A REAL TIME IOT BASED VEHICLE SURVEILLANCE TRACKING, FACIAL RECOGNITION ANTI-THEFT & EXHAUST GASES MONITORING SYSTEM

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ABSTRACT: The objective of this study is to develop a system with hardware and software components that would optimize the security of the vehicles. In line with this, the project aims to achieve the following specific objectives:

To install a face recognition system in the vehicle for authentication of engine ignition. To implement IoT and GPS that will notify the exact location of the motorcycle during incidents of theft. To implement other means of control the engine ignition aside from face recognition. These are through IoT and through entering a pass code. To monitor the exhaust gases for control emissions of pollutants into the atmosphere through the IoT. To monitor the vibration and exhaust gas temperature for avoiding noise pollution and global warming through the IoT.

Keywords: Vehicle Surveillance Tracking, Exhaust Gases, Control Emissions & Pollutants

1. INTRODUCTION

With the new modern era development of new technologies is a must be it in the management sector or in the technical sector. Improvements are necessary for every field. Regarding the project chosen in the field of vehicle security. Various techniques have been improved such as retinal scanning, image processing. Apart from all the improvised techniques the theft of vehicle still remains high in order to maintain the car security the system needs to be efficient, robust and highly reliable so in this paper, the security system involving face detection using Raspberry Pi, IoT along with database which consist of images uploaded by the owner of vehicle. If the newly scanned image does not match with the image uploaded earlier to the database, the system will stop immediately. All the process here is controlled by programmed Raspberry Pi. The central processing unit here is the Raspberry Pi system. It controls the IoT module, camera, and operations related to the database. When an unauthorized image is detected by the programmed algorithm, the controller takes the information in the hold and stops the working of a motor which then informs the authorized user by sending messages through the IoT module.

The number of cars on Earth exceeds 1 billion. The main danger of the chemical components contained in the exhaust gases is that the components are so small that they are absorbed into the blood through the lung tissue and have a harmful effect on various human organs. Pollution of the atmosphere leads to a decrease in oxygen and an increase in carbon dioxide, which entails a number of stable weather changes. Researches of scientists show, that from year to year the maintenance of carbonic gas in atmosphere increases. This leads to the so-called “greenhouse effect”, i.e. an increase in the average annual temperature on the planet by an average of 0.8-3%, which, in turn, will lead to significant climate changes.1-9. Pollution of the air basin creates a real danger to human health. The predominant symptoms are irritation of the upper respiratory tract and eyes, asthma or allergic rhinitis, bronchitis, lung cancer, respiratory tract cancer, leading to a sharp increase in rach it is and a delay in the normal development of children. First of all, the central nervous system of a person is affected. Unlike other environmental factors, air comes into direct and rapid contact with very large, physiologically active surfaces of the human body. Every day a person inhales 15,000-20,000 L of air, so even relatively small amounts of any harmful substances, long inhaled with contaminated atmospheric air, adversely affect his health and often cause various diseases.

2. LITERATURE REVIEW

Montaser N. Ramadan, Mohammad A. Al-Khedher, Sharaf A. Al-Kheder, “Intelligent Anti- Theft and Tracking System for Automobiles” IJMLC, Vol. 2, No. 1, February 2012

In, the paper exhibits objective of fleet monitoring and management. The system has two units: the main is the security unit consisting of a GSM, GPS, relay, current sensor and microcontroller. The current sensor will transmit an analog signal to the controller whenever the car is moving and confirmation is done by sending SMS to the owner.

Karan Siyal and G. Gugapriya," Anti-Theft Vehicle Locking System using CAN" IJST, Vol.9, December 2016

In, the framework acknowledges the message and through CAN Bus broadcasts the message to the whole vehicle network. The exact location will be send to the owner within very less time. The GSM modem interfaced to the microcontroller gets the message, the yield of which enacts a component that cripples the ignition of the vehicle by using flow sensor which results in stopping of the vehicle.

Pengfei Zhou, YuanqingZheng, Mo Li, "How Long to Wait? Predicting Bus Arrival Time with Mobile Phone Based Participatory Sensing," Mobile Computing, IEEE Transactions on, vol.13, no.6, pp.1228, 1241, June 201

In the author depicted a system to alert the user if the unauthorized person tries to take away the vehicle and stop the ignition and deactivate the gadget.

D. Jiang, V. Taliwal, A. Meier, and W. Holfelder, "Design of 5.9 GHz DSRC-Based Vehicular Safety Communication," IEEE Wireless Communications Magazine, October 2006

In author proposed a car security system involved with a GPS and a GSM module. The user connects through this substructure with vehicles and decides their present areas and status using Google Earth and the position of alerted vehicles can be followed by client.

B.G. Nagaraja, Ravi Rayappa, M. Mahesh, Chandrasekhar M. Patil, Dr. T.C. Manjunath, "Design & Development of a GSM Based Vehicle Theft Control System" 978-0-7695- 3516-6/08©2008 IEEE, DOI 10.1109/ICACC.2009.154, pp.148-152

In, motors of vehicles are controlled using GSM and microcontroller. The secret word which has been declared needs to be sorted out for the vehicle to start. At the point when the secret word coordinates then and at exactly that point ignition of the vehicle will begin. Every time secret key neglects to match up to the three trials then framework will starts the siren and it will send the message to the owner through GSM system.

3. EXISTING SYSTEM

In the existing system of car securities, various sensors are used door sensors, engine sensors, light sensors, etc. Where the door sensors are used for locking and unlocking the car doors through suitable key, when any duplicate key is inserted it sends some signals to the controller, however when key is made suitable as the original one the sensor might not be able to differentiate the changes in the system hence resulting in the car theft.

The other method to limit this theft is a surveillance pad that is used to monitor the car which consists of RF receiver, processing unit alarm, and display, but the drawback here is this surveillance pad should be carried by the user everywhere.

4. PROPOSED SYSTEM

4.1 OVERVIEW

This is an advanced system which can be utilized in many cars our system uses facial recognition to identify the authorized users of the vehicles and only authorized users allowed to use the vehicle. In this system we are designing facial recognition algorithm which will identify the driving person based on which the vehicle ignition can be controlled. System is built on Raspberry Pi Microprocessor and pie camera for facial recognition. Proposed system provides enough security in terms of vehicle theft happening and the ignition is only controlled by the facial recognition, Sensor is also used in the project to get the notification if the vehicle getting towed sensor value is checked multiple time to make sure the vehicle is in the stand alone and upright position. Sensor values can be modified based on the towing techniques. Proposed system having a cost efficiently an easy to be implement in the existing vehicles. If an unauthorized user tries to use the cars, the system scans the person's face and check the whether face matches with the authorized face, and if it is does not match the system denies and the buzzer starts and processed with the shock implementation. Proceed with the IOT notification.

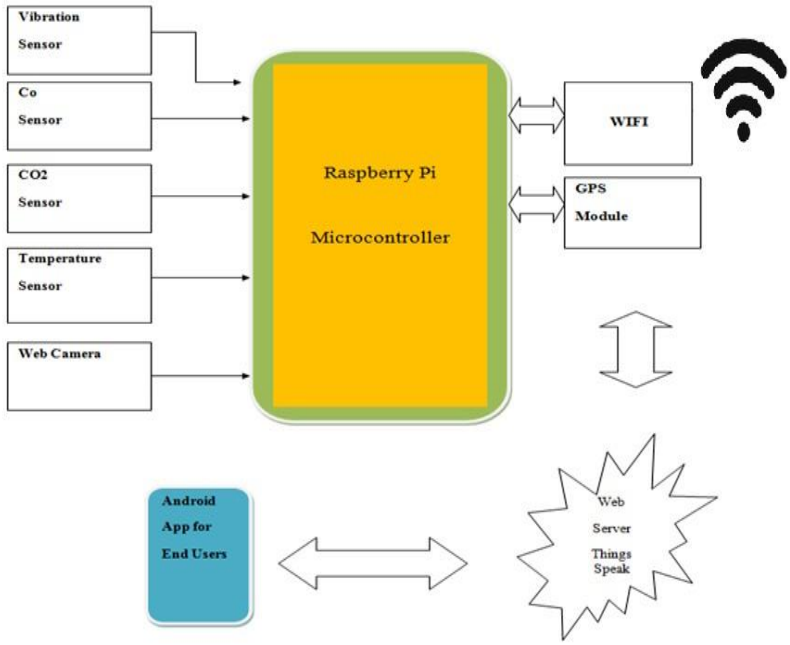


Fig: 1 Block diagram of project

Block Diagram Operation

1. The system uses a face recognition system to identify the authorized users of the vehicles.

2. The authorized users are allowed to use the vehicle.

3. When we turn on the system authority provided by 3 options that are registration, start, and clear data.

4. While registering, it first scans the owner's face. After successful registration, the owner can start the vehicle.

5. IOT Technology is proposed to improve the quality of atmospheric air by monitoring vehicle exhaust gases. With the use of IOT technology enhances the process of monitoring various aspects of exhaust gases such as exhaust gases monitoring is proposed in this paper. Here, using the MQ135 and MQ6 gas sensor gives the sense of different type of emissions gases(CO,CO2) for control emissions of pollutants into the atmosphere. so it is the heart of this project.

6. If the temperature of the exhaust gas increases the temperature sensor will deduct and alert for rectification and control the problems.

7,If the vibration of the engine will increases the vibration sensor will alert for reduced the excess throttling and speed of the engine. 12

Table 1 : Composition of exhaust gases of internal combination combustion engines,vol.%.

Components	Gasoline engine	Diesel engine
CO2	5 to 12	1 to 10
CO	1 to 10	0.01 to 0.5

4.2 CIRCUIT DIAGRAM

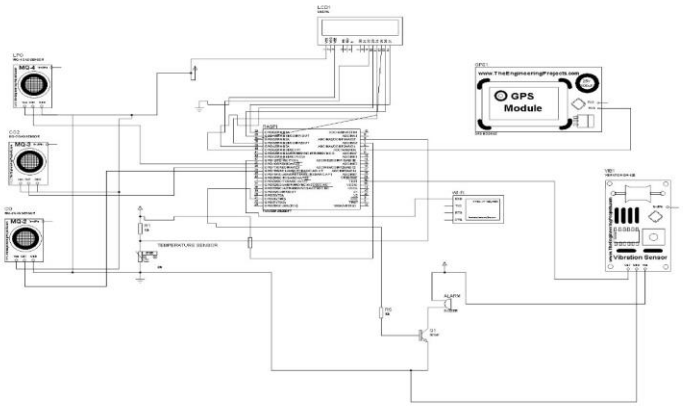


Fig :2 circuit diagram

Raspberry pi for performing data base adding, face recognition and response for the message of authorized person. The user database s stored in the raspberry pi memory unit image processing and detection processes are performed within the raspberry pi. It is also used as a control platform. GSM module is used for communication between the owner and car. The image of unauthorized person and location of vehicle are sent to the owner's phone through this GSM module using this we can also stop the ignition value of the car. The program for the smart car security is done in the python. According to the program face of the driver who sits in the driver seat is captured. Cut the image using Haar cascade classifier algorithm in the data base by PCA algorithm.

If the captured image is in the data base the vehicle can be accessed and an access is send to the owner. If the captured image is not in the data base the image is sent with a message of "unauthorized person is thing to access the vehicle" to the owner's mobile. the exhaust gas temperature sensor measures the temperature of the exhaust gas. There are two types of exhaust gas temperature sensors; one with a positive temperature coefficient (PTC) sensing element, and the other a negative temperature coefficient (NTC), the only difference being how they measure the temperature. The NTC element has a high resistance at low temperatures and a low resistance at high temperatures. In other words, its resistance decreases as the temperature increases. Whereas in a PTC element, the most common type, resistance increases in line with temperature. Either way a temperature is assigned to the resistance in the ECU and action taken accordingly. Engine vibration monitoring systems to monitor the condition and health of their engines.

The test is carried out idle by sucking the vehicle exhaust gas into the gas analyzer test then measured the content of the two elements that want to see the levels are CO2, CO. ADC will convert an analog signal from sensor to digital which then processed displayed through PC by microcontroller. Moreover, the data from EGD and gas analyzer were compared. EGD accuracy can be seen by its error in percent.

5. RESULT

5.1 IMPLEMENTATION RESULTS

FACE RECOGNIZATION

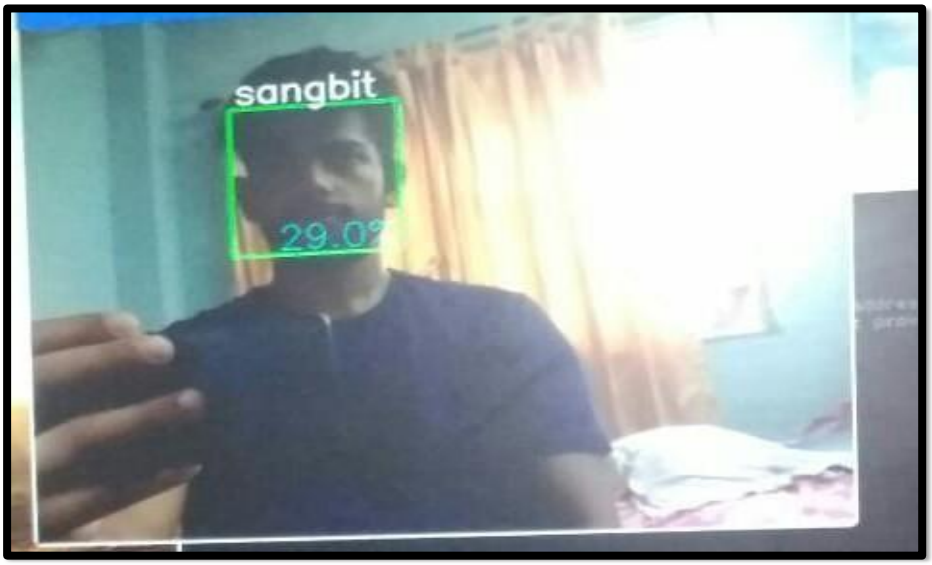


Fig :3 Output of Face Recognization

The above figure is the outcome of the Face Recognization. This picture is taken by the Raspberry Pi camera which is used for the face recognization. Firstly, taking the pictures and storing it in the database then during the recognition process the outcome shows the name of the identity if it is stored in the database and it also shows the matching index which is previously mentioned that if it is 45% or more then it is successful otherwise not. Here clearly it is not the case as the matching index is showing29.0%.

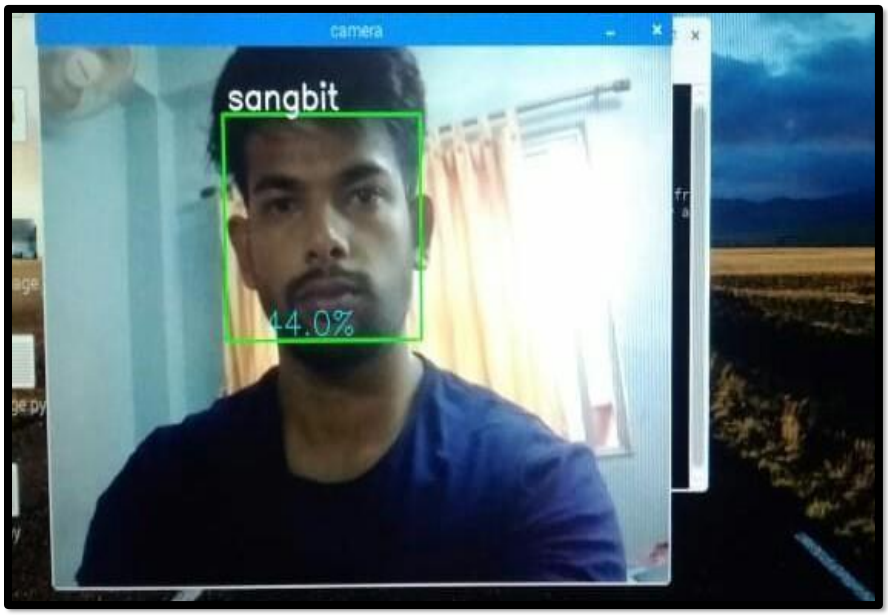


Fig:4 Output of the Face Recognization

In the above figure it is the output of the face recognization and the person is identified properly. The matching index here is 44% which is almost 45% (the desired matching index) so one can say here that it is approximately successful.

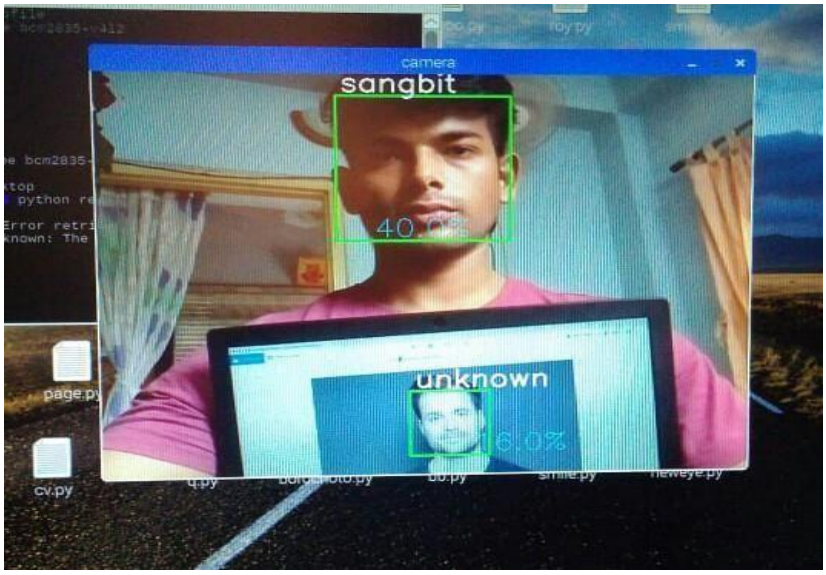
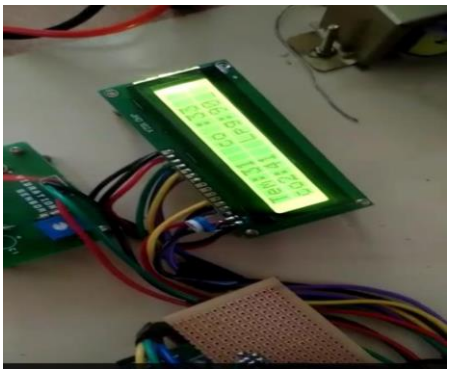
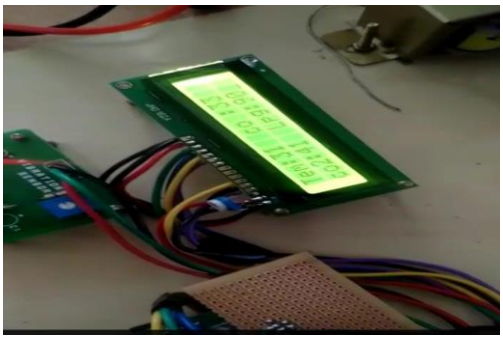


Fig :5 Outcome of the face recognization process

In the above figure one can see that one face is being recognized as it is stored in the database and another face is not properly recognized and is showing "Unknown "from here one can conclude that if the face is not stored in the database previously then the face won't be recognized and will show unknown. In this proposed scheme it has been already decided to introduce a smart door lock system where a miniature door will be used. The door will be driven by a DC motor which will be driven by a relay. the Pi camera is attached to the camera slot and the DC motor and Relay is attached to the GPIO pin so if the Raspberry Pi. As it is a two channel relay so it is connected to the LED and the DC motor which helps in driving the DC motor. Here the DC motor drives a miniature door. Which is being used for a door locking system for surveillance purposes. The door only opens after a successful recognization process, when the face is stored previously in the database and that image has got the access to open the door then it will work otherwise it won't open.

LCD DISPLAY





5.2 KIT DIAGRAM

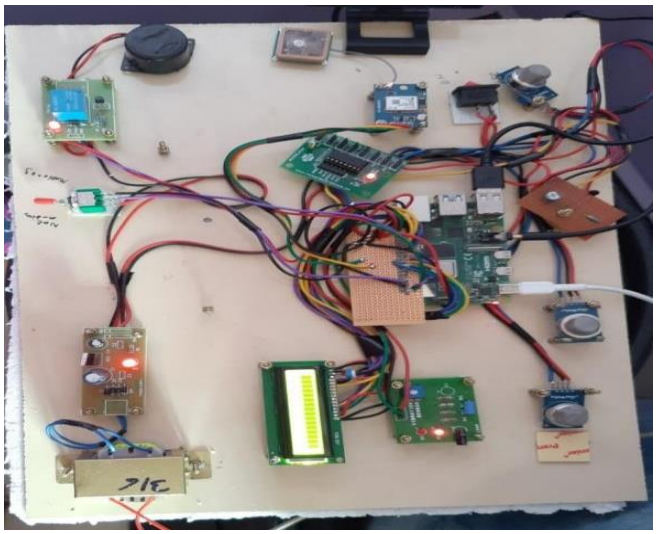


Fig: 6 kit diagram

6. 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. 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 so that it might more easily be accessible to the user.

7. REFERENCES

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