

# A Design and Implementation on Car Ignition Control & Security System

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## Abstract-

As in this digitized world, automotive thefts are taking major essential issues in modern automotive systems. To reduce the automotive thefts and to provide the security, we are dumping various different technologies in to the automobiles, which will helps to yield high increased surveillance to the owner and also to the user. There are various digital techniques like biometric and non-biometric system, to identify the interface of the user system. In non-biometric system it allows to verify using the password with more varieties of questions and to increase the incorporate level of security the biometric systems are used, in biometric system the advanced Face Recognition System (FRS) is used to provide the accurate response with the added new features with high resolution camera which will be user friendly to maintain, operate, and handle for automobiles. As the real time face recognition based car ignition access control system include an FRS and ignition controller unit.

The FRS task is to process the image data retrieval, image compression and face recognition system. The captured image is then tested and that is given to the face detector to detect the full face template matching and the result of the face detector to detect the full face template matching and the result of the face detector are fed to the face compression block, where it provides an economic representation of face which is implemented by applying (PCA) principal component analysis algorithm and to classify and to recognize the data accurately, the Euclidean norm distance classifier is used. The FRC will transmit the user ID to ignition controller unit and the management system allows the user ID to start the vehicle and alter the mirror position and to the preset level. The functionality of the integrated FRS with ignition control system tested

efficiently. The FRS is tested and validated for different facial expression, pose and skin color variations. The vehicle ignition system is developed to extend with the added concept of security cum automatic management system.

**Keywords:** FRS (Face Recognition System), PCA (Principle Component Analysis), FRC (Face Recognition Controller), GSM (Global System Monitoring), GPS (Global Positioning System)

## 1. INTRODUCTION

The thefts of automotive vehicles are increasing rapidly in the world, to provide the protection to the user and the automotive vehicles, the manufacturers are making their products more secure

by dumping current technologies into automobiles. The security system involves the key, which provides the basic process of how it identifies the user. There are two types of techniques like Biometric and non-biometric, in non-biometric system it uses a serial number such as personal ID and passwords to identify a person where the non-biometric ID will be forgotten, taken and stolen by the third person, then that will block the user verification and validity of ID users. Biometric systems provide more accurate security mainly due to their potential to identify a person with minimum requirements. A biometric based system allows the different stages of verification like, "who you claim to be" based on "who you are", "what you have" (keys), or "what you know" (password). This will enhance the security of the overall system and improve the accuracy level and speed of automobile identification.

The advanced security access system aimed to exhibit the facial recognition techniques that could antiquate, substitute supplement

conventional key vehicle ignition systems. In the present existing biometric system uses the iris, fingerprint, voice and palm geometry for the identification of a person and comparatively it is an complex process and also it is applicable only for users. In FRS system camera captures the users face from distance using high resolution camera. Hence, the FR can contribute recommended security, compared with the other existing biometric systems.

The face will be detected using the face detection process of an image, which is resolved by the skin color composition as claimed by Singh etc. the experiment is carried out and it shows the HSV color space situate on the skin color extracted to provide superior performance. to filter the image of the face captured by the camera YCbCr, HSV color spaces are generally used. As in the surveyed, the commonly used skin color detections are RGB, YCbCr, HSV, HSI and TSL, Hence the combinations of HSV and YCbCr color space provides the high accurate results for the detection of skin colour. From the reviewed literature the thresholds are identified for the segmentation of Asian skin colour to have constraints. To optimum the choice of thresholds, combined color spaces are used and their results is found encouraging for the real-time applications to overcome these constraints. Eigen face is the most evaluated approaches in face recognition and representation system. To represent the pictures of faces more precisely, CCN algorithm is used. The weights of the each face is obtained by determining and projecting the reference image onto the Eigen face. The images consists of a vast quantity of background area, where it results are influenced by the background. As the references explains the robust performance of the system under various lighting conditions by the noteworthy correlation between images with changes in illumination. The correlation between images of the complete face is not sufficient for moderate recognition fulfilment. Then consider the face focus algorithm which refrains the content of an image within the face, eliminating the background.

The Classification of face PCA algorithm consist of Euclidean-Norm classifier is to

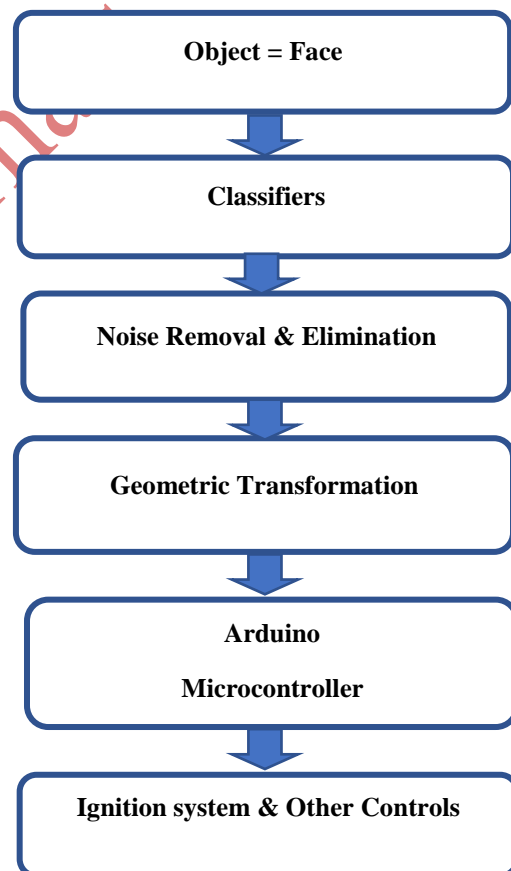
generate precise results provided the number of images used in training phase is less and distinct.

## 2. RELATED WORK

In the field of recognition of the image is an important aspect in the field of theft identification and recognition of an image using image processing, because of their huge applications in wide areas of identification of images, many articles and Literature review are published, as in the papers surveyed the analysis of literature survey, of existing system, As the security of the vehicle can be increased by providing an authentication, for starting the car engine by the face recognition of owner. Usage of alcohol sensor is also be added as an extra feature. This system can be designed using high resolution camera for face detection.

## 3. FLOW CHART

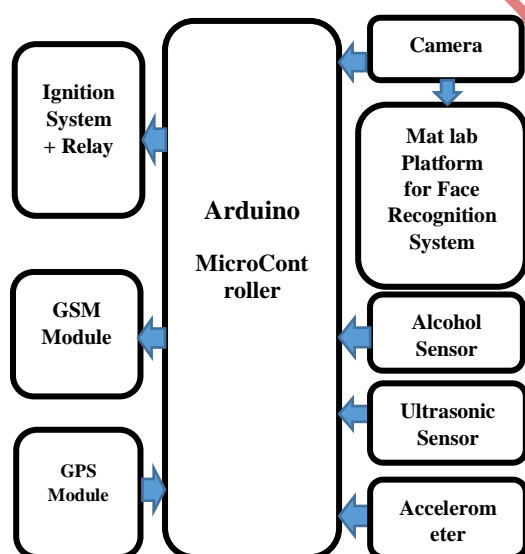
System Flow design and implementation method of proposed System.



**Fig 1: Proposed system flow design of access control and security system**

The above fig 1 flow chart explains how the system and its design of a real time face recognition based car ignition access control system actually works. The system consists of an FRS and an ignition controller unit. The FRS unit goes through the process of image data retrieval, image compression and face recognition. The captured test image passes through the face detector, where full face template matching approach has been used. The result of face detector is passed to the face compression block where an economic representation of face is implemented by applying the Principal Component Analysis (PCA) algorithm. For classifying and recognizing the test data accurately, the Euclidean-norm distance classifier is used. The Face Recognition Controller (FRC) is interfaced to the ignition controller system. If the test face is of an authorized user, the FRC will transmit the user ID to the ignition controller and to the comfort management system allowing the user to start the car and alter the mirror position to the pre-set value. The functionality of the integrated FRS with ignition control system is tested efficiently. The FRS is also tested and validated for different test cases involving varied facial expression, pose occluded face and skin color variations. The car ignition control unit of the developed system is also extended for the concept of security cum automatic comfort management system, which will helps to overcome the theft of the vehicle.

#### 4. SYSTEM OVERVIEW



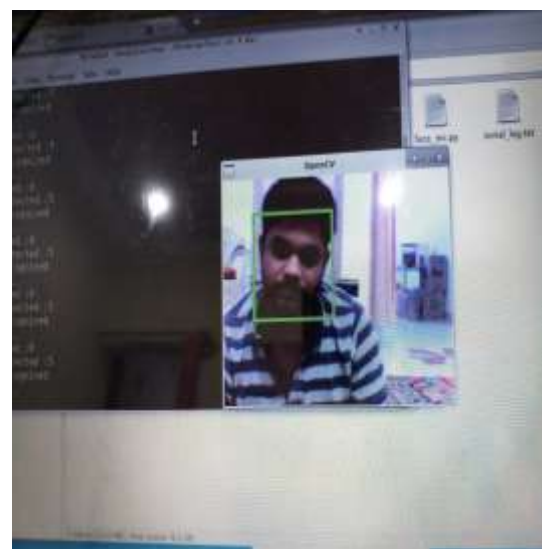
**Fig2: Proposed system of access control and security system**

Based on aforementioned method in the fig 2 shown, the image captured through camera, identifies the image with the saved images and recognize the image if, the saved image is same as the captured input through mat lab platform FR, then it checks for the alcohol level of the user, if the alcohol level is more gives the information through message and car ignition system doesn't respond. If the level of alcohol matches then the ignition control system judge if, the ignition system has to run or lock. The ultrasonic sensor is used in the system to measure the distance of the vehicle is in front to determine and caution about the blind spot created in traffic to secure from accidents, and the accelerometer that measures proper acceleration and senses to measure the position of the vehicle in three different angles. GPS is used to find the position of the car and GSM is used to know the state of the car, when theft occurs, accident happens, if more than three attempts to recognize the face or to start the ignition system using the key, and if alcohol level is more, the GSM system sends the message information to the car owner immediately.

#### 5. RESULT

##### Step 1: Face Recognition

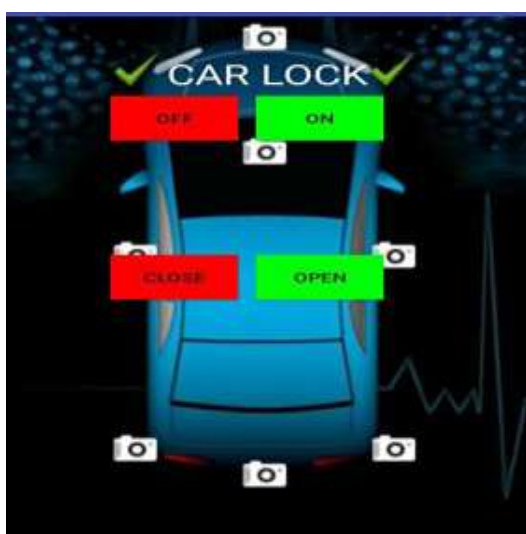
In the first step face recognition happens. When user touches the car it senses and turns on the camera. Camera captures the person's image for image acquisition, it compares the person image with trained images stored in database. Thereby image recognition completed.



**Fig 3: Image recognition**

### Step 2: Automatic Ignition System

After face recognition the car door unlocks automatically. This system is integrated with alcohol sensor, GPS and GSM. When the person enter the car and sit on the driver seat facing towards front side properly. The alcohol sensor senses the alcohol level of the person, if the alcohol level is below threshold then the car ignites automatically and parallelly the GPS and GSM turned on, which helps in locating and sending the status of the system. If any theft occurs GSM sends the message thereby system provide security of the vehicle.



**Fig 4: Automatic Ignition System**

## 6. CONCLUSION

The working flow of the system designed is analyzed for the process of ignition system by the face recognition technique, to improve the security of the car and also if, the FR system is placed in the vehicles thefts, accidents etc, can be overcome and by the use of GPS and GSM module placed in FR system, the vehicle can be easily recognized and identified by the owner. The FR system designed is user-friendly as per the requirements. Hence, the results are verified.

## 7. REFERENCES

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