

ANTI-THEFT OF LOCKER SYSTEM USING RASPBERRY PI

Nisha Naveen [1], Indu Priya [2], Samya Sharma [3], Sakshi Sharma [4], Roshan Zameer Ahmed [5]

School of Electronics and Communication, REVA UNIVERSITY, Bangalore, India

Abstract – In current scenario, bank and locker robberies are frequently happening this means our locker has no ultimate protection rather than a lock and key. Currently, most of the banks use two keys to open the lockers. One key is with the customer and another key is with the bank manager. This system is having some drawbacks. There is a possibility of losing the key which make the system to be insecure and duplication of keys may lead to unauthorized access of the locker. So, in order to overcome that we are introducing Locker Security System based on Face Recognition and GSM (Global System for Mobile) technology, which can be used in Banks, Security Offices and Homes for giving protection to expensive possessions. In this system, only the authorized person can access the valuable things like money, licenses and jewels from locker.

1.0 INTRODUCTION

Facial recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database. Face Recognition is done by using active appearance model algorithm with Bayesian classifier, which is used to identify the persons and verify their identity with the Raspberry Pi processor. RFID (Radio-frequency identification) and GSM technology are combining together for accessing the locker securely. Essentially, the process of face recognition is performed in two steps. The first involves feature extraction and selection and, the second is the classification of objects. Later developments introduced varying technologies to the procedure.

Some face recognition algorithms identify facial features by extracting landmarks, or features, from an image of the subject's face. For example, an algorithm may analyze the relative position, size, and/or shape of the eyes, nose, cheekbones, and jaw. These features are then used to search for other images with matching features. Facial recognition technology is set to revolutionize how global destinations create, collate, distribute and retail photo and video-graphic content. In the coming years, integration and the development of facial recognition and other digital tools will ensure leisure businesses can exceed expectations and improve experiences. When an authorized person tries to access the locker, the system will generate a one-time password and send to the registered mobile number of that person. If the password entered by him is correct, then only he will be allowed to

access the locker. If he does any offensive acts on the locker, it will be sensed by the vibration sensor and the sensor will send the control signal to Raspberry pi processor and it will generate alarm sound.

1.1 LITERATURE SURVEY

Siddique Reza Khan and et al. Have proposed a system contains sensors to detect obstacle, touch, heat, smoke, sound. The whole system is controlled by a PIC microcontroller 16F76. It collects information from the sensors, makes a decision and sends SMS to a corresponding number by using a GSM modem. If it finds any interruption in its sensors like if the IR is interrupted then PIC will send a SMS to the home owner and another SMS to the Police Station. In the same way for fire interruption a SMS will be sent to the fire brigade and another to the home owner. In this system require extra hardware components like Sensors, GSM Modem. Alerts are sent through only SMS.

B. Udaya Kumar and et al. presents the implementation of a low-cost wireless home security system using ZigBee protocol and remote access through internet. A ZigBee based star network with two nodes had been established employing Xbee radio, ARM7, PIC, and MBED microcontroller. The detection of the intruder motion, gas leakage detection and visual surveillance of the home were provided with the help of Passive Infrared Sensor (PIR), Gas sensor (GH-312) and Camera (LS_Y201). Problem is here multiple micro controllers are used; usage of ZigBee based network to communicate with the base station is limited to 100-150 meters long distance only. Base station is dependent on only Ethernet for internet connectivity.

J. Shankar Kartik and et al. Have proposed two systems are proposed, one is based on GSM technology and other uses web camera to detect the intruder. The first security system uses a web camera, installed in house premises, which is operated by software installed on the PC and it uses Internet for communication. The camera detects motion of any intruder in front of the camera dimensions or camera range. The software communicates to the intended user via Internet network and at the same time it gives sound alert. The second security system is SMS based and uses GSM technology to send the SMS to the owner. Mae. Y and et al. presented the system; it monitors everything by moving cameras. The system can increase the efficiency of monitoring and can eliminate the blind spots of fixed cameras. In this system, a mobile manipulator is developed which is equipped with cameras at the arm end for purpose of monitoring.

Mounika B. R, Reddy proposed a Neural Network based face detection by using Gabor Features. The complex classifier is used to better the algorithm by representing Gabor faces use in distance measures in future improve the detection rate and speed of the detection process.

Tudor BARBU proposed a novel approach of face recognition which based on Gabor filtering and supervised classification. The 2D filter bank are used and then produces 3D robust face for vector average distance used in supervised classifier and threshold-based face verification method used by using this technique a high facial recognition rate is obtained

K. Gopalakrishnan, V. Sathish Kumar : They were used an Embedded platform which was very unique and easy to implement .They proposed an image capturing technique in an embedded system based on Raspberry Pi board and Considering the requirements of image capturing and recognition algorithm, Raspberry Pi processing module and its peripherals, implementing based on this platform, Finally they were concluded that the designed system is fast enough to run the image capturing, recognition algorithm, and the data stream can flow smoothly between the camera and the Raspberry Pi board.

Tony Di Cola: His project was “Raspberry Pi Face Recognition in Treasure Box” a great example of how to use the Raspberry Pi and Pi camera with Open CV’s computer vision algorithms. By compiling the latest version of Open CV, it can get access to the latest and most interesting computer vision algorithms like face recognition. Also, he used a Solenoid double action lock which is lock/unlock using key after power off. Kuldeep Soni: He developed a system with an advanced surveillance camera capable of face detection and at the same time recognizing the face detected using OPEN-CV library, Eigen face methodology and these all processing has been done on Raspbian OS on Raspberry Pi. For capturing the images, he used Pi Camera Board. With the help of face recognition capability, he proved that the advanced surveillance camera system using face detection and at the same time recognizing the face detected is highly secured system.

Sanjana Prasad, P. Mahalakshmi, A. John Clement Sunder, R. Swathi: They implement Smart surveillance monitoring system using Raspberry pi and PIR sensor for mobile devices. Also, their proposed work implements home security system captures information and transmits it via a 3G Dongle to a Smart phone using web application. Raspberry pi operates and controls motion detectors and video cameras for remote sensing and surveillance, streams live video and record sit for future playback.

2.0 PROPOSED WORK

This section of the report will include the proposed work as to how the project has been carried out showing the Hardware used, Software’s utilized, Algorithms used with respect to deep learning part of the project and working of the project.

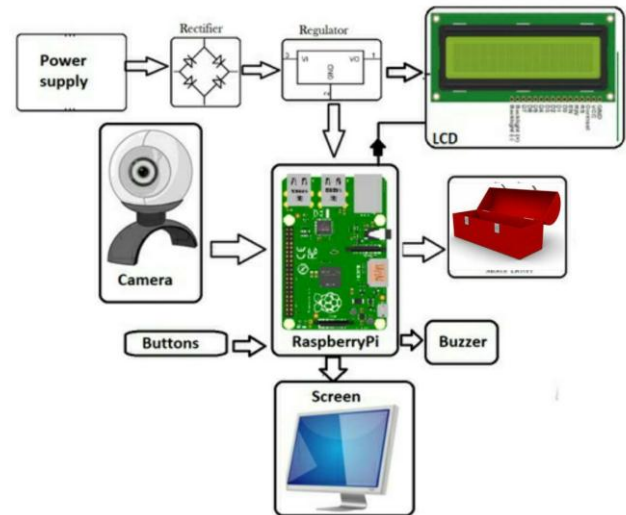


Fig1.BLOCK DIAGRAM.

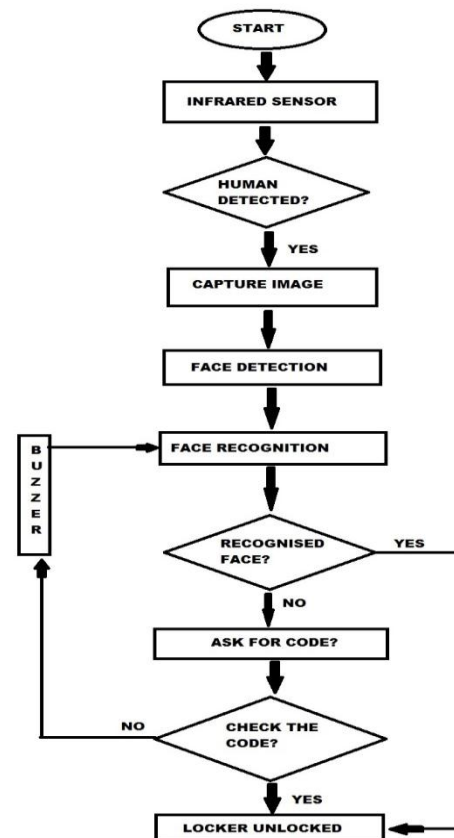


Fig2.PROJECT FLOW

In order to make the project development running smoothly and complete in scheduled period, the project is divided into five phases which started with project planning, hardware development and software development. After that it's followed by simulation and lastly, build the prototype.

When a person wants to open the locker, he/she has to keep their face in front of camera, then the camera will recognize their face if they are authenticated person. If they are authenticated person then the box will open, if no then it will send the message to the owner about that person with picture.

Step 1: Raspberry Pi Camera: used for to take the Driver Face image.

Step 2: The first stage of any vision system is the image acquisition stage. After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks required today.

Step 3: The images used in the analysis are resized in different scales to determine how various sizes affect the recognition process. Different image sizes carry different information that's why the best image size needs to be examined in details. The purpose of image resizing is to produce a lower data size, which hastens the processing time. The resize scale randomly varies from 0.1 to 0.9 value, which produces different image sizes. Fig 3 shows an example of image resizing with a scale of 0.5. Resizing the image to a small scale can lead to the loss of many important features, especially if the image texture is used during classification. Fig 4 shows an example of the feature lost when the image is seized with a scale of 0.25.

Step 4: When converting an RGB image to grayscale, we have to take the RGB values for each pixel and make as output a single value reflecting the brightness of that pixel. One such approach is to take the average of the contribution from each channel.

Step 5: Contrast is an important factor in any subjective evaluation of image quality. Contrast is created by the difference in luminance reflected from two adjacent surfaces. In other words, contrast is the difference in visual properties that makes an object distinguishable from other objects and the background.

Step 6: Filtering is a technique for modifying or enhancing an image. For example, you can filter an image to emphasize certain features or remove other features. Image processing operations implemented with filtering include smoothing, sharpening, and edge enhancement.

Step 7: The phase consists of capture image; Detect faces in the image, feature extraction, template comparison, declaration of matching template. The acquisition of face

images can be done by acquiring the real time image. Here classifier algorithm scans the image and creates a bounding box as returns for each detected face.

Step 8: A region of interest (ROI), is a selected subset of samples within a data set identified for a particular purpose.

Step 9: The first LBP administrator marks the pixels of a picture by thresholding the 3-by-3 neighborhood of every pixel with the focus pixel esteem and considering the outcome as a parallel number.

Step 10: Machine learning algorithms are often categorized as being supervised or un supervised. Supervised algorithms can apply what has been learned in the past to new data

If is face is recognized then the locker opens.

If the face is not recognized the system will ask for a code, the user then have to input the code. The system will check for a code in the database.

If the code is right then the locker opens, if not the the buzzer goes on and the owner is notified about the intruder.

3.0 RESULT ANALYSIS

The implementation of the project helps the farmer to monitor the pump status and hence overflow of water can be avoided. Renewable energy charges the battery and depletion of electricity can be avoided. So, the Status of the automatic irrigation can be identified easily by the farmer. Wastage of water must be monitored in agricultural field by using automatic plant irrigation system Following are the graphical representation

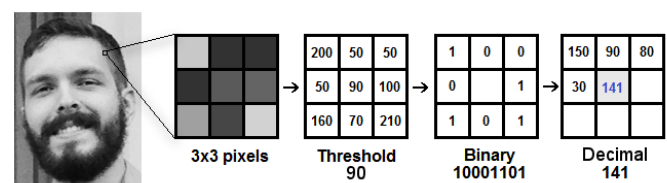


FIG3. identification of a person

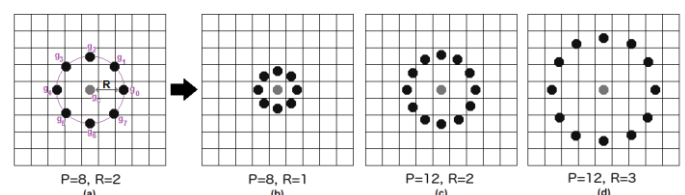


Fig4. bipolar interpolation

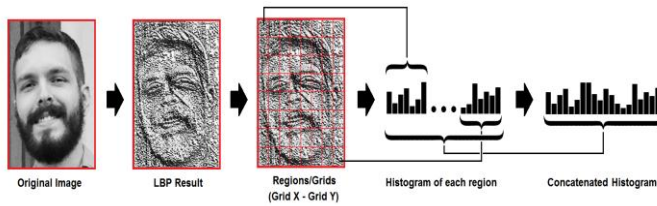


FIG5. Extraction of histogram

3.1 APPLICATIONS

Offices: Physical access to workspace facilities

Government: transfer important document safely.

Banking and Telecom: Help to know the current process to the customer, allow authentication of credit/debit cards

Education: Allow attendance tracking of the students and entry to labs

Construction: Control access to specific point at a site

Real Estate Commercial: Offers access to campus facilities like residence halls, common area, cafeteria, etc.

Manufacturing: Control and record access to specific locations for employees, visitors, vendors and maintenance staff

Aviation: Paperless travel at airports

Warehouse: Control process to provision entry and exit of vehicles

Entertainment: Access to multiplex cinema

4.0 CONCLUSION

In this paper, we have proposed an improved methodology for face detection for various challenges such as different pose angles, various facial expression, complex background, and illumination etc. We have used LPBH face detection algorithm and accuracy of this improved algorithm of all the standard database is better than others already shown in the results sections. We proposed a pre-processing step including image enhancement and noise removal. At last, we identify the human face correctly. It is not yet suitable for face recognition in video surveillance. Future works will be to find out the solutions to overcome these limitations and this work will continue in future for face recognition and matching also.

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