

# The Vehicle's Safety Squad System

Hemalatha K N<sup>1</sup>, Sharan S M<sup>2</sup>

<sup>1</sup>Assistant Professor, Dept. of Computer Science and Engineering, Atria Institute of Technology, Karnataka, India

<sup>2</sup>Student, Dept. of Computer Science and Engineering, Atria Institute of Technology, Karnataka, India

\*\*\*

**Abstract** - There are increasing cases of vehicle thefts in the country and is leading towards becoming a major criminal offense soon. Few things like parking our own vehicles outside our houses or on the streets in the parking area is inevitable. As these things are unstoppable and is a part of our life-style, we have no reason to complain rather than protecting them from thefts. Thefts maybe for various reasons most commonly we see robbers robbing vehicles for things ranging from fuel to costlier vehicular parts. Being within our senses and helping ourselves not to be a victim of the same is more important. Hence this research paper throws light upon safety of our vehicles and securing them in the best possible way which is using the most talked technology of the day that is, Internet of Things along with image processing for face recognition. A complete safety squad is established within each vehicle to detect the same. Adding on to this is an alcohol detecting system, installed within the same vehicular module as a parameter of safety to avoid the damages by drink and drive. Overall, it's a complete system for providing the much-required safety measures for our vehicles and securing them from any sort of thefts.

**Key Words:** anti-theft, face-recognition, IoT, Image Processing, security

## 1. INTRODUCTION

Vehicular thefts conceivably can be titled as the fastest growing crime in India. Statistics also show that there are over 100 vehicle thefts recorded per day in the urban areas and this figure isn't any different for the rural areas too. According to the police department in the capital, vehicular theft is the least solved offense. Less than 20% of almost 45,000 cases regarding the theft were solved in the recent years. Added on to this statistic, the number of vehicles successfully found in usable condition were much lower.



Fig -1: Vehicle theft

Fig- 2 clearly shows the statistics of various crimes in the nation and vehicular thefts out of these grabs in the first position. With this rapid increase in the thefts nationally and internationally, the need for anti-theft devices to be made and installed becomes a major need. With the sharp and strong stealing methodology used by the robbers make it all the way more fearful to

the vehicle owners to even park their vehicles outside their own houses. Thus, protection of the vehicles become important and this can be solved by using real time vehicle security squad which is basically a security system using face detection.

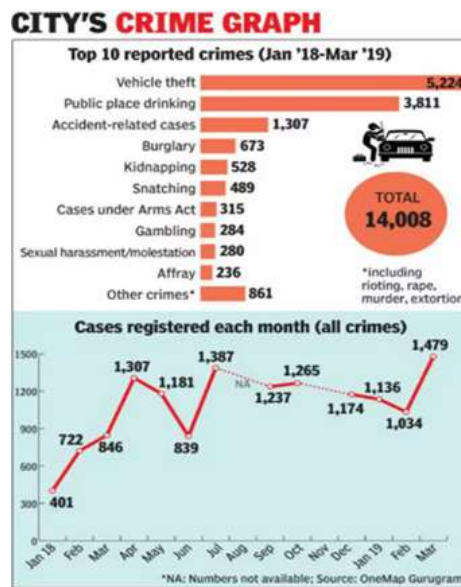


Fig -2: City's crime graph

This proposed system provides security based on the face recognition and detection techniques used as a means of user authentication for the vehicles and also uses other IoT technologies. It's a complete system that provides in an alcohol sensor too that helps in detecting if the driver is drunk. This can be an add on feature to this system which can help controlling the drink and drive accidents. As this system uses the face recognition for providing user authentication, we have a camera installed within the vehicle for the same purpose. Varieties of sensor like touch, MEMS and GPS modules are used within to support this system as a whole.

## 2. LITERATURE SURVEY

The Table -1 comprises the description of four various papers and research works published from the year 2011, 2013, 2014 and 2016 respectively.

Table -1: Various Existing Ideas

Sl No.	AUTHOR	TITLE	DESCRIPTION
1.	a) Kulkarni b) L.N.K.Rao.	"Embedded Car Security System On Face Detection"  Year: 2011	This is an embedded car security system, Face Detection System. It is used in detecting the face of the driver and compare it with the predefined face. This prototype is built on the base of one embedded platform in which one SoC named "SEP4020" (works at 100MHz) controls all the processes.
2.	a) V.Balajee Seshasayee b) E.Manikandan.	"Automobile Security System based on face recognition structure using GSM network"  Year: 2013	This is built on an embedded platform in which a system on a chip that is named as "SEP4020" (at 100MHz) controls all the processes.
3.	a) C. Nandakumar b) G. Muralidaran c) N. Tharani.	"Real-Time Vehicle Security System through Face Recognition "  Year: 2014	Face of the person is detected using "Viola Jones algorithm". The face extracted is recognized using the enhanced Linear Discriminant Analysis (LDA) algorithm authorization involves setting the threshold value & comparing with that of Euclidean distance above which the person is not authenticated.

4.	a) Neha J Agarwal b) Sidharth Ladhake.	"A Review On Anti-Theft Mechanism Through Face Recognition"  Year: 2016	A face recognition technology is used to automatically identify a person through a digital image. The Principal Component Analysis (PCA) algorithm is used for face recognition with fixed back ground (white in color). The Linear Discriminate Analysis (LDA), Independent Component analysis (ICA) and some other systems are developed by combining different algorithms. PCA is also known as "Eigen faces" algorithm.
----	---	---	---

### 3. METHODOLOGY

In this vehicle's safety squad system, the major objective is to prevent the theft of vehicle and ensure safety of vehicle. One level of ensuring authentication of the driver is through face recognition system. Only the authorized person has access to the ignition system. Fig- 3 shows the various components used in this security squad system

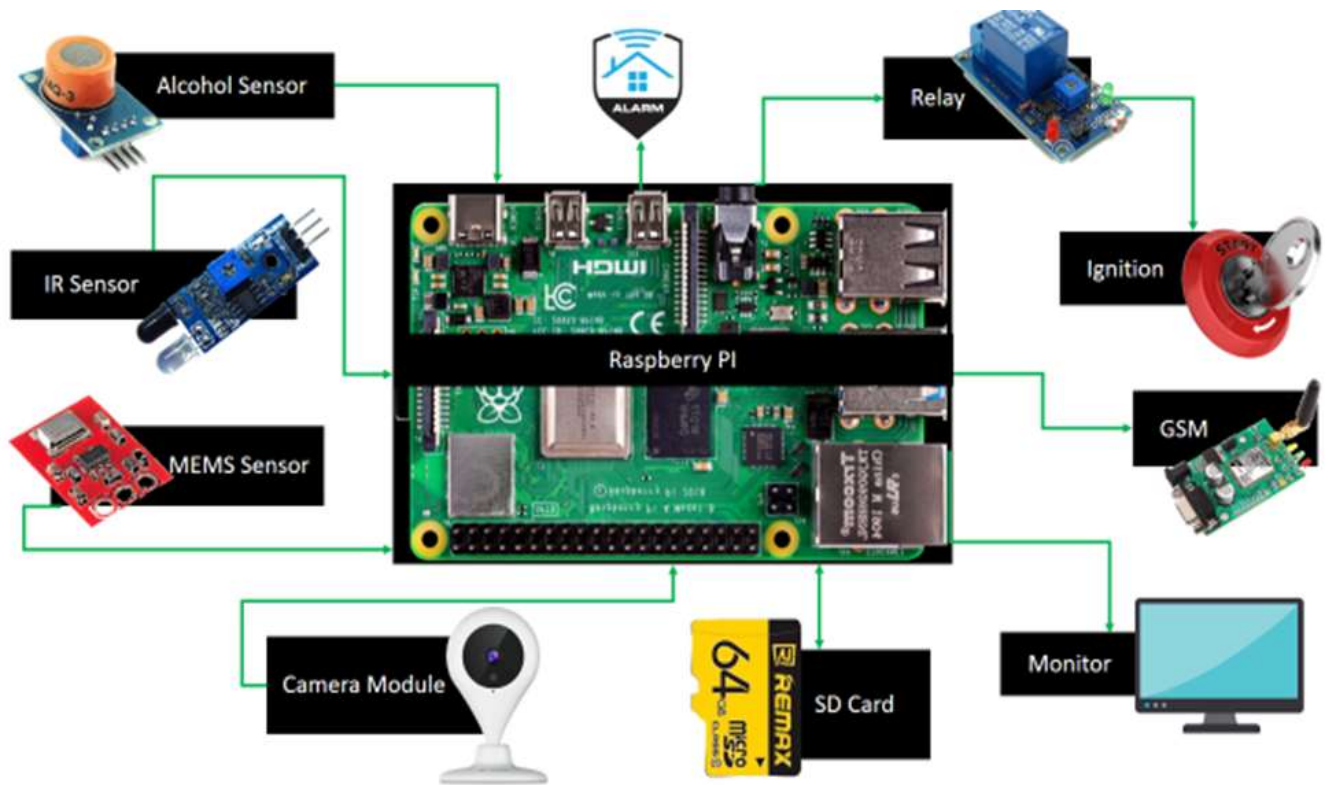


Fig -3: Components used in vehicle safety squad system

As seen in the above figure various components are used to make one complete vehicle's safety squad system. The alcohol sensor is used to detect the presence of ethanol and hence alert other systems that the driver is drunk and declare him as unfit to drive. Further the ignition won't turn on due to high level of ethanol being tested. The next sensor used is the IR sensor, which is used as a touch sensor in this system. This touch sensor is used indirectly to switch on the working of the other components in the system it detects the driver or any other person inside the vehicle. MEMS sensor is the third component used, these devices or rather systems have a greater ability to not only sense but also control and actuate on the micro scale, & also generate effects on the macro scale. The camera module is used in order to monitor remotely using in the monitor and helps in the major functionality of our system which is face recognition. It is used to detect the face and authenticate the user. The data of the authenticated driver can be stored in the SD card which is also connected to our main module, Raspberry PI. Raspberry PI in turn is made up of ARM1176JZF-S ARM Core which enables various other components to be connected and explore the computing and functionalities of various components. Other components include the relay which allows low voltage devices to be turned ON and OFF in response to the various activities going in or out of the complete system. This helps in igniting the machine on valid authenticated user. Finally, the GSM module is used to send in messages to the person who is monitoring the entire system regarding the driver, his alcohol levels and so on. But the major work that this module is assigned

to is to verify the driver again after the face detection. The user has to send a status message from his/her cell phone as a double check authentication of the user. If anything goes wrong an alarm is used that starts ringing as a sign of possible thefts. The various softwares include Open CV, Raspbian and an operating system likely a LINUX system.

The flowchart in the Fig- 4 gives us an overview of how the system works step by step. It's the basic design methodology used by the safety squad system to operate and produce the desirable results. This algorithm used is efficient and helps reaching our goal.

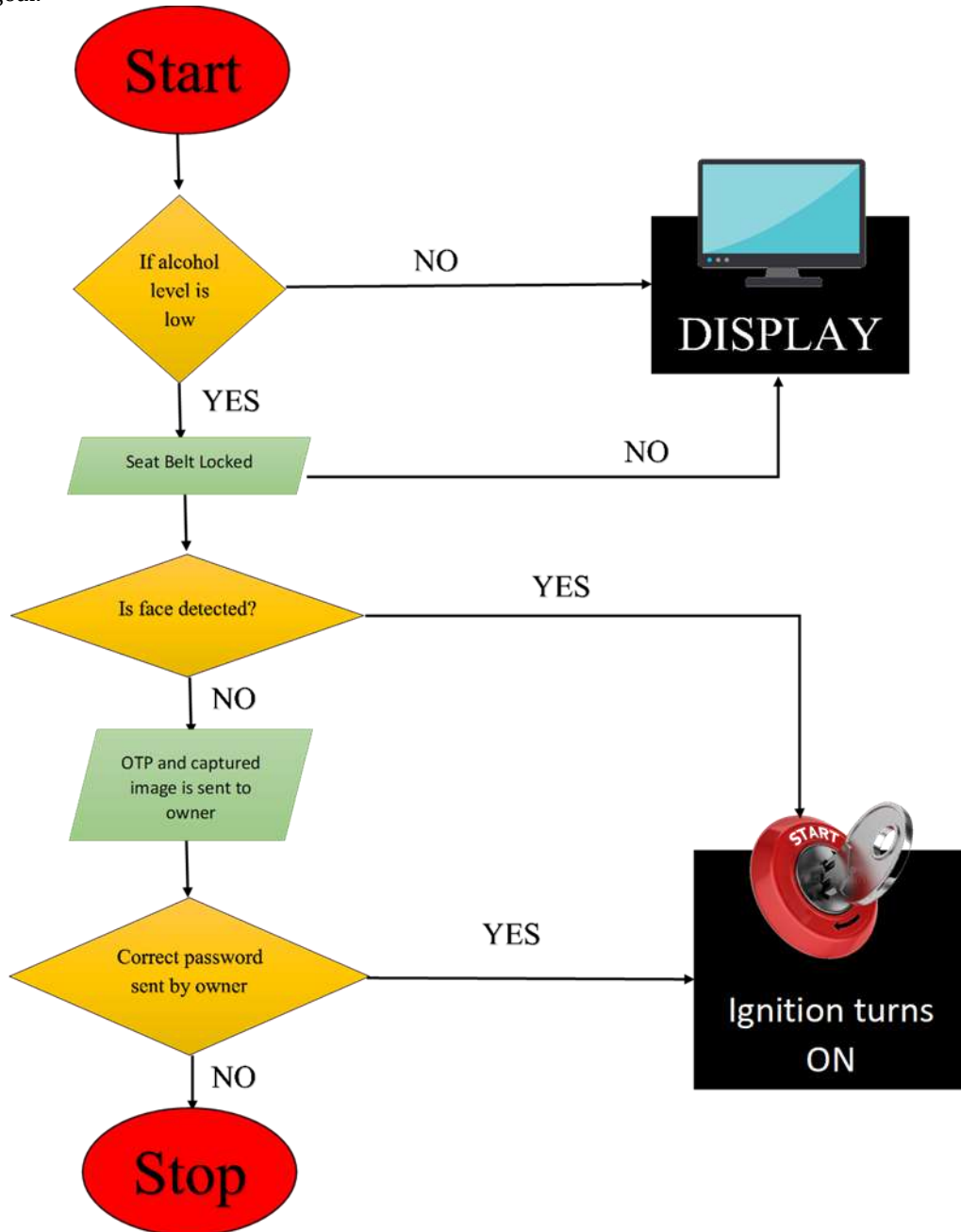


Fig -4: Flowchart of vehicle's safety squad

To summarize the above flowchart, we can formulate them as a six-step algorithm,

**Step 1:** Check for the alcohol content level of the driver using the alcohol sensor, only if the level is low then the system goes for face authentication.

**Step 2:** The safety squad system will check the seat belt pattern of the driver and display the warning if it's not right.

**Step 3:** The system's camera captures the driver's face and matches with the database that's already stored in the SD card.

**Step 4:** The ignition of the vehicle turns on only if both the faces are matched or an OTP. The captured image will be sent to the owner.

**Step 5:** The owner resends the password to the driver, if he/she identifies the driver and then the driver can ON/OFF the ignition.

**Step 6:** The face recognized through the password will be stored in database temporarily which can be removed by owner later.

#### 4. RESULT

The vehicle safety squad system can be used for saving the robbery of many vehicles and be within complete alert virtually through the system. The following table gives an overview of variety of results drawn through the system against its various functionalities.

**Table -2:** Various Existing Ideas

SI No.	Feature	Action	Result
1.	Alcohol Sensor	Senses low ethanol content	Ignition can be turned ON
		Senses high ethanol content	Ignition cannot be turned ON
2.	Face Detection	Matches the face stored in database	Successful
		Doesn't match the face stored in database	Alarm starts ringing
3.	GSM Module	On detection of face, sends message to the owner for further authentication	Message is received to the owner of the vehicle
4.	SD Card	When face is detected, a) Matches with the face present in its storage b) Doesn't match the face present in its storage	a) Sends "matches" to the face detection module b) Sends "doesn't match" to the face detection module

#### 5. CONCLUSION

The vehicle safety squad is a system proposed in order to minimize the increase in number of vehicular thefts that is happening all over the world. With the many statistics about the latest crime, it's pretty clear that in no time, robbery of vehicles will be added on to a severe criminal offense. In order to straighten up the things and help individuals to protect their vehicles, this system of vehicle safety squad can be put into use. It basically authenticates the user with face detection mechanism or also through message. This authentication makes it harder for the robbers to achieve in their goals. Various data like the user's face and other essential things are stored in SD card. It uses the Raspbian, Open CV softwares for connecting in and face detection respectively. Overall, this system aims in providing utmost safety and security to the vehicles and also help in bringing down the vehicular theft rates all over the world.

#### ACKNOWLEDGEMENT

The research work carried on for this paper would have taken much longer to complete without the encouragement from many. I acknowledge those who have supported me to do things in a better way and it would include my guide, Mrs. Hemalatha K N for providing the right path throughout this research and giving in her encouragement and support. I would also like to

thank my parents for their encouragement and finally all my friends who helped in improving the ideas and giving in their thoughts to make it a better and efficient idea.

## REFERENCES

- [1] Nithin Kurup U.G (M.Tech) & G.Vara Lakshmi, "Car-Theft Identification, Tracking &Control System", Volume 4, Issue 2 (Sep-Oct. 2012).
- [2] Jian Xiao & Haidong Feng "A Low cost Extendable Framework for Embedded Smart Car Security System",IEEE International Conference on Networking, Sensing & Control, Okayama, Japan, March 26, 2009.
- [3] S. P. Pingats, Shubham Rakhecha, Rishabh Agrawal, Sarika Mhetre & Pranay Raushan,"Real-Time Smart Car Security System Using Biometrics", Volume-2, Issue-4, March 2013.