A NEW APPROACH TO VEHICLE SECURITY SYSTEM USING FACE RECOGNITION

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Abstract - Traditional vehicle security systems rely on many sensors and costs a lot. When one vehicle is lost, no more feedback could be valid to assist individuals to retrace the car. In this proposed smart vehicle security system, Face Detection System is used to detect the face of the driver and compare it with the predefined faces. When someone steals the vehicle, the Face Detection System obtains the images of the thief by a tiny web camera which can be hidden in the vehicle. Face Detection System compares the obtained image with the predefined images of the owner in the database. If the image does not match, then the information is sent to the owner through SMS with a link containing the thief's images. The GPS system in the vehicle traces the exact location of the vehicle and sends it to the owner. When the owner enters the key from his/her mobile, the vehicle's ignition flag changes from 1->0 and the vehicle stops in the very place. So the owner has the entire control over his vehicle even when it is lost,he can retrieve it easily with the information received through SMS.

Keywords: GPS, FDS, Vehicle Security System

I. INTRODUCTION

A. OBJECTIVE

The main objective of our proposed system is to avoid theft of vehicle by tracking the stolen vehicle using the information obtained through SMS about the exact location of vehicle and the thief's images.

B. EXISTING SYSTEM

In the current scenario, alarm systems are used for providing security in vehicles yet the number of thefts and malpractices are increasing. In most cases, the alarm sound goes unnoticed by the owner. Hence the security of the vehicle cannot be ensured and the vehicle once stolen ,is hard to get back.

C. PROPOSED SYSTEM

In the proposed system we are introducing a low-cost extendable framework for embedded smart vehicle security system that contains a Face Detection System (FDS), a GPS (Global Positioning System) module, a GSM (Global

System for mobile Communication) and a control platform. With this system, the vehicle that is stolen away can be tracked through mobile phone via SMS. In this way the image of the thief is determined and the exact location of the vehicle as well. Finally the owner of the vehicle locks the vehicle using the unknown unauthorized key. Thus the proposed system provides high degree of security to the vehicle and tracks the vehicle efficiently in case of any theft.

II. IMPLEMENTATION

A. FACE DETECTION

When someone enters the vehicle and starts the ignition system in the vehicle, a tiny web camera placed near the driver's area starts capturing the person. The face detection is performed using the PCA algorithm and skin tone detection. The proposed system uses the concept of PCA since it reduce the large spatial property of the data space (observed variables) to the smaller intrinsic spatial property of feature space (independent variables) that are required to explain the data economically. This is possible only when there is a strong correlation between observed variables.

PCA ALGORITHM

By using Principal Component Analysis the Eigen vector value is obtained which is used for discriminating the pattern of different signals with limited features. The signal reduction is used to determine, the variations using limited signals

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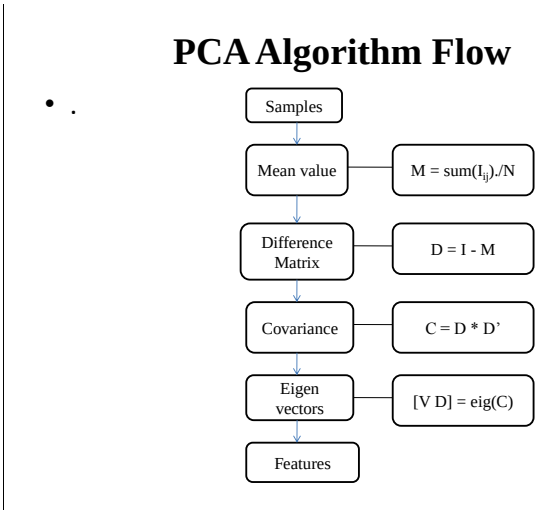

It takes a data matrix of n objects by p variables, which can be correlated, and it is summarized by uncorrelated axes (principal components or principal axes) that are linear combinations of the initial p variables. The first k components display as soon as possible, the variation among objects.

SKIN TONE DETECTION

When an image has been captured by camera, it is further preprocessed using skin tone detection. A skin detector typically transforms a given pixel into an appropriate color space and then uses a skin classifier to label the pixel whether it is a skin or a non-skin pixel. The decision boundary of the skin color class in the color space is defined by skin classifier. Important challenges in skin detection are to represent the color in a way that is invariant or at least insensitive to changes in illumination.

RGB COLOR SPACE

RGB color space is used for classifying a pixel and eliminate illumination conditions to the best extent. The first step is to normalize the colors in an image. In RGB-encoded digital

image, the color of a pixel is represented by the values ranging from 0 to 255, each representing one color channel with red, blue and green.

The RGB encodings can be normalized as

1. Intensity I= (R+G+B)/3
2. Normalized red r=R/(R+G+B)
3. Normalized green g=G/(R+G+B)
4. Normalized blue b=B/(R+G+B)

The next step is to apply a skin color model. It translates the normalized R, G, B values to RGB values in [0,255] space. If the color falls in the range, it is a skin pixel otherwise it is a non skin pixel. Finally, binary erosion is applied to display the connected components of the image. Bounding boxes of each region eliminates the regions that are most unlikely to be a face by comparing width-to-height ratio of the regions.

B. FACE RECOGNITION

In this paper, a face recognition system using the Principal Component Analysis (PCA) algorithm is implemented. Automatic face recognition systems tries to identify the detected face image from the list of images stored in the database. The memory of the face recognizer is generally simulated by a training set. Here the training set consists of the features extracted from known face images of various people. Thus, the task of the face recognizer is to find the most similar feature vector among the training set to the feature vector of a given test image. Here, we want to discern the identity of a person when an image of that person (test image) is given to the system.

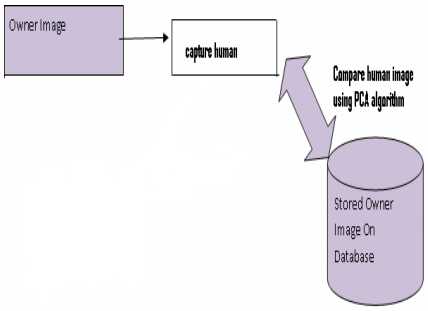

FIG.1 FACE RECOGNITION

C. SECURITY SYSTEM

In this module, the test image captured by the tiny web camera is compared with the pre-existing owner's image in the database. If they are found to match then the access is provided to the user. If not, the control is transferred to the authentication module.

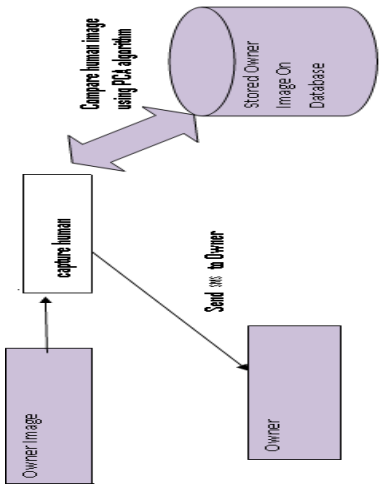

FIG. 2. SECURITY SYSTEM

D. AUTHENTICATION

In the authentication process ,if the images are found to be different, the GPS system is

activated automatically and starts sending the security alert messages to the owner's mobile. The GPS system tracks the location of the vehicle and sends it as a message to the owner's mobile along with the image captured. On receiving the security alert messages , the owner can provide two types of keys namely known unauthorized and unknown unauthorized. If the owner provides the known unauthorized key, the security system stops. In case, the owner provides unknown unauthorized key, then the control moves on to the vehicle locking module where the vehicle is stopped from moving any further and locked.

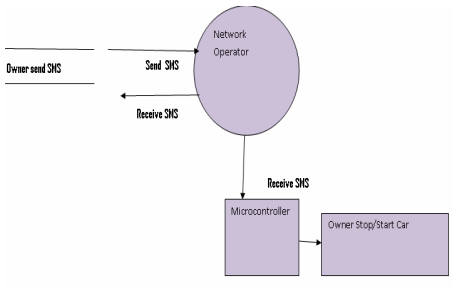

FIG. 3 AUTHENTICATION

E. SYSTEM DESIGN

System design is the process of declaring and defining the architecture, modules, components, interfaces, and data for a system to satiate the desired requirements. Thus system design is the process of defining and constructing systems to satiate the desired requirements given by the user.

ARCHITECTURE DIAGRAM

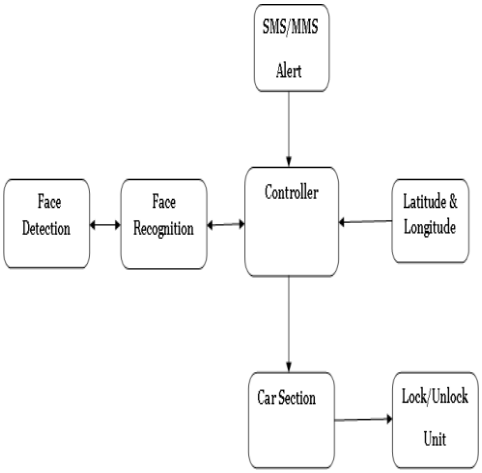

FIG. 4 SYSTEM ARCHITECTURE

The Architecture diagram is a representation of a system, in which the principal parts or functions are depicted by blocks connected by lines, which indicate the relationships of the blocks. The Architecture diagram is typically used for a higher level. The agenda of this less detailed description is comprehending the overall concepts and lesser understanding of the details of implementation. It shows the relationship between different components of system.

III. CONCLUSION

The proposed paper enhances the security of the vehicle by tracking the location of the vehicle which is sent in the form of SMS to the owner's mobile along with a link to view the thief's image. When the owner feels that the person accessing the vehicle is unauthorized then he can stop the vehicle by issuing the key through his mobile. Thus in this way, the owner has the entire control over the vehicle even when it is stolen thereby restricting the usage of unauthenticated users. Since the system enhances the security of the vehicle, they could be used in our day to day life.

So, we Predict and indent system for the society

IV. REFERENCES

[1] Kosav, Fab H. P" Rapid stereo-vision enhanced face detection",2011.

[2] Zhang Yu, "Research on High Level Model and Performance Estimation" Southeast University PHD thesis, 2011.

[3] Liu Weifeng,Song Caifeng, Wang Yanjiang, **"**Facial Expression Analysis Using a Sparse Representation Based Space Model**"** ,2012.

[4] Teresko, J. , "Winning with wireless," Industry Week, 252(6), Available ProQuest, 2012.

[5] Wola. p,Jones " Rapid Object Detection using a Boosted Cascade of Simple Features",2011.

[6] K Periasamy, B Latha . " *Zombie Avoidance using Attack Analyzer in Cloud Environment* ", Vol. 3 - Issue 4 (April- 2014), International Journal of Engineering Research & Technology (IJERT) , ISSN: 2278-0181 , www.ijert.org.

