Machine Learning Based Automated Door Access Control System

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Abstract- *the Identification of facial features of a person. Face recognition technology, used a biometric technology, which is based on the identification of facial features of a person. User collect the face images, and the recognition equipment automatically processes the images. This paper introduces the related researches of face recognition from different perspectives. This paper describes the development stages and the related technologies of face recognition. In this paper we introduce the research of face recognition for real conditions, and also the general evaluation standards and the general databases of face recognition. We give a forward-looking view of face recognition in which Face recognition has become the future development direction and has many potential application prospects.*

Keywords- Raspberry Pi, Motor, relay module, Raspberry Pi Camera.

I. INTRODUCTION

The face recognition is a sub-division problem of visual pattern recognition. Humans are recognizing visual patterns all the time, and we obtain visual information through our eyes which is recognized by the brain as meaningful concepts. For a computer, it is necessary to distinguish who the face belongs to in the part of the data that all machines think of the face. This is a subdivision problem. Face recognition includes related technologies for building a face recognition system. This is the process of determining whether the candidate area is a face. The face coordinate system's output can be square, rectangular, etc. The coordinate position of the face feature(face position) in the face detection coordinate system. The calculation time of face positioning algorithm is much shorter than face detection.

In 2016, an artificial intelligence (AI) product called AlphaGo which was developed by a team led by Deep Minda's Demis Hassabis came out. , the DeepMind team announced the strongest version of AlphaGo, named AlphaGo Zero [1]. We expect to find the ideal transformation function so as to achieve the optimal recognition effect, but the search process is very tough. From the application layout of face recognition technology, it is widely used in attendance access control [2], security [3] and finance, while smartphone, transportation, logistics, retail, education, real estate, entertainment advertising, government management, network information security [4] . It represents a great progress of artificial intelligence technology, which means that we require more accurate, more flexible and more faster recognition technology.

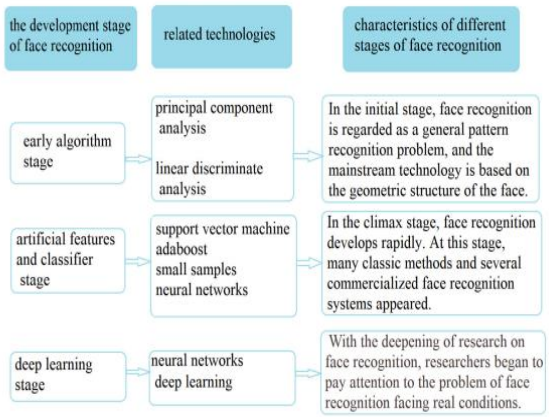


FIGURE 1. The development stage of face recognition, related technologies and characteristics of different stages of face recognition.

II. PROPOSED SYSTEM

The Architecture of the proposed system shows the actual design diagram Proposed system aims to convey the internal design of the proposed system of the system which describes . In architecture diagram, we see the modules with its various functions which acts as separate a process.

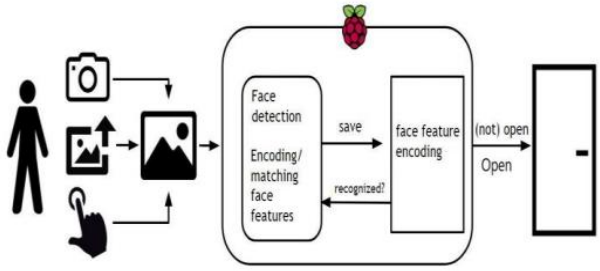


Fig -1: Architecture of automated door access control system

There are different security mechanisms such as fingerprint scan, facial recognition, pin, and password. In this the application will learn from the user behavior according to algorithm and increase security when required .The user accessing the lock details will be stored in the server with date and time which can be further used to predict the times when the user will enter the house and handle security accordingly.

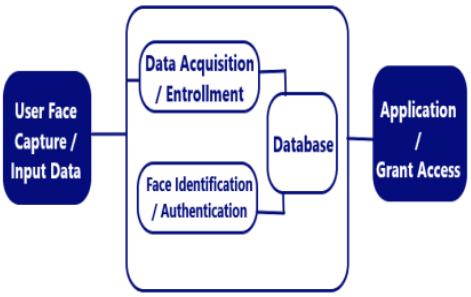


Fig -2: Block Diagram of automated door access control system

A. USER FACE CAPTURE

In this module, the Facial images and Video frames are captured for Face Recognition and Detection with the help of Input Devices like Web Camera, Raspberry Pi Camera. These all captured images acts as training data of our Machine Learning Algorithm to Achieve the Automatic Door access control system. The Facial data collected from the Input devices that are captured Image of Human Face and Video frames. to the processing unit this input is provided in performed on the proposed person detection and door lock system which the processing or calculations based on algorithm are module, the code which implements the resultant output process.

B.PRE-PROCESSING MODULE/ UNIT

In this Pre-processing module, the image which collected from input camera is stored in the database. it will perform the some classification and machine learning algorithm Before storing the image and store in database. Also we recognize and detect the input images in this module. This the captured image compared with database and after matching connected to the outer side of the door, where is found in that images the lock
gets accessible to that person.

III. MACHINE LEARNING ALGORITHM PXL VISION'S FACIAL-RECOGNITION AND FACE VERIFICATION

Facial recognition technology works that is fairly difficult to grasp and a quality explanation so it will go beyond the parameters of this article. SO the purposes, we will consider the four overarching issue that a machine needs to solve in order to recognize a face. these are some ways: face detection, face alignment, and most of time feature extraction, face recognition and face verification and so on.

Face Detection – the face in the image or video will be locate by the machine must first . By now, an in-built face detection function avable in most cameras have. there are some example of Face detection used in Snapchat, Facebook and other social media platforms in whice it allow users to add effects to the photos and videos that they take with their apps and web portals.

Face Alignment – the focal point look totally different to a computer in Faces that are turned away from .with the faces in the database an algorithm is required to normalize the face to be consistent . by using multiple generic facial landmarks is one way to accomplish this . For example, the bottom of the chin, the top of the nose, and many more the outsides of the eyes, also in various points around the eyes and mouth, etc. on any face and turn the face towards the centre The next step is to train an ML algorithm to find these points .

Feature Measurement and Extraction – The measurement and extraction of various features from the face This step requires that will permit the algorithm to match the face to other faces in its database. However, features should be measured and extracted until researchers discovered that the best approach was to let the ML algorithm figure out which measurements to collect for itself. it was at first unclear which This process is known as embedding and itself to generate multiple measurements of a face, allowing it to distinguish the face from other faces. deep convolutional neural networks to train in which it uses

Face Recognition – a final ML algorithm will match the measurements of the face against is Using the unique

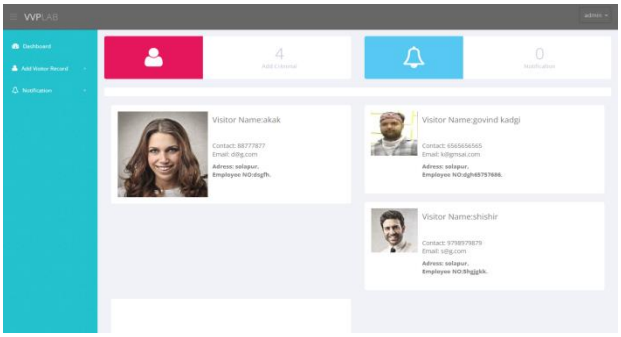
measurements of each face, known faces in a database. also face in your of the face in question will be returned as the match by database comes closest to the measurements.

Face Verification – Face verification compares The ML algorithm will return a confidence value to assess the unique properties of a given face to another face. whether the faces match or not.

IV. EXPECTED OUTPUT

Step1: Secured login system

Step2: Visitor Login Process



Step 3: List of register visitor

Step 4: Output – Target Visitor Identification Process

V. FUTURE WORK

Face recognition technology has been widely used in security and financial fields because of its convenience. With the rapid development of science and technology, the application of faces will be more developed, and the application scenarios will be more diverse. However, face recognition will easily cause technical, legal, and ethical problems. And due to the automated features of face recognition technology, similar related information may be processed or decided through automation, lacking transparency and not easy to supervise, and even in the event of errors or discrimination. It is difficult to trace back. For example, the face recognition information is used to achieve non-recognition purposes such as judging an individual's sexual orientation, race, or religion. How to enhance the interpretability of algorithms to avoid discriminatory algorithms or incomplete information that will lead to decision errors? How to promote the development of new technologies related to face applications while ensuring public safety and personal rights? These problems remain to be discussed in depth

VI. CONCLUSIONS

With the development of science and technology, the face recognition technology has made great achievements, but there is still room for its improvement in practical application. In the future, there may be a special camera for face recognition, which can improve the image quality and solve the problems of image filtering, image reconstruction, denoising etc. We can also use 3D technology to supplement 2D images to solve some problems such as rotation and occlusion.

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