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Bank Security Alert System Using Face Recognition

K Hima Bindu[1], Sk Riyaz Ahmed[2], B Antony Lokesh[3], K Vijaya Bhumika[4], K Aparna[5]

Assistant Professor, Department of Information Technology, Kallam Haranadhareddy Institute of Technology, Chowdavaram, Guntur (DT), Andhra Pradesh, India[1]

B. Tech Students, Department of Information Technology, Kallam Haranadhareddy Institute of Technolgy, Chowdavaram, Guntur(DT), Andhra Pradesh, India[2, 3, 4, 5]

ABSTRACT: Unauthorized person, which means when someone enters into your device, system or your house without your permission is said to be unauthorized access. Several methods are being used to handle these unauthorized access problems. This project demonstrates to increase the capability of the devices we have constructed. Our proposed method integrates a better approach, intended to advance the cooperativeness of the explore operation.In this work, we develop the application with a device to eradicate the unauthorized access of unknown persons into our premisesOur application can be able to alert the persons whenever any unknown person is trying to enter into our premises.

KEYWORDS: Unknown person, Application, Deep Learning, Face Detection.

I. INTRODUCTION

Intelligent systems appear more and more in people's lives, and often need to be identified when using intelligent systems. Traditional methods of identification mainly identify individuals with some personal characteristics, such as identity documents, such as documents and keys, which have obvious shortcomings. They are easily forgotten, lost or faked. If you use some of the personal characteristics to identify the effect will be quite good, such as: face recognition, fingerprinting and so on. In terms of algorithms, there are sharing parameters between the convolution layer and the convolution layer of CNN. The advantage of this is that the memory requirements are reduced, and the number of parameters to be trained is correspondingly reduced. The performance of the algorithm is therefore improved. At the same time, in other machine learning algorithms, the pictures need us to perform pre-processing or feature extraction. However, we rarely need to do these operations when using CNN for image processing. This is something other machine learning algorithms cannot do. There are also some shortcomings in depth learning. One of them is that it requires a lot of samples to construct a depth model, which limits the application of this algorithm. Today, very good results have been achieved in the field of face recognition and license plate character recognition, so this topic will do some simple research on CNN-based face recognition technology.The Bank Security Alert System using Face Recognition is an innovative technology that aims to enhance the security and safety measures in banks. With the increasing number of security breaches and frauds in the banking sector, this system provides an efficient and reliable solution to prevent unauthorized access to bank premises and protect the customers' assets. The system uses facial recognition technology to identify individuals entering the bank premises and match them against a pre-existing database of authorized personnel. In case of a mismatch, the system immediately sends an alert to the bank security team, triggering appropriate actions to be taken. This advanced security system not only provides an extra layer of protection but also saves time and resources for the bank staff, making it a crucial tool for any modern banking institution.

II. RELATED WORK

[1] Yao L S, Xu G M, Zhap F. Facial Expression Recognition Based on CNN Local Feature Fusion[J]. Laser and Optoelectronics Progress, 2020, 57(03): 032501.

With the transition of facial expression recognition (FER) from laboratory-controlled to challenging in-the-wild conditions and the recent success of deep learning techniques in various fields, deep neural networks have increasingly been leveraged to learn discriminative representations for automatic FER. Recent deep FER systems generally focus on two important issues: overfitting caused by a lack of sufficient training data and expression-unrelated variations, such as illumination, head pose and identity bias. In this paper, we provide a comprehensive survey on deep FER, including

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datasets and algorithms that provide insights into these intrinsic problems. First, we introduce the available datasets that are widely used in the literature and provide accepted data selection and evaluation principles for these datasets. We then describe the standard pipeline of a deep FER system with the related background knowledge and suggestions of applicable implementations for each stage. For the state of the art in deep FER, we review existing novel deep neural networks and related training strategies that are designed for FER based on both static images and dynamic image sequences, and discuss their advantages and limitations. Competitive performances on widely used benchmarks are also summarized in this section. We then extend our survey to additional related issues and application scenarios. Finally, we review the remaining challenges and corresponding opportunities in this field as well as future directions for the design of robust deep FER systems.

Summary: Recent deep FER systems generally focus on two important issues: overfitting caused by a lack of sufficient training data and expression-unrelated variations, such as illumination, head pose and identity bias. In this paper, we provide a comprehensive survey on deep FER, including datasets and algorithms that provide insights into these intrinsic problems. First, we introduce the available datasets that are widely used in the literature and provide accepted data selection and evaluation principles for these datasets.

2. Zhang Chen. Research on some key technologies of facial micro-expression recognition [D]. 2019.

Facial Expression Recognition (FER) can be widely applied to various research areas, such as mental diseases diagnosis and human social/physiological interaction detection. With the emerging advanced technologies in hardware and sensors, FER systems have been developed to support real-world application scenes, instead of laboratory environments. Although the laboratory-controlled FER systems achieve very high accuracy, around 97%, the technical transferring from the laboratory to real-world applications faces a great barrier of very low accuracy, approximately 50%. In this survey, we comprehensively discuss three significant challenges in the unconstrained real-world environments, such as illumination variation, head pose, and subject-dependence, which may not be resolved by only analysing images/videos in the FER system. We focus on those sensors that may provide extra information and help the FER systems to detect emotion in both static images and video sequences. We introduce three categories of sensors that may help improve the accuracy and reliability of an expression recognition system by tackling the challenges mentioned above in pure image/video processing. The first group is detailed-face sensors, which detect a small dynamic change of a face component, such as eye-trackers, which may help differentiate the background noise and the feature of faces. The second is non-visual sensors, such as audio, depth, and EEG sensors, which provide extra information in addition to visual dimension and improve the recognition reliability for example in illumination variation and position shift situation. The last is target-focused sensors, such as infrared thermal sensors, which can facilitate the FER systems to filter useless visual contents and may help resist illumination variation. Also, we discuss the methods of fusing different inputs obtained from multimodal sensors in an emotion system. We comparatively review the most prominent multimodal emotional expression recognition approaches and point out their advantages and limitations. We briefly introduce the benchmark data sets related to FER systems for each category of sensors and extend our survey to the open challenges and issues. Meanwhile, we design a framework of an expression recognition system, which uses multimodal sensor data (provided by the three categories of sensors) to provide complete information about emotions to assist the pure face image/video analysis. We theoretically analyse the feasibility and achievability of our new expression recognition system, especially for the use in the wild environment, and point out the future directions to design an efficient, emotional expression recognition system.

Summary: We comparatively review the most prominent multimodal emotional expression recognition approaches and point out their advantages and limitations. We briefly introduce the benchmark data sets related to FER systems for each category of sensors and extend our survey to the open challenges and issues. Meanwhile, we design a framework of an expression recognition system, which uses multimodal sensor data (provided by the three categories of sensors) to provide complete information about emotions to assist the pure face image/video analysis.

3. Xu Linlin, Zhang Shumei, Zhao Junli. Expression recognition algorithm for constructing parallel convolutional neural networks [J]. Journal of Image and Graphics, 2019, 24 (02): 0227-0236.

Facial expression recognition is one of the very important research topics in computer vision. Studies on nonverbal communication have shown that 55% of intentional information is conveyed through facial expressions. Expression recognition has recently found a lot many applications in medical and advertising industries. In this paper we have proposed a parallel Convolutional Neural Network (CNN) structure for detection of expression from frontal faces. The CNNs are trained on two most important subfacial patches. The overall feature vector will be the features concatenated from the parallel models. We have experimentally found applying such a strategy provides better results than the

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models which take the entire facial image. We have also compared our performance with other benchmark CNN structures like AlexNet and VGG16.

Summary: Studies on nonverbal communication have shown that 55% of intentional information is conveyed through facial expressions. Expression recognition has recently found a lot many applications in medical and advertising industries. In this paper we have proposed a parallel Convolutional Neural Network (CNN) structure for detection of expression from frontal faces.

4. Li Siquan, Zhang Xuanxiong. Research on Facial Expression Recognition Based on Convolutional Neural Networks [J]. Journal of Software, 2018, v.17; No.183 (01): 32-35

Facial expression recognition has been an active research area over the past few decades, and it is still challenging due to the high intra-class variation. Traditional approaches for this problem rely on hand-crafted features such as SIFT, HOG and LBP, followed by a classifier trained on a database of images or videos. Most of these works perform reasonably well on datasets of images captured in a controlled condition, but fail to perform as good on more challenging datasets with more image variation and partial faces. In recent years, several works proposed an end-to-end framework for facial expression recognition, using deep learning models. Despite the better performance of these works, there still seems to be a great room for improvement. In this work, we propose a deep learning approach based on attentional convolutional network, which is able to focus on important parts of the face, and achieves significant improvement over previous models on multiple datasets, including FER-2013, CK+, FERG, and JAFFE. We also use a visualization technique which is able to find important face regions for detecting different emotions, based on the classifier's output. Through experimental results, we show that different emotions seems to be sensitive to different parts of the face.

Summary: Traditional approaches for this problem rely on hand-crafted features such as SIFT, HOG and LBP, followed by a classifier trained on a database of images or videos. Most of these works perform reasonably well on datasets of images captured in a controlled condition, but fail to perform as good on more challenging datasets with more image variation and partial faces. In recent years, several works proposed an end-to-end framework for facial expression recognition, using deep learning models.

III. EXISTING METHOD

To fully understand just how powerful devices which have ability to detect recognized devices are very less. Now, we need to look at it from the very beginning which is traditional method. Traditional method basically uses person observations to estimate the parameters or features from the person. Traditional method practices fail because of belief in people. To prevent the harmful attacks from the unknown persons, we have to appoint a person for the entry of known person. It is a major challenge for us. Such a method won't be able to match with our requirements and it also consumes more time and won't support us in the way of protecting.

DISADVANTAGES:

- Failure for the data maintained.
- Expensive.
- Inefficient.
- Requires planning and time
- Time consuming.

Proposed System:

We propose a method in which a device is built by simply providing facial recognition of the person and the device, that can be considered a useful system since it helps to reduce the limitations obtained from existing system. The data can't be trained by the unknown users. The authentication process is implemented here where the training accessibility will be held with only the owner of the application. By providing support to these types of devices, we will prevent ourself from the unknow persons. When an unknown person was recognized, this system will automatically send an alert message to applicant.

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Block Diagram:

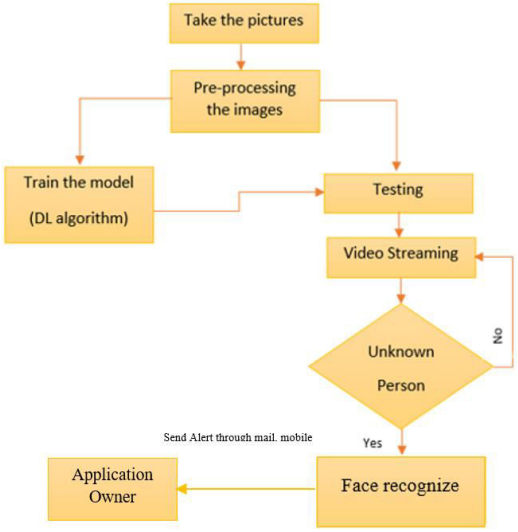
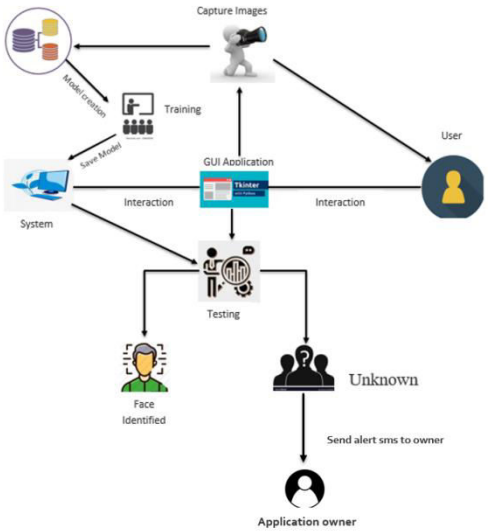


Fig. Block diagram of proposed method

Advantages of proposed system:

- High efficiency.
- Time Saving.
- Inexpensive.
- Low complexities.

Architecture:



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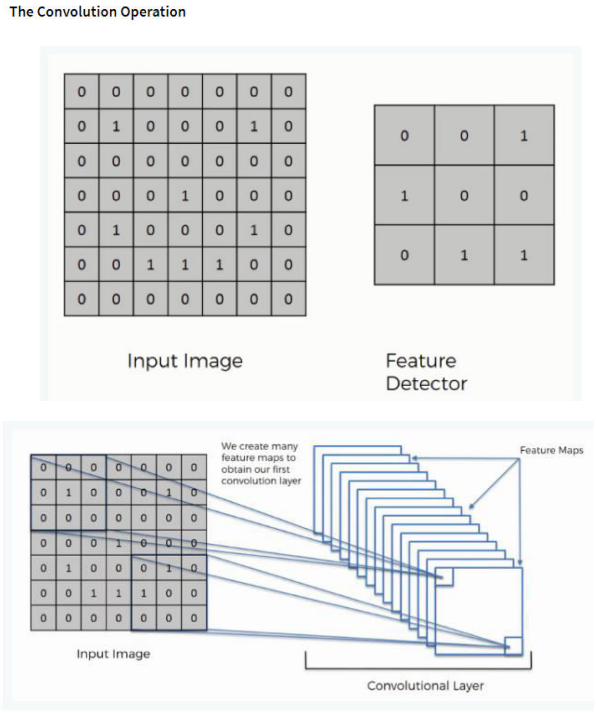
IV. METHODOLOGY

Convolutional Neural Network

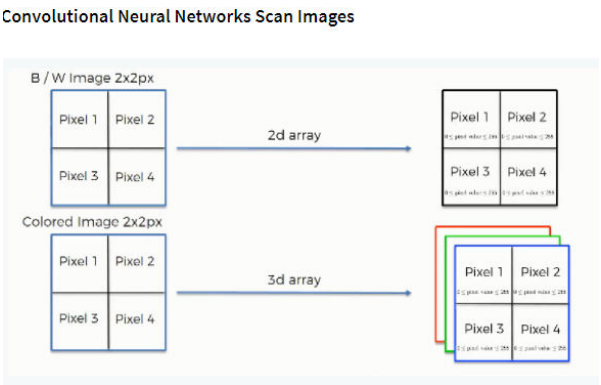
Step1: convolutional operation

The first building block in our plan of attack is convolution operation. In this step, we will touch on feature detectors, which basically serve as the neural network's filters. We will also discuss feature maps, learning the parameters of such maps, how patterns are detected, the layers of detection, and how the findings are mapped out.



Step (1b): Relu Layer

The second part of this step will involve the Rectified Linear Unit or Relook. We will cover Relook layers and explore how linearity functions in the context of Convolutional Neural Networks.
Not necessary for understanding CNN's, but there's no harm in a quick lesson to improve your skills.



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Step 2: Pooling Layer

In this part, we'll cover pooling and will get to understand exactly how it generally works. Our nexus here, however, will be a specific type of pooling; max pooling. We'll cover various approaches, though, including mean (or sum) pooling. This part will end with a demonstration made using a visual interactive tool that will definitely sort the whole concept out for you.

Step 3: Flattening

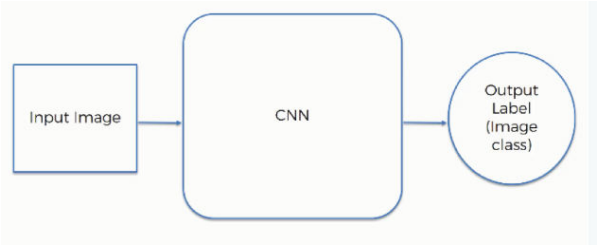
This will be a brief breakdown of the flattening process and how we move from pooled to flattened layers when working with Convolutional Neural Networks.

Step 4: Full Connection

In this part, everything that we covered throughout the section will be merged together. By learning this, you'll get to envision a fuller picture of how Convolutional Neural Networks operate and how the "neurons" that are finally produced learn the classification of images.

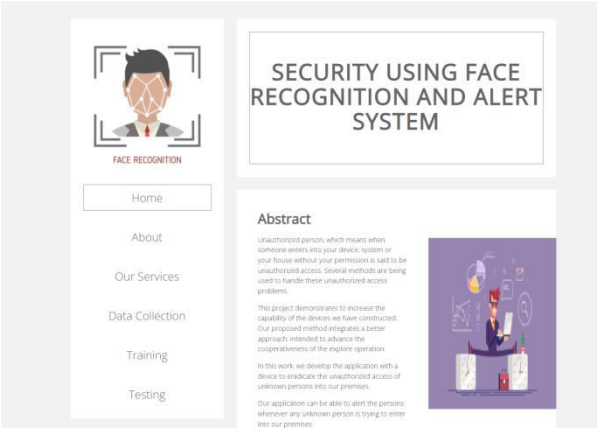
Summary

In the end, we'll wrap everything up and give a quick recap of the concept covered in the section. If you feel like it will do you any benefit (and it probably will), you should check out the extra tutorial in which Soft ax and Cross-Entropy are covered. It's not mandatory for the course, but you will likely come across these concepts when working with Convolutional Neural Networks and it will do you a lot of good to be familiar with them.



V. RESULT

Home Page:



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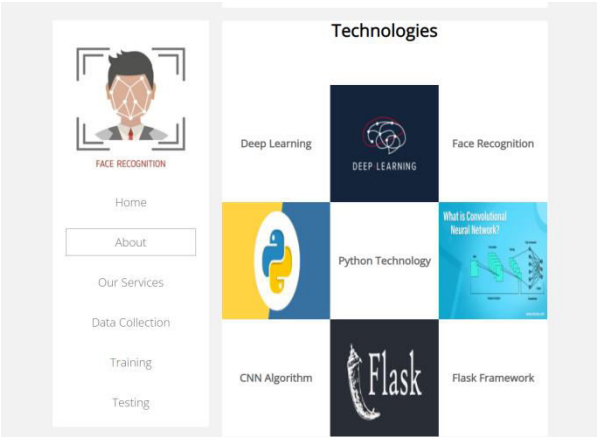
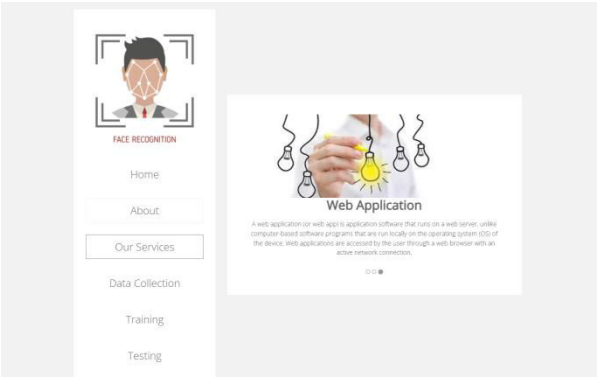
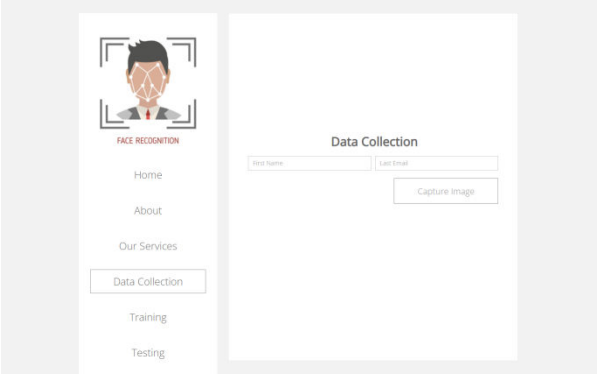
About Project:



Our services:



Data collection page:



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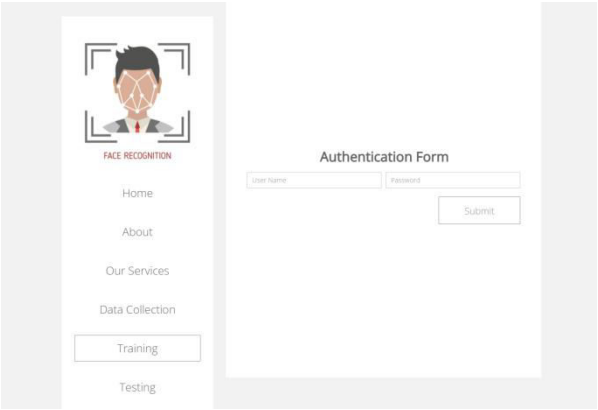
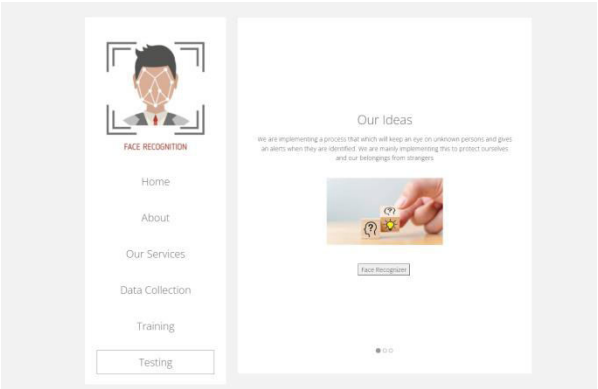
Training authentication page:



Face recognition page:



VI. CONCLUSION

In this project we have proposed a UGI based application which is used for Security using Face Recognition and Alert System by using DL techniques. We used an algorithm named Convolutional neural network which termed to be easily identify the response to capture, Images we have used a webcam by using a computer vision technique. In this project we have successfully developed an application, that which can detect and faces of unknown persons. This application give an alert through mobile and mail, when an unknown person is entered into your surroundings.

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