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# IOT based Vehicle Theft Detection using Raspberry pi

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**ABSTRACT:** With an increase in technology and the manufacturing of new items in the market can easily improve the quality of human lives. One of the important sectors is the automobile sector. With an increase in the population and usage of the vehicle has also increased in demands. With the increase in these sectors the vehicle theft cases and the number of accidents, rash driving cases are increasing by day-to-day life. Our paper deals with a solution for vehicle theft cases and a decrease in accident. The main feature which makes it preferable is its low cost and can be implemented and used by many leading manufacturing companies. This system uses a GSM system, GPS, a buzzer, camera which is used start the engine by authorized person, a switch for detecting accident, RF pair module for detecting the theft.If anyone tries to start the vehicle without the permission of the owner, the camera will know the authorized person of the vehicle and send it to the microcontroller which will inform the owner via GSM and the buzzer will turn on. GPS tells us about the position like latitude, longitude. The switch which is used in the system is used for finding the accident like if the vehicle falls then it will send to the owner that the vehicle might be fallen accidentally or met with an accident. Thus, this research work conclude that this system can be used in any vehicle like a car or bike and the system to intimate the owner about the theft of the vehicle and the owner can monitor the vehicle status by Internet of Thing (IOT).

**KEYWORDS:** Raspberry pi, GSM, GPS, Switch, Buzzer, Power supply, RF pair module, Internet of Thing(IOT), Engine, Anti-Theft.

## I. INTRODUCTION

With an increase in the population, the demand for vehicles has been also increased from time to time. With the increase in vehicles in recent days the cases of vehicle robbery cases also rapidly increasing. Most of the anti-vehicle theft systems are mostly installed in the high-cost vehicle only so many peoples are demanding anti- vehicle theft systems for protection from the theft. The trouble of automobiles robbery is growing every day in our society and no matter the efforts of the safety agencies, all the stolen motors are not recovered. Also, stolen motors were difficult to be recovered in any other jurisdiction distinct from that in which they had been stolen through the police or civil society, because of no common data of stolen motors available. Those detected or recovered motors also may not get to their proprietors on time because of this. We additionally found evidence that the stolen vehicles may be altered without the information of the owner. Many cars stolen through fraud are quickly resold, in several ways by the thieves.

Car rental agencies and automobile dealerships also are defrauded via way of means of automobile thieves into renting, selling, financing, or leasing them motors with false identification, checks, and credit scorecards. To halt this issue, there is a need for a theft alert system that helps the owner in the identification of theft vehicles and to track the robbed vehicle. The theft alert system is installed with GPS and GSM technologies, in the vehicle to communicate with the vehicle's owner's mobile phone. The communication established includes sending a Short



Message Service (SMS) by GSM module to the owner's mobile phone to provide all information about the theft vehicle. The GPS technology used here is to provide the exact location of a vehicle which represents theft whenever an unauthorized person enters the vehicle and tries to start the engine. Then by resending the command to stop the vehicle to GSM we can turn off the engine remotely.

## II. LITERATURE SURVEY

Recently automobile monitoring machine is getting significant recognition due to the growing wide variety of the stolen vehicles. Vehicle robbery is occurring on parking and occasionally riding in unsecured places. This study mainly explores the way to keep away from this form of stealing and offers greater safety to the vehicles. The numerous troubles that we are facing because of automobile thefts are [1]:

1. To pick out the strolling thief with the stolen automobile.
2. To redeem essential artifacts available inside the automobile.
3. To trace the area and to prevent the strolling automobile.

And we are also dealing with the problems of accident detection. There are many peoples are dying in accidents due to late information of accidents. This problem can be solved by keeping the switch which will sense when a vehicle is fallen and intimating immediately to the owner families with the location.

In [2], it mainly focused on the basic needs of the anti- vehicle theft requirements like GSM which only gives the information message about the status of the vehicle for every interval of time. While [3] has introduced a GPS in the device which tells us the real-time location of the vehicle and a fingerprint sensor where a vehicle can be turned on by using the fingerprint. With solving [3], [4] has built a smartphone application, Here the author focused on keeping a GPS in the vehicle and track the vehicle via a smartphone application. With tracking and intimation also, there are some problems like stopping of the vehicle since the thief may go far away from us so a locking device was introduced in [5]. Each and every vehicle should have an anti-vehicle theft and an accident detection device where [6] and [7] are primarily focused on the problem for detection of an accident alone which are the focus in [8].

However, the following problems were identified in existing methods

- Keeping multiple devices in a vehicle is difficult, requires more space, and more cost.
- Receiving notifications for every certain amount of time not only makes disturbances but also more power consumption.
- The components used in the devices are expensive, least efficient, and more delayed.
- The turning of the engine when a vehicle is stolen is not used.

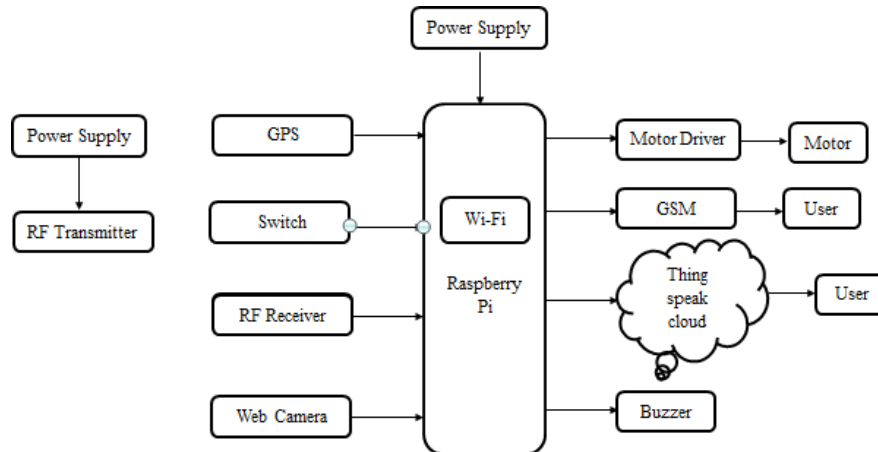
## III. PROPOSED METHOD

In this proposed system continuous monitoring of personal vehicles and school vehicles at real time is possible and if the unauthorized person tries to access the vehicle then this system helps to gather the information such as key detection, engine started or not and accident detection and it will give the alert message to the owner's Smartphone. The proposed system uses Raspberry pi board which placed inside the vehicle. In this system there should be two modes user modes and theft mode. In the user mode there will be normal operation that means owner or authorized person is driving the vehicle. The proposed system can be done by the recognizing the face of the authorized person to unlock the engines. In case of any theft, the system will not let the engines start and it will SMS to the owner through GSM in the pre-installed system of the vehicle and also it will send location of the vehicle to through GPS.

When the user is not driving the vehicle then it will be in theft mode which is done by switching the modes by sending the messages to the system by using internet of things and whenever the system in theft mode and if unauthorized person accesses the vehicle then it will send the alert message to the owner. Owner can switch the two modes that are user mode and theft mode by using IOT. The modes can be switched by sending the message to the system for user mode message will be User mode and for theft mode message will be Theft mode. The system is operating in user mode, when camera is detected the authorized person and engine will be started no message will be sent to the owner. Hence, we can avoid unnecessary data in user mode. The IOT would get communicate to raspberry pi board. If unauthorized person tries to access the vehicle then camera will detect it and message will be sent to the owner also if engine gets started then also it will send the message to the owner. If engine gets started then again message will be



sent to the owner mobile number. By using the GPS this can send location of the vehicle to the owner. By using IOT this message will be delivered to the owner. That input will be given to the raspberry pi. The switch will detect the accident of the vehicle.



**Fig 1: Vehicle theft detection block diagram by using Raspberry Pi****HARDWARE REQUIRED**

- Raspberry Pi
- GPS Module
- GSM Module
- RF Transmitter
- RF Receiver
- Motor
- Motor Driver
- Buzzer
- Web camera
- Switch

#### **SOFTWARE TO BE USED**

- NOOBS
- Python IDE
- VNC viewe



IV. METHODOLOGY

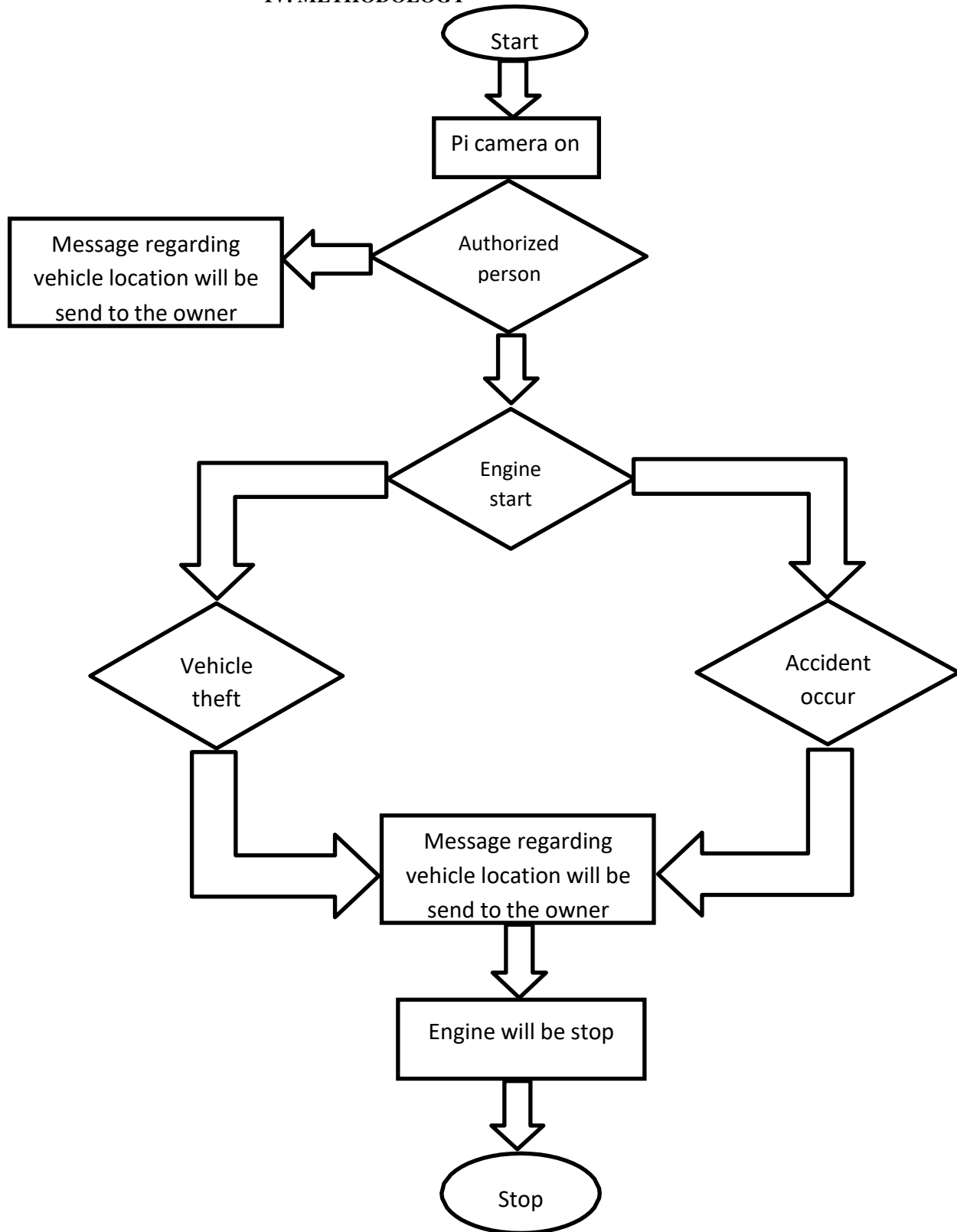


Fig 2: Methodology



Fig 2 is the flow of the work. Here a vehicle theft switch needs to be switch on before you leave the vehicle. Then when the vehicle is in on condition with correct owner it will start moving without any problems else the buzzer will ring with an alerting message of location of the vehicle to the owner mobile. The owner now can send a common command to stop the vehicle permanently. After stopping the vehicle, the owner again will receive the message where the vehicle has been stopped so that he can collect the vehicle. A switch is used as a sensor in the system for detecting an accident to the concern family members. It detects when the switch is closed. When it detects then a message alert will send to the concern owner family members regarding the location so that he knows the location as soon as possible and may rescue them. A RF module is used in the system for detecting a theft to the concern family members. It detect when the signal cut between RF transmitter and RF receiver. When it detects then a message alert will send to the concern owner family members regarding the location so that he knows the location as soon as possible and may retrieve the vehicle.

### V. SCHEMATIC DIAGRAM OF THE PROJECT

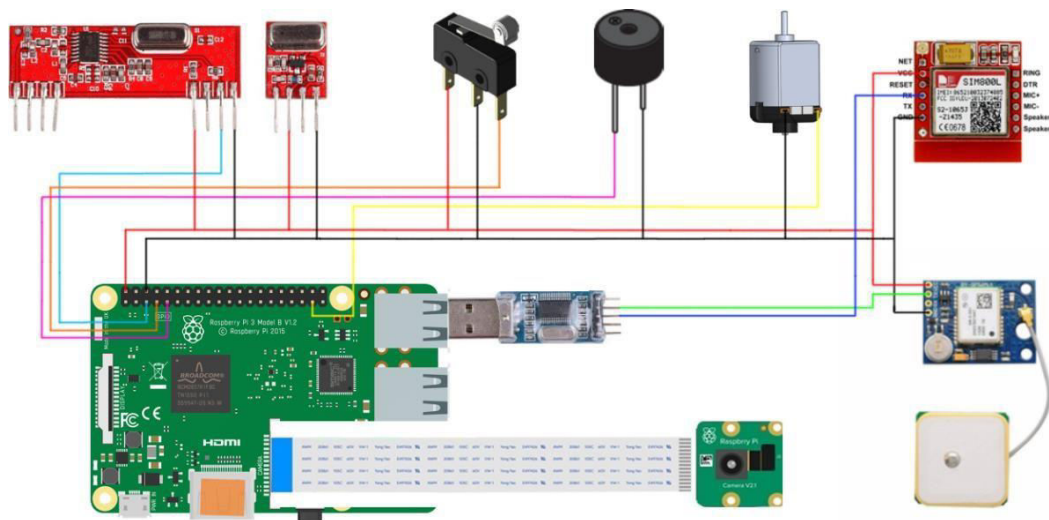


Figure 3: Schematic Diagram

Figure 3 shows the connections of various items to the Raspberry pi pins. The USB to TTL convertor is connected to USB port of the raspberry pi and USB to TTL convertor RX and TX pins are connected to GPS TX pin and GSM RX pin respectively. Buzzer and motor are connected to 17 and 26 raspberry pi pins respectively. RF receiver data pin and switch NC pin are connected to the 3 and 4 pins of the raspberry pi respectively. RF transmitter is given to power supply pins of the raspberry pi.

### Result

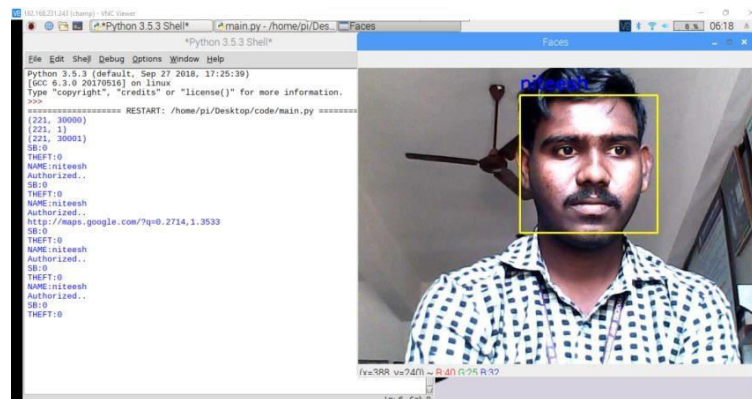


Fig 4: Detected authorized person

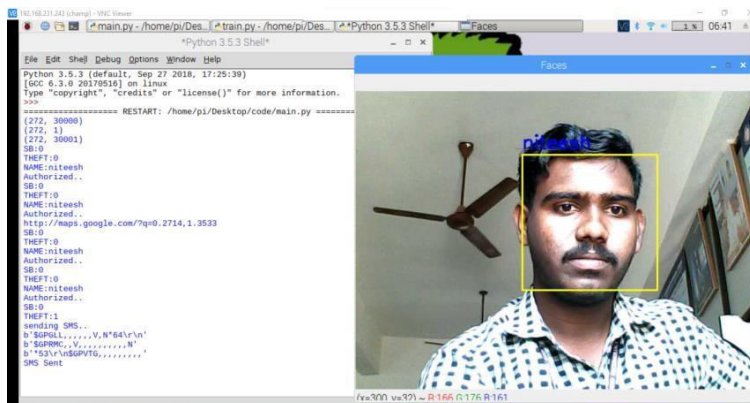


Fig 5: After vehicle theft the SMS send to the owner

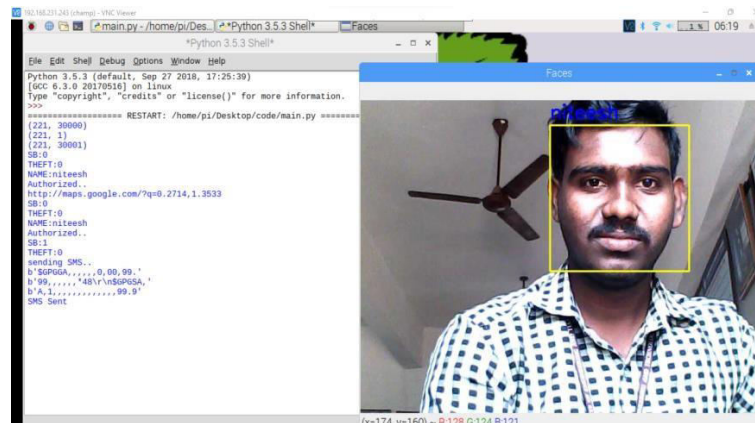


Fig 6: After vehicle accident the SMS send to the owner

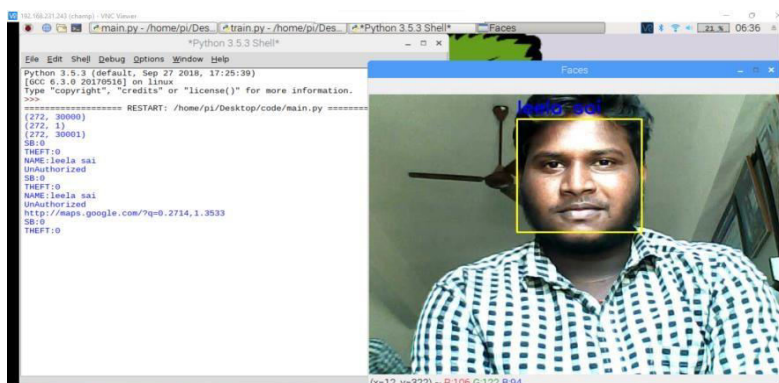


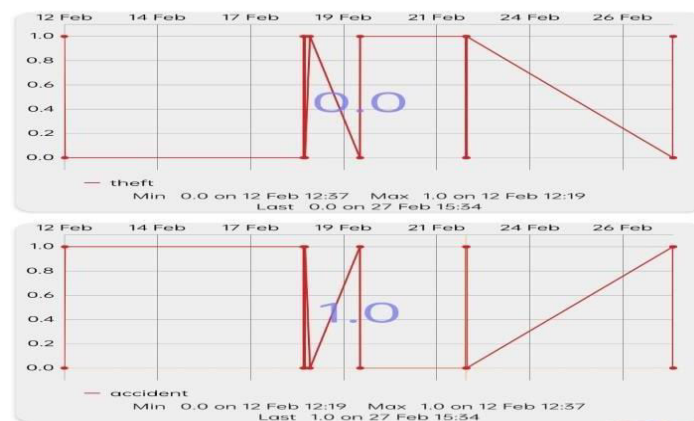
Fig 7: Detected unauthorized person

abnormal condition detected at  
abnormal condition detected at  
<http://maps.google.com/?q=16.283804,81.20011>

Fig 8: SMS sent by the system



**Fig 9: Real time location of Vehicle**



**Fig10: Vehicle status check in IOT**

## V. CONCLUSION

We got to learn a lot about system implementation, component interfacing on the board and efficient, compact programming. Vehicle theft detection device is the need of the hour and a compact, efficient and cheap device can be made using Raspberry pi. A powerful product can eventually be made out of this system. We can improve the accuracy by increasing the cost of the components. We can add ambulance contact numbers and police station contact number so that they can reach out very fast to that location. The application can be made capable of generating the voice based alert to the user. Also, the features to block the ignition unit by sending some instructions to the microcontroller can be added make the vehicle impossible to start for improved security. The entire system can be integrated with an android app and the relevant data can be stored in a database also.

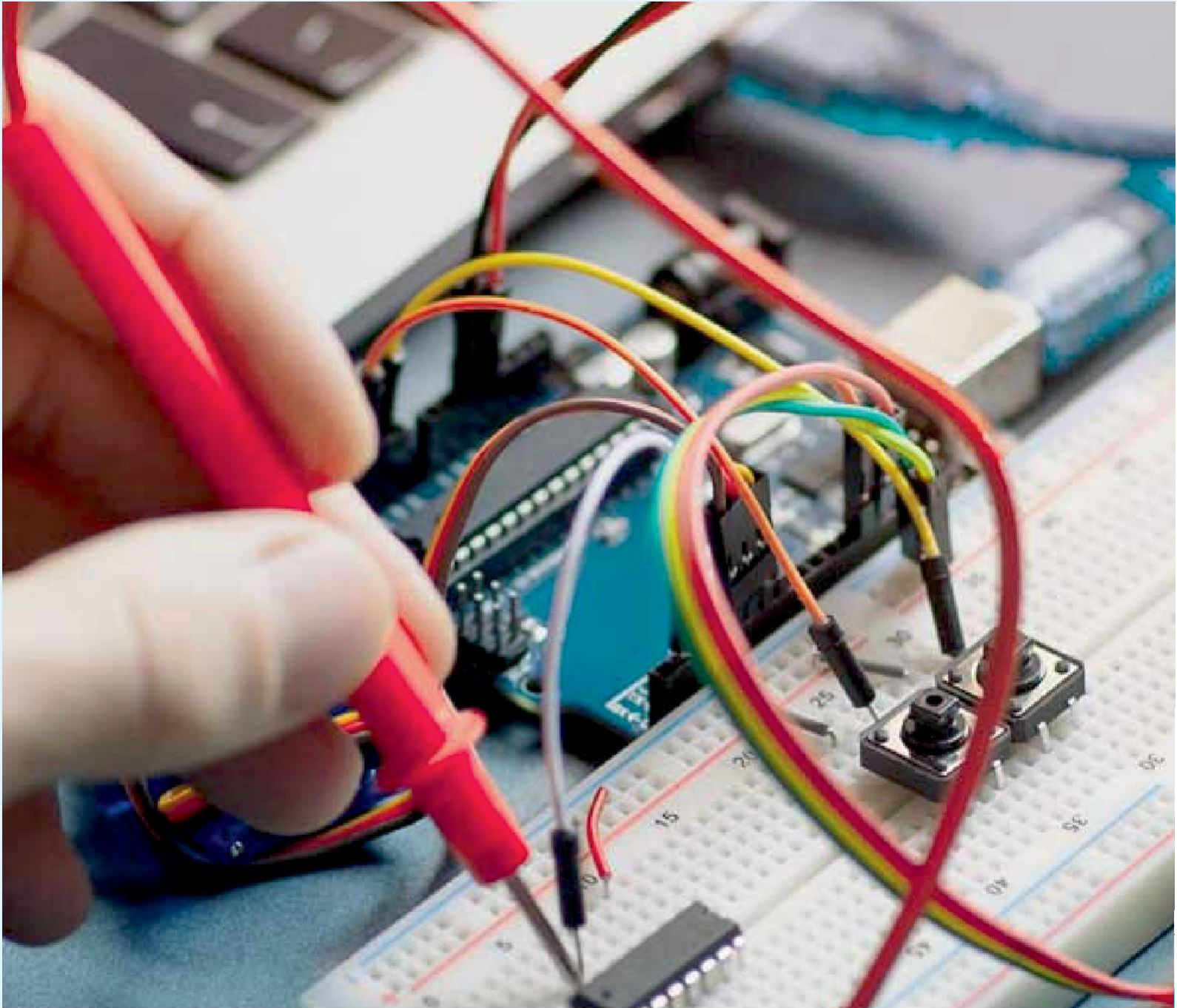
## REFERENCES

1. **Zhixiong Liu. (2005).** “A New Embedded Car Theft Detection System”. Second International Conference on Embedded Software and System (ICCESS’05).
2. <https://doi.org/10.1109/icess.2005.6>
3. **Nagaraja, B. G., et al. (2009).** “Design& Development of a GSM Based Vehicle Theft Control System”2009 International Conference on Advanced Computer Control.
4. <https://doi.org/10.1109/icacc.2009.154>





5. **Dey, M., Arif, Md. A., and Mahmud, Md. A. (2017).** “Anti-theft protection of vehicle by GSM & GPS with fingerprint verification”. 2017 International Conference on Electrical, Computer and Communication Engineering (ECCE).
6. <https://doi.org/10.1109/ecace.2017.7913034>
7. **Shruthi, K., et al. (2015).** “Design of an anti-theft vehicle tracking system with a smartphone application”. 2015 International Conference on Information Processing (ICIP). <https://doi.org/10.1109/infop.2015.7489483>
8. **Mohanasundaram, S., et al. (2019).** “Vehicle Theft Tracking, Detecting and Locking System Using Open CV”. 2019 5<sup>th</sup> International Conference on Advanced Computing and Communication Systems (ICACCS).
9. <https://doi.org/10.1109/icaccs.2019.8728460>
10. **H. Garg and A. Agrawal,** "A Comparative Study on Vehicles Safety Systems," 2020 Sixth International Conference on Parallel, Distributed and Grid Computing (PDGC), 2020, pp. 172-176. <https://doi.org/10.1109/PDGC50313.2020.9315786>
11. **N. Parveen, A. Ali and A. Ali,** "IOT Based Automatic Vehicle Accident Alert System," 2020 IEEE 5th International Conference on Computing Communication and Automation (ICCCA),2020, pp. 330-333. <https://doi.org/10.1109/ICCCA49541.2020.9250904>
12. **R. Rishi, S. Yede, K. Kunal and N. V. Bansode,** "Automatic Messaging System for Vehicle Tracking and Accident Detection," 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), 2020, pp. 831-834.
13. <https://doi.org/10.1109/ICESC48915.2020.9155836>
14. **K. JEYA PRAKASH, K. SAI KUMAR GOUD, K. PRADEEP KUMAR REDDY and S. THEJESWARA REDDY ,** “Vehicle Theft Intimation over SMS and Remote Control of its Engine” 2021 IEEE 6th International Conference on Communication and Electronics Systems (ICES-2021). <https://orcid.org/0000-0001-7493-1914>



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