

SECURITY SYSTEM BY USING FACE RECOGNITION AND MOTION DETECTION

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Abstract : School security is growing. To ensure security in the school, a facial recognition system can be implemented. A standard camera captures the image to identify the person. It is a prototype that identifies the visitor. When the door recognizes the visitor, they are greeted by their name and the door is unlocked with the name "open". If they are not identified, the door is locked. The system performs recognition and detection quickly in real-time. In this project, the basic webcam and the Internet connection are used to create a door that is opened by facial recognition. If the visitor is recognized by the door, the door is unlocked! This project mainly adds four functions to school automation: security, control, motion detection, and monitoring. First, the system requires facial authentication so that the user can enter the School(locked/unlocked). When an unauthenticated user attempts to log in, that face is captured and sent to Dropbox as an attachment. The system must also support the remote control of the school. This paper details the design and development of Wi-Fi connectivity based on School security surveillance cameras using Raspberry Pi and an IoT Module reducing continuous human monitoring and controlling with enhanced performance and effective results. The user is warned via Dropbox notification after an unusual behavior occurs and event notification is sent which shows the events captured by the camera. Face recognition has been one of the most interesting and important topics in research fields as it deals with security and privacy. The human face plays a critical role in our social association, passing on individuals' identities.

IndexTerms - emotion analysis, human identification, face detection, face/head tracking.

I. INTRODUCTION

The current scenario guarantees safety and security Safety has become indispensable. Is there Regressive progress in the security system as the influence of modern technology reaches its peak? If there is a modern School with a minimum of people. Trouble, it is known as the Modern School. There is it's an advent of wireless and digital technologies Together, it introduces automated intelligent security. Faster data transfer it is carried out via the WLAN of the security systems. This helps the user to control and monitor the Global system. New products and services based on IoT. It will grow exponentially in the foreseeable future. From the analysts. The IoT includes various tie layers Technologies and a wide range of devices. IOT It provides open access to a specific record. Raspberry Pi is a compact minicomputer smart enough to give good connectivity Internet as well as increasing the signals. This one here Marco's mainly about School safety system, networks, and really integrated. Time data and data management. This proposal the system has high latency and low cost. The system is Very reliable and uses very little energy Comparison with the existing system. School security System is based on a camera that is connected to the building and the output is done in real time with the Minimal delay in the operation. The aim of this work is the safety of the School. With Raspberry Pi by IoT. Pictures of The authorized person is stored in the database and when some human encounter with the camera, the camera will do it. Capture the image and compare it to the data. Base if the image matches the database, the Pop name of us will come from this particular authorized Human.

II. Existing system

The technology of facial recognition is currently used in various services. According to the results of the algorithm program, the real identification rate is 92.3% compared to the information of 1.6 million images of offenders, if they were done through the most effective algorithm program [1]

There are 3 phases of the processes in question during this sensing system which are the face of the image, the extraction of the options and the classification. And play an important role. The Nine Percentage in the Method of Detection of the Faces. [2]

Human emotions have been mental feelings that arise impromptu rather than through a very conscious effort and which are found in the course of physiological changes. a series of essential emotions are joy, sadness, anger, disgust, fear, surprise, etc. Facial expressions play in the role of non-verbal communication that seems to be two to the internal feelings of someone reflected in their faces. For modeling and human feelings about portable, many studies have been conducted. However, it is still being compared to the human visual system. [3]

Has made many new studies: (i) it has measured and compared the precision in the absolute freedom of imagination; (ii) examined the result of the immutable attributes and the gender and the specific attributes in illumination, occlusions, and poses in human verification. [4]

This document describes this house Automation or automation of an office so also in electronics and communication Promotion. Platforms based on cloud computing help connect with the things that surround everyone so that you can easily access everything and Easy to use, anytime, anywhere Way with custom portals. Where the cloud serves as a front-end to access the

Internet of Things. The exciting opportunities to further increase connectivity and Household appliance relationship Goals to the Internet.[5]

This article describes Various Home Automated methods analyzed from a Security Perspective and Private Sector Challenges Automation Security. It shows how the concept has security and the meaning of the word "intruder" changed in modern homes. Various house Automation technologies are taken into account in this work include contextual home automation systems, centralized domestic systems based on control, Bluetooth-based home automation systems, Global Mobile or mobile system Home automation systems, short messaging

Domestic systems based on service, general Home automation based on radio packet service Systems, Dual-tone multi-frequency home Automation systems and home based on the Internet Automation systems. [6]

III. Facial recognition

In this paper, focus on facial recognition based on images. If have a photo of a digital camera, want to know if anyone is in it, where his face is and who he is. However, facial recognition is generally done in three steps: face detection, feature extraction, and face detection.



A. FACE DETECTION:

The main function of face recognition is to determine whether or not human faces appear in a particular image and to determine where those faces are in a particular image. The expected outputs of this step are spots that include each face in the input image. Therefore, to make facial recognition more robust and efficient, facial alignment is done to justify the scales and orientations of those points. In addition to the preprocessing phase for facial recognition, facial recognition can also be used to detect areas of interest, retarget, video and image classification, and more.

B. FEATURE EXTRACTION:

After the face recognition step, the human visual fields are extracted from the images by the feature extraction phase. Using these patches directly for facial recognition can have some disadvantages. First, each patch typically contains more than 1000 pixels that are too large to provide reliable detection. Second, the facial patches may be captured with different illuminations, facial expressions, and a different orientation of the camera, and may have occlusion and a saturated background. To overcome these drawbacks, we perform feature extractions to reduce dimensionality, pack information, extract saliency, and eliminate noise. After this step, the system converts the field of view into a vector with a fixed dimension or a set of reference points and their corresponding positions. The system can include feature extraction in either face recognition or facial recognition, as shown in the survey conducted in some publications.

C. FACE RECOGNITION:

After formulating the individual face patches in the previous steps, the final step is to recognize the identities of those faces. Face recognition requires a database of faces. For each person, multiple images are taken and their properties are extracted and stored in the database. Each time we get an input image, we do facial recognition and extraction, and then compare the characteristics of each face to the stored database.

This system generalizes two applications of face recognition: identification and verification. The identification of the face means that for a given image of the face, the system should say who it is and identify the individual. While face inspection is based on an image presumption based on an identification presumption, the system should say true or false about the presumption. Facebook uses face recognition programs to automate customer identification on photos. These are the means by which Face Recognition works on Facebook: Each time a person is marked on a photo, the software application stores data about that person's face qualities. The moment a sufficient amount of information about a man is collected to recognize him, the frame uses that data to distinguish a similar face on multiple photos. In this sense, it is recommended to label these photos with the name of that person.

Factors of human appearance variations:

There are several factors that can cause facial recognition and recognition difficulties. Face patches can be captured with different lighting, facial expressions, and camera orientation, and have occlusions and a saturated background. Some of the factors we need to consider are facing posture, facial expression, lighting, RST variation (rotation, scaling and translation), saturation and occlusion.

a. Illumination

The look of a face changes dramatically as the lighting changes. Different light conditions make facial recognition a challenging and difficult task. Illumination changes have been discussed in numerous face recognition and recognition studies. This diversity is caused by different lighting conditions under which the photograph was taken, and it is believed that the appearance has greater contrasts than the differences caused by different personalities. Under certain lighting conditions, we cannot guarantee recognizable evidence or draw attention to areas with facial reflections.

b. Face Pose

The change in posture results from different angles and positions during the face recognition process. This variation alters the spatial relationships between the facial reflections and results in a strong distortion of facial recognition algorithms based on appearance, such as facial appearance. B. own interfaces and fishing surfaces.

c. Face Expression

Man uses characteristic facial expressions to express his feelings or moods. The variety of appearance causes both the change in spatial connection and the change in the shape of the face highlighting. Facial expressions can be subdivided mainly into six basic emotions that are known as happy, sad, disgusted, surprised, anxious and angry. Several research groups have shown that the type of emotion expressed affects the accuracy of each expression recognition system.

d. RST (rotation, scale, and translation) variation

The RST variety (rotation, scaling and translation) is also caused by the variety of image capture. This causes difficulties in both recognition and recognition of the face and may require a comprehensive search in the recognition process for all possible RST parameters.

e. Clutter Background

In addition to the four previous variations that lead to facial appearance changes, we must also consider the impact of environments and backgrounds on people's images. The saturation background affects the accuracy of face recognition, and facial patches containing this background further reduce the performance of face recognition calculations.

IV. PROPOSED SYSTEM

In this work, propose system a School Security System in which the entrance of the person is taken. In this work, system use Raspberry Pi and Internet. of the things. In this project, we create a database. For the persons and we take 8 photos of each. You. There is a change of appearance in each person in a few days, it will be easy for the algorithm to do this sure if the coming person is authorized or No We use the hair for that. An algorithm in the open curriculum vitae. The picture comes from the live video transmission. And stored in the database. How to save the memory System convert every image into grayscale, with the grayscale conversion. Hair Algorithm basically has a cascaded version of Many entries for the parts of the face to identify which part is which And with the special calculations of With every feature on the face we can make a perfect face. Detection algorithm. When an unauthorized person approaches At School, the camera takes your photo and converts it. In grayscale and compare with the database. Yes, the image is already stored in the database, which then the pixels are more accurate when the output is made visible as if the input image is not saved in the database, the pixels are less consistent. Here we show how the computer is. Connected to the RPI. It need a Wi-Fi connection to RPI connectivity through the system. And the main gateway for connecting the RPI is the Internet of Things IoT helps in the transaction of the data. Although one device to another, as the RPI is known as The machine for man and the machine for the machine. Transaction of the data. The desk is not portable and therefore we cannot take it wherever we go, we can share the screen. With the same IP address. First we have to connect the ones Desktop with RPI and check the wireless connection. Since the Wi-Fi connection is made, we have to connect our laptop to the same Wi-Fi connection. Now you only see what IP address the RPI uses, you must assign the same IP address to the remote desktop. Connect to the laptop and wait for the login screen. Once the login screen appears, we need to write that correct the credentials and log in to the Remote Desktop. Now the screen we see is the same. Now we can control it from the desk Remote location of the area.

V. Architectural system

The architectural diagram (Fig) shows the flow of events for the facial expression recognition intelligent security system for the real-time surveillance system. The camera captures the movements concentrating on the head and in the motion detection module, the face will be detected together with the head pose estimation. After the face is detected comes behavior understanding of the facial expression. Behavior understanding has two phases: Verification and Identification. In the verification phase, the system tries to identify the expression detected by reading action units (the dots in eyes, nose, eyebrows, and mouth. In the identification phase, the system attempts to match if the detected and verified expression portrays any feelings that have intentions of doing any prohibited work.

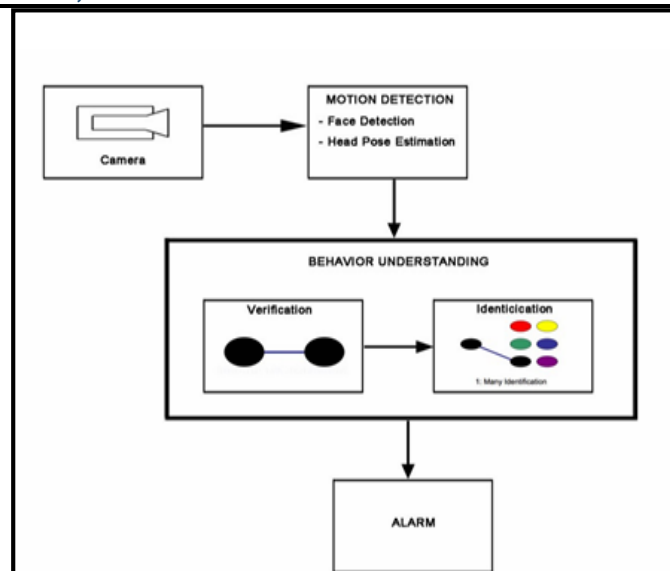


Figure: Architectural Diagram of the proposed system

VI. ALGORITHM

1] Haar Algorithm:

1. The program imports all files into the library.
2. Enter an input image to compare with the database.
3. Grayscale conversion for each image.
4. The comparison of the images is done in the hair algorithm.
5. Decision making after comparison, whether authorized or unauthorized.
6. End.

The Haar algorithm is predefined software in which the facial recognition and the rest of the programming are. Already available the needy can be downloaded and with a few adjustments can be calibrated as the user wishes for the use. In this Project, we take 100 * 130 pixels as input the image of facial recognition. The hair algorithm is Cascade form of tickets, where each and every one the characteristics are taken as input to theirs and are given certain part of the face. A face consists of two eyes, a nose, a mouth, a forehead, a chin, etc. These properties are taken as input and calculated the distance for future use.

2] Algorithm for Motion Detection:

1. Motion detection process.
2. Calculation of the average of a particular tone in this first frame.
3. Waiting for X sec.
4. Calculation of the average of a certain tone in this second frame.
5. Absolute condition $(\text{avgFrame1} - \text{avgFrame2}) > \text{Threshold}$ then.
6. Motion detected.

Motion Detection algorithm can't examine a spinning thing – a thing i.e. changes. The monitoring system includes hardware and software operations. The hardware implementation ran the Raspberry Pi, and the software implementation executed the program programmed on the Raspberry Pi and on the person's computer. Raspberry Pi is the central core of the entire proposed system. Accepts the command of an Android tablet or PC and controls the devices connected to the output port according to the command. The connection to an Android tablet or phone is made through a router that uses a Wi-Fi or Ethernet cable.

VII. RESULT

Categories	Input Images	Hit count	Miss Count	Accuracy percentage (%)
Smile	99	93	6	93.93
Sad	91	84	7	92.30
Surprise	79	70	9	88.60
Normal	85	83	2	97.64

Fig. result table1

Region of Interest (ROI)				
ROI	Total Input Images	Correct Detection	False Detection	Accuracy (%)
Left Eye	249	245	04	98.39 %
Right Eye		243	06	97.59 %
Lip		231	18	92.77 %

Fig. result table2

The facial recognition system introduces the capture of the emotions of a given image, the extraction of characteristics of the regions of the face and the recognition of emotions. The entry into the system is an unknown face and the system returns the emotion detected from a database containing various characteristics extracted from the emotions in the face images, displaying the results in categories, in images, in number results, number of errors and percent accuracy. Face Recognition and ROI should refer to image type, global input images, correct recognition, poor recognition, and percent accuracy of the image.

VIII. CONCLUSION

In this paper, have one Wireless security system for School over the Internet by Things module and Raspberry Pi version 3. It is an active system that indicates whether the person is authorized for domicile or not authorized. It is a friendly User interface system. It is easy to install and can be used anywhere since this is a wireless system. This system is easy to use, low power consumption and profitable. This is designed for remote access controls and uses Wi-Fi for the transmission of Data. It is easy to install and can be anywhere Controlled by each remote area.

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