monitors the important Vehicle conditions/parametersof Engine temperature, Fuel level of the tank and also determines the weatherconditions of the driving terrain that includes the temperature and humidity outsideof the weather for further control the internal conditions of the vehicle tocontrol the Air conditioning unit. Mainlyit monitors the fuel level and engine temperature in real time on the display. 2. The driver/user is intimated whenever the fuel level falls below thethreshold and the Engine heat level conditions above the normal values to stopthe vehicle movement by giving advanced information to the driver that keepsthe vehicle in good health condition. The system detects and also alert the driver/ user whenever a pedestrian is detected along the driving road to provide the safety and security to the passengers by avoiding the accidents.

. The system also identifies the occurrence of an accident, if occurred. Immediately it sends an emergency SMS message to pre-defined user

numbers, High way petrol police team people or Emergency Health care Vehicle services such as 108. 5. The system also provides advanced biometric based authentication of Finger print and Face recognition and Alcohol detection which provides a high security to the vehicle from the theft and safety to the driver/passengers through vehicle ignition control which cannot be mimicked easily. Figure 7. 4 : Face recognition results Alcohol Detection Figure 7.

5 : Display of Alcohol Detection Figure 7. 6 : The parameters of the Smart Vehicle Navigation System on the Head-Up display

of Samsung Galaxy Notepad 7. 4 Conclusion and Scope of Future work The developed Proto type system of the hardware and software is implemented and tested successfully in the first step of the process for the monitoring of Fuel level, Engine Temperature and Humidity values and also Weather Monitoring parameters of Temperature and Humidity outside the vehicle also. In the second step it detects the obstacle/pedestrian and detects the accident occurrence and send alert messages to provide immediate help to the passengers of vehicle.

In the third step it provides the security to the vehicle from the theft by intruders and security to the passengers from the driver not permitting to drive the vehicle by the ignition control of the vehicle by Finger, Face recognition and alcohol test to the driver. All these parameters and Navigation system is also successfully implemented as presented above. Scope of the Future work As a future scope of the work it suggested that to develop a general purpose plug-in sensors single

application board to interface all the vehicle parameters to connect with the processor including Bluetooth and GSM/GPS module board to reduce the hardware complication and reduce the cost of the system. Now even today some vehicle/cars are not having colour touch screen display system up to the cost of Rs. 10. 5 Lakhs worth. They are giving this as a specific feature to only High End/ SUV vehicles.

Hence it is suggested the researchers to implement the Touch screen as display unit with their system with lowcost which is quite possible. 3. As per myobservation now some of the vehicles having seat belt provision as an importantfeature that provide the safety to the driver and co-passenger at the frontside of the vehicle. If the driver and co-passenger are not putting their seatbelt properly will give an alarm for 3 minutes and stop which is not providingthe complete safety feature of the same. Hence it is suggested the researcherswho are going to work on seat belt feature has to implement the condition ifboth are not properly putting seat belt, then immediately the engine has to beoff by controlling the ignition to self-motor or stop the petrol supply to theengine through an electro mechanical valve arrangement interfaced with thesystem processor. 4. It is also suggested to introduce new kind oftechnology to replace the air bags with a low cost as a feature in the vehicleswhich can be affordable by the low, middle and average middle class users as itis a burden to them if once opened. 5.

Now a days all vehicle accidents are happened only dueto the negligence, drinking and tiredness i. e. unrest or sleepless and alsorash driving. At present all high end and SUV vehicles also not having thefeature of Ignition

control system with Finger, Face recognition, alcohol detection and detecting the emotions of the driver. Hence, it is suggested to new researchers to introduce a DSP based image processing system to analyse the face emotions of the driver.

Based on that the the vehicle has to be stop if the condition of the vehicle driver face emotions are deviating with actual parameters such as blinking of eyes etc. 6. Now mobile phones are playing advanced role in vehicle systems.

Hence it is suggested to introduce new Mobile eye technology that use artificial vision to some Advanced Driving Assistance system (ADAS) in one device that analyses the road on detect and alert of hazards as pedestrian collision. 7. It is also suggested the researcher to use the mobile application of Finger, Face and password provision to use as an Ignition control system of the vehicle controlled through mobile phone.