Real time vehicle security system through face recogniton

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ABSTRACT

Nowadays vehicles are becoming an important part of human life. Vehicles have a tremendous role on lightening the life styles of people. At the same time the rate of vehicle theft is increasing day by day. Here comes the importance of detection of vehicle theft. The existing security system is based on anti theft alarm. Whenever a person touch the body of the vehicle, the alarm is automatically turned on and sounds. The limitation of the existing system is that an intruder can break the security alarm when he is able to access the power source. The aim is to develop a security system which can be incorporated inside a vehicle for the purpose of detecting theft. The proposed system is a face recognition based security system with face recognition module loaded in Raspberry Pi . When the driver sits in the driver seat and inserts key in to the key hole, a Alcohol sensor is activated and a hidden camera captures the image of the driver which is then sent to the Raspberry Pi through an RS-232 cable. The captured image is pre-processed using histogram equalization .The pre-processed image is given for face detection. Face detection is performed using Viola-Jones algorithm. The extracted face is recognized using the Local Binary Patterns Histograms algorithm. If the vehicle is stolen, the software sends an mms to the owner comprising the image of the driver and the current location of the vehicle. The system is well implemented in OpenCV- Python and trained to identify two possible drivers. The software can distinguish between authorized and unauthorized drivers and send email to the owner if the vehicle is driven by an unauthorized person. If sensor Finds Drunken Driver automation sends GSM message to owner and off the vehicle Engine. Here We placed Load sensor to Monitor load level of Vehicle.

Keywords: Face Detection, DNN, Machine Learning, Neural Networks.

INTRODUCTION

Building up of a security mechanism that is incorporated inside an automotive is a novel idea. The proposed system is having great relevance in detecting theft of a vehicle when the owner parks his vehicle in a parking lot or anywhere. The idea of authenticating a vehicle using face recognition system incorporated inside Raspberry Pi is a novel one. The main advantage of face recognition among other biometric methods is that it does not require the active co-operation of a person and can be used in cases where people are unknown about the presence of face recognition system. Here we used Raspberry Pi B+ as the microcomputer in which the face recognition module is loaded. It is a small, low cost computer developed by Raspberry Pi foundation, UK. It is a single board computer which is capable of doing any work a desktop can do and can be placed anywhere inside the vehicle.

The image of the driver, captured using a camera is passed to the face recognition system loaded into the Raspberry Pi. The face recognition system detects the face portion in the image and compares it with the images of possible drivers in the training set. If a mismatch is found, the owner is informed of the vehicle theft by sending an mms containing the acquired image of the driver as well as the current location of the vehicle.

Nowadays, a growing crucial problem faced by the world is an unnatural death due to drunk driving and driving under the influence of alcohol (DUI). The main aim of this paper is to reduce traffic accident cases based on driving under the influence of alcohol, especially in India. As per the data from the transport research wing of India [1], the percentage of accidents has increased by 2.5% between 2014-15. From these, we can concur that the road accidents which occur are responsible for around 1,374 deaths that take place every day in India. Among them, 70% of total road human deaths were caused under the influence of drunken driving. These days, the majority of road accidents are caused by drinkdriving. Driving in an intoxicated condition is highly dangerous as our mind is in an unstable condition and hence, the decisions taken by us have a huge impact. Most of the deaths caused by drunken driving are preventable. Although the proportion of alcohol-related crashes

has dropped dramatically in recent decades, there are still far too many such preventable accidents [2]. Hence, to avoid these situations we need a more efficient system that will, primarily, be able to verify whether the driver is in an intoxicated situation or not, and secondly, after the driver is found to be drunk, the vehicle ignition function should get disabled and a message in the form of vehicle location will be sent to the driver's relative whose number is pre-installed in the system. This can be implemented using Arduino, internetworked with various other sensors and modules.

LITERATURE REVIEW

With a gigantic deluge of multimodality information, the job of information examination in wellbeing informatics has filled quickly somewhat recently.

This has additionally provoked expanding interests in the age of scientific, information driven models dependent on AI in wellbeing informatics. Profound learning, a strategy with its establishment in fake neural organizations, is arising lately as an amazing asset for AI, promising to reshape the fate of man-made consciousness.

Quick upgrades in computational force, quick information stockpiling, and parallelization have additionally added to the fast take-up of the innovation notwithstanding its prescient force and capacity to create naturally streamlined undeniable level highlights and semantic understanding from the information.

Profound learning has acquired a focal situation as of late in AI and example acknowledgment. we have laid out how profound learning has empowered the improvement of more information driven arrangements in wellbeing informatics by permitting programmed age of highlights that lessen the measure of human intercession in this cycle.

MACHINE LEARNING

Artificial Machine learning (ML) is the investigation of PC calculations that improve naturally through experience. It is viewed as a subset of man-made consciousness. Artificial Machine learning calculations assemble a model dependent on example information, known as "preparing information", to settle on expectations or choices without being expressly modified to do as such. Artificial Machine learning calculations are utilized in a wide assortment of utilizations, for example, email separating and PC vision, where it is troublesome or impractical to create regular calculations to play out the required assignments.

A subset of Artificial Machine learning is firmly identified with computational measurements, which centers around making forecasts utilizing PCs; yet not all Artificial Machine learning is factual learning. The investigation of numerical enhancement conveys strategies, hypothesis and application areas to the field of Artificial Machine learning. Information mining is a connected field of study, zeroing in on exploratory information examination through solo learning. In its application across business issues, Artificial Machine learning is likewise alluded to as prescient investigation.

MODULES
PREPROCESSING
Picture pre-preparing is the name for procedure on Face pictures at the most minimal degree of reflection whose point is an improvement of the Face information that stifle undesired twists or upgrades some picture highlights significant for additional handling. Its strategies utilize the extensive excess in Face pictures Here we executed HOG based pre-handling method

FEAUTURE EXTRACTION
Highlight extraction includes lessening the quantity of assets needed to depict a huge arrangement of information. Highlight extraction is an overall term for techniques for building blends of the factors to get around these issues while as yet portraying the Face information with adequate exactness. Here we carried out K-implies Cluster procedure.
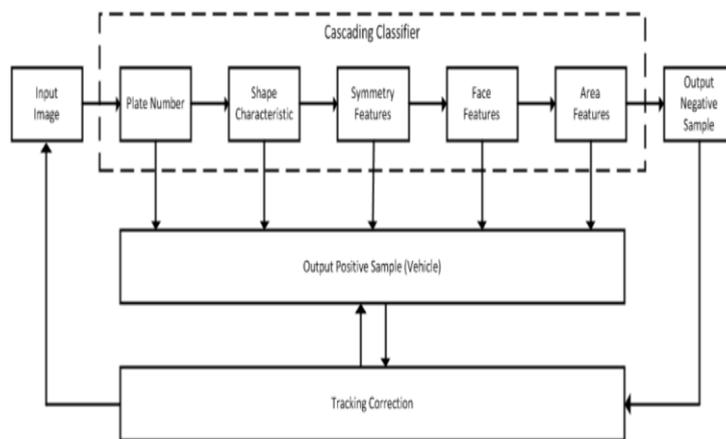

Fig 1: Block Diagram

SEGMENTATION
In advanced picture handling and PC vision, picture division is the way toward dividing a computerized picture into different portions (sets of pixels, otherwise called picture objects). Picture division is regularly used to find items and limits (lines, bends, and so forth) in pictures. methods

CLASSIFICATION
DNN characterization is a cycle to break down the quantity of informational collections and concentrates the significance of information. Backing vector machine gives strategies and

to change of the information into helpful data for dynamic. With precision of 98%.These procedures can make measure quick and set aside less effort to foresee the Glaucoma with more exactness. The medical services area collects huge amount of medical services information which can't be mined to reveal covered up data for strong dynamic. It turns out to be more compelling if there should be an occurrence of Glaucoma that is considered as the dominating purpose for death everywhere on the world. In clinical field, Data Mining gives different procedures and has been broadly utilized in clinical choice emotionally supportive networks that are valuable for anticipating and analysis of different sicknesses.

4. EXISTING SYSTEM

The drawbacks of this system was that although it was easy to implement, the entire setup was dependent on the MQ-3 sensor, whose malfunction would render the entire operation useless. iv. Another method involved the physiological behavior and changes of the drunken person [5], which could be detected by using special sensors like heartbeat sensors, eye blink detection, etc. The main drawback of this method was the need for real-time data transmission and verification, which would lead to slightly complex systems.

- The previous systems of Vehicle safety systems also use a sensor interface
- Here an alert is turned on when the system detects not authorized face
- Less effective
- No remote communication

5. PROPOSED SYSTEM

Face detection identifies human faces in digital images. The process of extracting the face blob from its surroundings and localization of its exact position is referred to as face detection. It finds or marks the region belonging to a face in an image. In this system Viola-Jones algorithm [4] is used for detecting and extracting face blob. In Viola-Jones algorithm, the input image is partitioned into a number of sub windows. From these sub windows we are extracting certain features that corresponds to human face. The algorithm consists of four stages.

- Haar features selection
- Creating integral image
- AdaBoost Training algorithm
- Cascaded classifiers

Our proposed work requires various modules and units which will make up the system, like the alcohol detection unit, power supply unit, ignition system unit, display unit, etc. A DC motor can be used as an engine to illustrate the concept of engine locking. A microprocessor under the name of Raspberyy pi is used to keep looking for the output from the alcohol sensor. The Raspberry pi sketch, i.e. an environment that can be used to program, writing and compilation of code, generation of hex file and loading on to the microcontroller. The diagram of the proposed project is as follows. It consists of an influence supply section, MQ-3 alcohol sensor, DC motor, LCD, microcontroller, Load sensor and other sensors. the varied units are designed and tested separately.
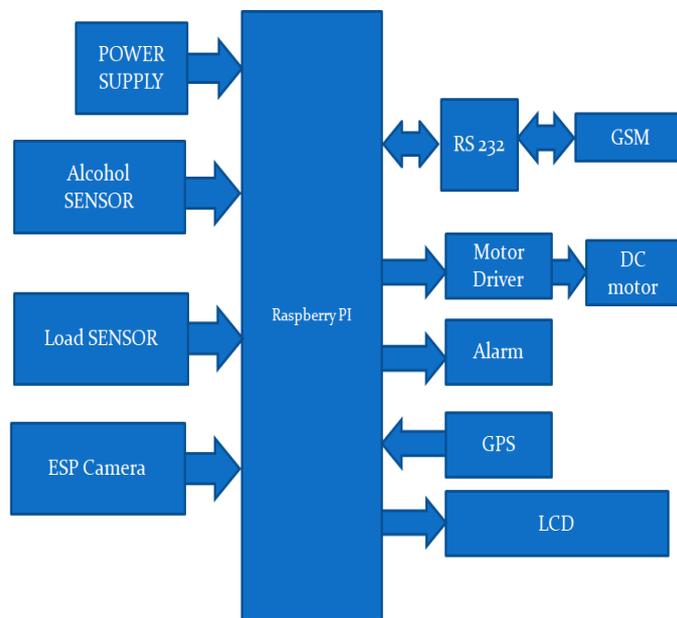
- Here the Driver Face sensing, Load sensor and alcohol sensors are used
- The sensors are interfaced with a Microprocessor Raspberry pi
- The system is programmed in such a way that monitors all the sensors
- The engine wont start if the Vehicle sensing system does not sense a Vehicle and or if the rider consumed alcohol which is detected by the alcohol sensor
- Here an GSM and GPS is incorporated which is achieved by using the GSM and GPS module. Where the parameters such as the position of Vehicle or alcohol consumption alert or Load alert is viewed remotely online.
- And also the parameters can be viewed on the mounted LCD(16X2) screen.

CIRCUIT DIAGRAM
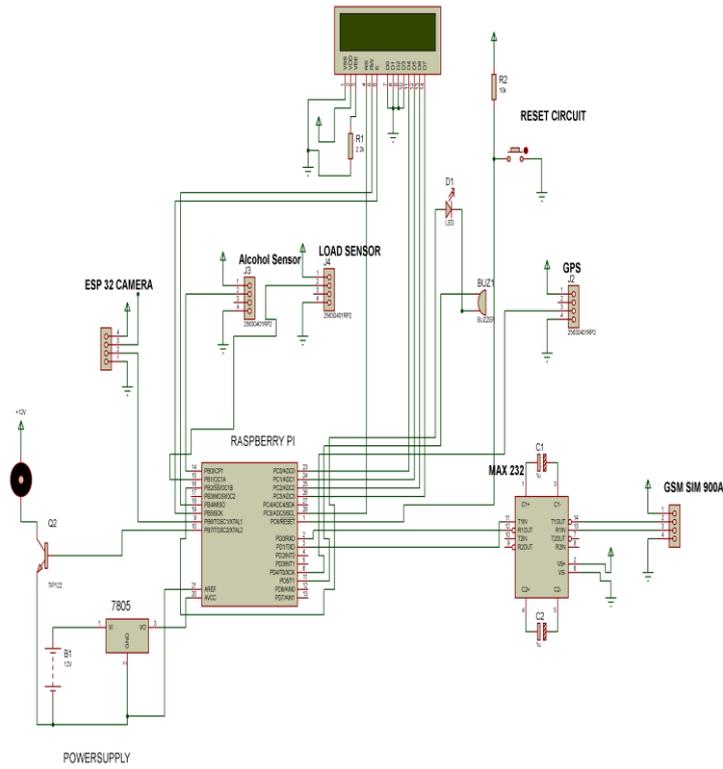
HARDWARE
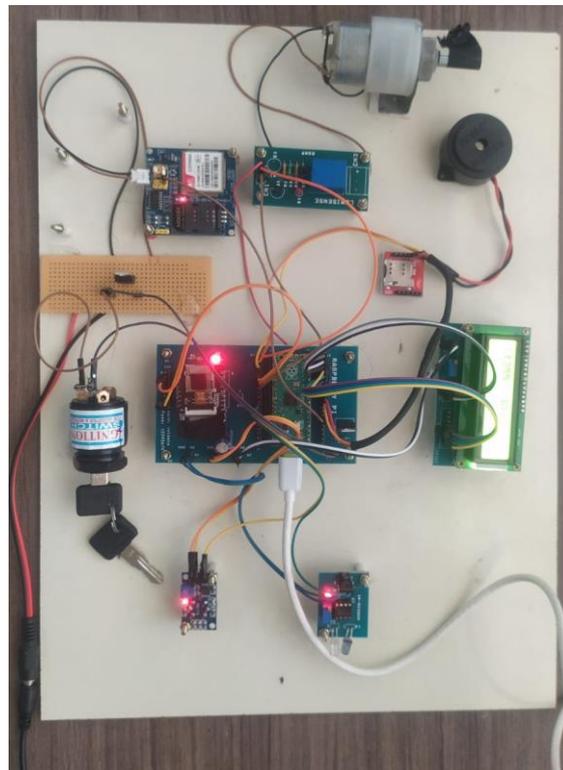
- Power supply unit
- Raspberry pi
- Load sensor
- Alcohol sensor
- GSM
- Buzzer
- DC motor

- ESP CAM

SOFTWARE
- PYTHON 3.7

RESULT

	Accuracy	sensitivity	specificity	MCC	F1_score	FM
RF	85	86	100	78	83	84
KNN	90	100	100	100	100	100
NN	40	100	40	56	57	63
DNN	98	100	100	100	100	100

Fig 2: Using multi-objective feature selection
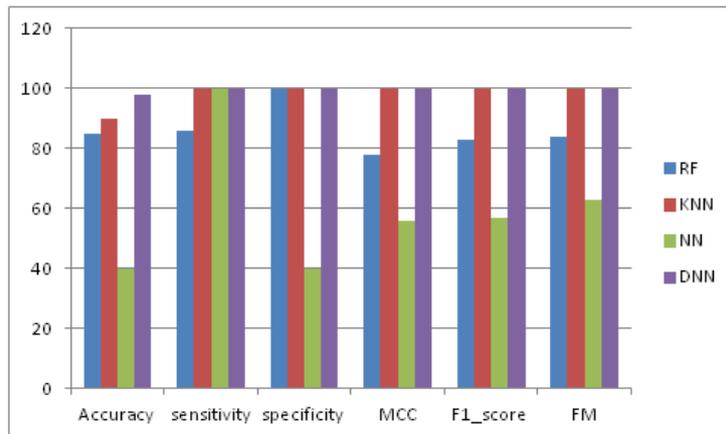
Fig 3: Comparison Graph

	Accuracy	sensitivity	specificity	MCC	F1_score	FM
RF	90	90	100	80	88	89
KNN	95	100	100	100	100	100
NN	85	93	100	83	90	91
DNN	100	100	100	100	100	100

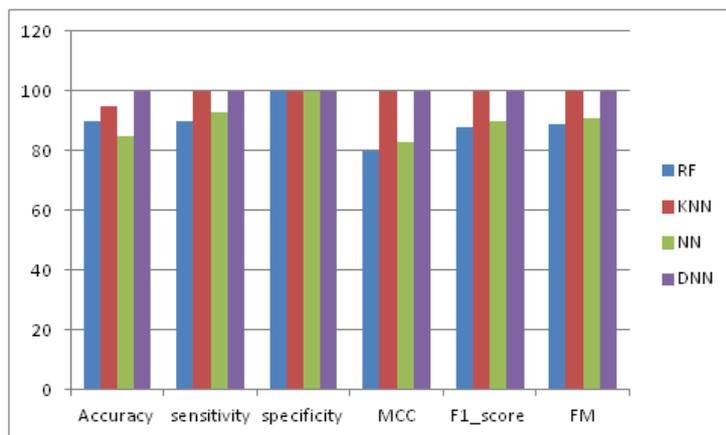**Fig 4: Using Relieff feature selection**

Fig 5: Comparison Graph

CONCLUSION

The proposed system is a novel idea that enables the manufacturer of a vehicle to embed the security system inside the vehicle at the time of manufacturing. Here it is illustrated how face recognition can be used in the detection of vehicle theft. For face detection we used Viola-Jones algorithm and Local Binary Patterns Histogram method for face recognition. The two methods are efficiently implemented in Open CV along with Python. Viola Jones algorithm is a fast method of detecting face regions from images. The Local Binary Patterns Histogram method successfully classified images as authorized and unauthorized and email is sent to the owner when the person is unauthorized.

Scope for Future Work

In future we have planned to construct our intelligent system during a compact size and additionally as globally acceptable to notify the No entry and No parking areas. Light dimmer sensors can be used to dim the light automatically when light from other vehicles falls on it.

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