

# Double Security System For Unlocking Automobile Ignition

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**Abstract-** In the modern world security is one of the major issues. As technology is getting advanced many security issues are arising. A vehicle key is the only way to start the bike or to provide ignition to the engine. The face recognition based bike ignition system literally replaces the bike ignition by replacing the key with specific user face. While dealing with the topic the objective arises is the achievement of luxurious features and the safety concern, which can be achieved by means of the automotive electronics. In this project, we are proposing facial recognition system with the use of python programming. The options of facial recognition and detection have been taken into consideration just because it is widely used in the interactive user interface and plays a crucial role in computer vision. In the case of unauthorized/unknown access, the notification sends to the concerned authorities through an online application. There is a strong need for robust and efficient face detection algorithm. An efficient automotive security system is implemented for anti-theft using an embedded system for starting the ignition by the use of face recognition.

by the authorize person. The biometric identification system is one of the solution to authorize the person.

The biometric recognition system is unique and personal which very good implement for identification of a person. There are many recognition system based on biometrics, such as face of the person, fingerprint, signatures, and eyes.. The use of vehicle becomes important everywhere in the world and also preventing it from theft is required. Vehicle manufacturers are attaining the security features of their products by introducing advanced automated technologies to avoid the thefts particularly in case of cars. Biometric and non-biometric methods usually provide such security features. Sometimes these systems fail due to hacked Password and encryption of decrypted data, but it is almost impossible to make replica of distinctive characteristics. Biometric systems are modern and use techniques like fingerprint recognition, iris recognition and face recognition. Of these face recognition and detection systems are more sophisticated, easy to deploy and people can be identified without their knowledge.

## I. INTRODUCTION

Currently, the emergence of industrial revolution in the autonomous vehicle sector is experiencing rapid growth. The advance autonomous technology involves many aspects in the vehicle, such as autonomous self driving, and full autonomous self driving. One of the importance aspect in advance autonomous vehicles is security system. Security system plays important rule in vehicle safety system, specially theft case and unauthorized person.

Nowadays, conventional security systems such as key, code pin, ID card, are very popular in many countries. However, the conventional security system has potential to be lost, stolen, or duplicated by someone. Furthermore, many of the traffic accidents occur mostly due to young vehicle drivers and theft due to vehicle security system. Based on these circumstances, it is necessary a security system able to prevent from car theft. One of the solution to the problem is by applying the security system which capable of activating only

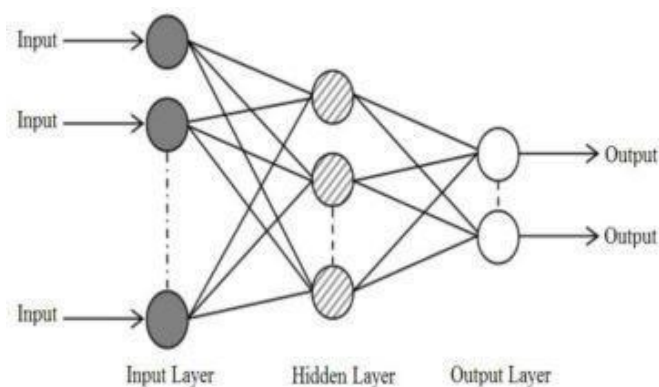
Some advantages of facial recognition method for vehicle security application are:-

1. More convenient, sensed as soon as one is seated in position.
2. Low cost and a better approach to be used with existing methods.
3. Requires no active part of the user.

## II. FACIAL RECOGNITION SYSTEM

A facial recognition system is a technology capable of matching a human face from a digital image or a video frame against a database of faces, typically employed to authenticate users through ID verification services, works by pinpointing and measuring facial features from a given image. Development began on similar systems in the 1960s, beginning as a form of computer application. Since their inception, facial recognition systems have seen wider uses in recent times on smartphones and in other forms of technology,

such as robotics. Because computerized facial recognition involves the measurement of a human's physiological characteristics, facial recognition systems are categorized as biometrics. Although the accuracy of facial recognition systems as a biometric technology is lower than iris recognition and fingerprint recognition, it is widely adopted due to its contactless process. Facial recognition systems have been deployed in advanced human-computer interaction, video surveillance and automatic indexing of images. The Facial recognition systems are employed through out the world today by governments and private companies. Their effectiveness varies, and some systems have previously been scrapped because of their ineffectiveness. The use of facial recognition systems has also raised controversy, with claims that the systems are violates privacy, commonly make incorrect identifications, encourage gender norms and racial profiling, and do not protect important biometric data. These claims have led to the ban of facial recognition systems in several cities in the United States. As a result of growing societal concerns, Meta announced that it plans to shut down facial recognition system, deleting the face scan data of more than one billion users. This change will represent one of the largest shifts in facial recognition usage in the technology's history. Anti-theft systems protect valuables such as vehicles and personal property like wallets, phones, and jewelry. They are also used in retail settings to protect merchandise in the form of security tags and labels. Anti-theft systems include devices such as locks and keys, RFID tags, and GPS locators. Under normal circumstances, theft is prevented simply through the application, and social acceptance, of property law. The best anti-theft device ownership-marking, e.g. license plates, name tags, RFID. When clear owner identification is not possible, and when there is a lack of social observance, people may be inclined to take possession of items to their own benefit at the expense of the original owner. Motive and opportunity are two enabling factors for theft. Given that motives for theft are varied and complex, and are, generally speaking, not within the control of the victim, most methods of theft prevention rely on reducing opportunities for theft.



## IOT

The Internet of things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet of things has been considered a misnomer because devices do not need to be connected to the public internet, they only need to be connected to a network and be individually addressable. There are a number of concerns about the risks in the growth of IoT technologies and products, especially in the areas of privacy and security, and consequently, industry and governmental moves to address these concerns have begun, including the development of international and local standards, guidelines, and regulatory frameworks. The field has evolved due to the convergence of multiple systems, automation (including home and building automation), independently and collectively enable the Internet of things.

In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems, cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smart phones and smart speakers. IoT is also used in healthcare systems.

## III. IOT IN AUTOMOTIVES

The vehicle crimes result in vehicle theft and trafficking, which affect owners, companies which are responsible for insurance, and public safety in all countries, and have connections to major organized crime networks. In order from 1002 to 1014. to prevent vehicle theft, latest systems based on innovative technologies must be implemented to assist law enforcement agency as well as

vehicle owners in tracking, controlling, recovering, and arresting thieves. With this presented system, vehicle pursuing, and IOT based control system, which monitors, controls, and proposes clear information about nearby law enforcement agency headquarters that perhaps be analysed rapidly and a reliable mode of transportation. and vertical division.

## COMPONENTS USED

### ARDUINO

Arduino is an open-source hardware and software company, project, and user community user community that designs and manufactures single. Microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially from the official website or through authorized distributors. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the Arduino language, inspired by the Processing language and used with a modified version of the Processing IDE. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) and a command line tool developed in Go. The Arduino project began in 2005 as a tool for students at the Interaction Design Institute Ivrea, Italy,<sup>[2]</sup> aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats. The name Arduino comes from a bar in Ivrea, Italy, where some of the founders of the project used to meet. The bar was named after Arduin of Ivrea, who was the margrave of the March of Ivrea and King of Italy



ARDUINO

### FINGER PRINT MODULE

Fingerprint scanners are security systems of biometrics. They are used in police stations, security industries, smart phones, and other mobile devices. Everyone has patterns of friction ridges on their fingers, and it is this pattern that is called the fingerprint. Fingerprints are uniquely detailed, durable over an individual's lifetime, and difficult to alter.

Because there are countless combinations, fingerprints have become an ideal means of identification.

There are four types of fingerprint scanners: optical scanners, capacitance scanners, ultrasonic scanners, and thermal scanners. The basic function of every type of scanner is to obtain an image of a person's fingerprint and find a match for it in its database. The measure of the fingerprint image quality is in dots per inch (DPI). 1. Optical scanners take a visual image of the fingerprint using a digital camera. 2. Capacitive or CMOS scanners use capacitors and thus electrical current to form an image of the fingerprint. This type of scanner tends to excel in terms of precision. 3. Ultrasonic fingerprint scanners use high frequency sound waves to penetrate the epidermal (outer) layer of the skin. 4. Thermal scanners sense the temperature differences on the contact surface, in between fingerprint ridges and valleys.

All fingerprint scanners are susceptible to be fooled by a technique that involves photographing fingerprints, processing the photographs using special software, and printing fingerprint replicas using a 3D printer.



FINGERPRINT MODULE

#### IV. RESEARCH METHODOLOGY

This project involves sample images as data collection of the face recognition system. Sample images taken through the camera, which used 10 sample images from two different people. Sample images will make the training process in order to find out how good the system when comparing detected image with sample images.

The overall model of the proposed is Automotive start-stop engine based on face recognition system. Sample face image taken through the camera, the image is processed in the computer through face recognition system. The result of a face recognition system is 4 E3S Web of Conferences 2018 then used as input to Arduino to trigger the relay. Connected relay will directly turn on the vehicle. In order to achieve the objective of this project, the following procedures will be considered:

(I) This project will start with the understanding of image processing, artificial intelligent technique, and hardware development.

Development of face detection, and feature extraction technique. On this step, some sub-step will be done, these are:

a) Face detection using the Viola-Jones method applied for detecting the face in the image. It able to run in real time condition.

Creating bounding box specified face in the image, and cropping that image.

b) Feature extraction using the Canny edge method to detect a wide range of edges from face also reducing noise image. Combining with Fast Fourier Transform to extract the segmented face image get the graph data

iii. Development of face recognition system. The development of face recognition system is done in this step using ANN as an intelligent recognition system.

iv. Development of Matlab for automatic start-stop engine based on Face recognition system. Matlab® used as a tool to develop start-stop engine program.

v. Development of hardware integrated system for automatic start-stop engine based on Face recognition system. Hardware used Arduino in order to get the input from Matlab and trigger the relay to activate the engine.

vi. Analysis the performance of the system and improves the performance of the proposed system. Effectiveness system of the proposed automatic start engine based on Fast Fourier Transform (FFT) and Artificial Neural Network (ANN) is evaluated.

#### V. SOURCE CODE

```
import cv2
import urllib.request
import numpy as np
f_cas=
cv2.CascadeClassifier(cv2.data.haarcascades+'haarcascade_fr
ontalface_default.xml')
eye_cascade=cv2.CascadeClassifier(cv2.data.haarcascades
+'haarcascade_eye.xml')
url='http://192.168.1.58/cam-lo.jpg'
##"cam.bmp / cam-lo.jpg / cam-hi.jpg / cam.mjpeg ""
cv2.namedWindow("Live Transmission",
cv2.WINDOW_AUTOSIZE)
while True:
img_resp=urllib.request.urlopen(url)
imgnp=np.array(bytearray(img_resp.read()),
dtype=np.uint8)
img=cv2.imdecode(imgnp,-1)
gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
face=f_cas.detectMultiScale(gray,scaleFactor=
1.1,min Neighbors=5)
for x,y,w,h in face:
cv2.rectangle(img,(x,y),(x+w,y+h),(0,0,255),3)
roi_gray = gray[y:y+h, x:x+w]
roi_color = img[y:y+h, x:x+w]
eyes = eye_cascade.detectMultiScale(roi_gray)
for (ex,ey,ew,eh) in eyes:
cv2.rectangle(roi_color,(ex,ey),(ex+ew,ey+eh),
(0,255,0),2)
cv2.imshow("live transmission",img)
key=cv2.waitKey(5)
if key==ord('q'):break
cv2.destroyAllWindows()
```

#### VI. EXPERIMENTALWORK

This section presents the performance of the proposed to Automotive start-stop ignition based on face

recognition system. This section consists of three important subsections, they are experimental setup, experimental result and experimental analysis.

### EXPERIMENTAL SETUP

The proposed system description, the system basically consists of three main components, namely external camera, Arduino, and two automotive relays.

One relay is to turn on a starter motor and the other is to turn off a capacitor discharge ignition (CDI) pulse to an ignition coil.

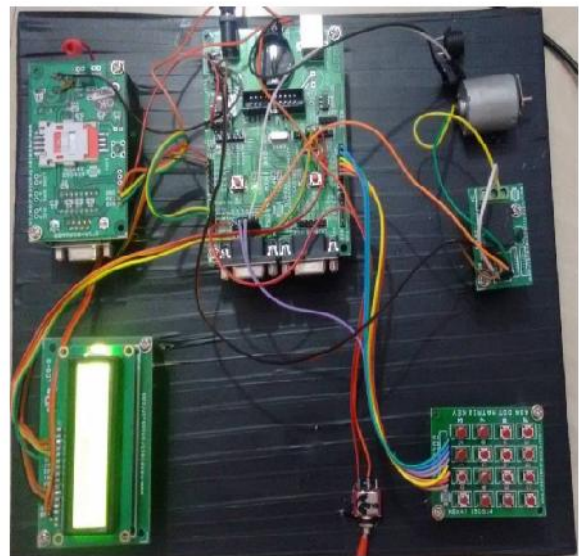
A camera used for tracking and capturing a face image person. The captured face image, then processed in an intelligent face recognition system which will recognize the person's identity based on his/her Face.

Recognized face is then used as an input to the Arduino which will activate the automotive relay to activate the engine's starter or turn off the ignition pulse.

A personal computer (PC) of 2.1 MHz Intel Core i7 processor equipped with external camera is used for face recognition system implementation.

In this system, all of the face data processing and face recognition algorithms are implemented in the PC using MATLAB and its toolbox.

As a result of the face recognition system, a decision signal which will switch on or off the engine is sent through the parallel port of the PC to the Arduino. This decision signal is sent from Arduino to one of the automotive 5 E3S Web of Conferences 130, 01020 (2019) <https://doi.org/10.1051/e3sconf/201913001020> IC-AMME 2018 relays. The automotive relay works on 12 volts DC power supply and it is set in normally open (NO) condition.



OUTPUT MODEL

### VII. RESULTS AND DISCUSSION

In our proposed work FRS for opening cars utilizing GSM and control platform was intended to screen burglary occasion and to give prompt help. This framework can be effortlessly fitted in vehicles and can give exact results in all situations. With the assistance of GSM framework consolidated in the undertaking, it will caution the proprietor about the burglary furthermore the robbery picture is put away in the database for the further activities like police confirmation.

### VIII. CONCLUSION

Generally this face recognition is a big challenge as there is a chance of high uncertainty due to the external lighting conditions, so we are taking the advantage of histograms and LBP (Local Binary Pattern), which are less effected to the external environment. An intelligent portable human recognition and identification system is proposed in this project using an ARM 7 based microcontroller and Matlab based machine.

Furthermore, by sending a SMS like entryway opened by introducing the GSM, and initiates the FRS for next stage Processor equipped with external camera is used for face Recognition which will recognize the persons identity the Sample face image taken through the camera, the image is Processed the computer through face recognition system.

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