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Smart Security using Image Recognition

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Abstract: ***we all know safety is the major thing that everyone is concerned about. In this project, we provide security by using face recognition system. Face detection is the initial step for face recognition. So, this system is going to provide smart security by detecting images in the dataset which consists of a collection of images where some are trained and stored in trained-set and some are tested, stored in test-set. This Security system predicts accuracy and leads to get the appropriate result by detects a particular person by recognizing an image of that person which ensures security. The techniques used for the whole process of face recognition are machine learning-based because of their high accuracy as compared with the other techniques. This system uses one of the deep learning technique i.e. Convolution Neural Network (CNN). CNN is a neural network that has one or more convolution layers trained to perform a specific task using classification without any human supervision.***
Keywords: deep learning, convolution neural network, security, image recognition, accuracy.

I. INTRODUCTION

Real-time face recognition is one of the disciplines of biometrics. A computer can perceive a human through a unique regular feature. Face recognition gives the ability for the computer to recognize a human by its facial qualities. At present, biometrics is one of the sectors in trend setting innovation that growing rapidly. Forecasts demonstrates, biometrics outbreak in the following 100 years, to verify characters and avoid unauthorized access to systems, databases and offices. A facial acknowledgement gadget is like a device that takes pictures of an individual's face and contrasts it with the different images in a database. The structure, shape and portions of the faces are compared during the face acknowledgement process. The distance between the eyes, nose, mouth, and jaw, the sides of the mouth, the place of the nose and eye's, and the area surrounding the bones are also compared. Facial recognition is broadly utilized because it has its pros. The advantages of facial acknowledgement are that it isn't obtrusive, should be possible even from a significant distance without knowing to the individual that he/she is being scanned. This thing must be useful in certain divisions like banks, workplaces for instance and this improves facial acknowledgement systems better than other biometric strategies which can be utilized for observations purposes like scanning for needed lawbreakers, suspected terrorists, or missing youngsters. By using a facial recognition system, several pictures of the person are taken at different positions and with different facial expressions. To do verification and identification the individual stands before of the camera for certain seconds, and then the image is compared with the image that previously recorded.

II. LITERATURE SURVEY

Trung Nguyen, Barth Lakshmanan and Weihua Sheng recommended that, the human brain causes vision to be extremely simple. It does not take any trouble to tell apart a cheetah and a tiger, read a sign or identify a human face. But these are really difficult issues to solve with a PC. They only seem to be easy because human brains are marvelously acceptable at understanding images. In recent years, machine learning has made marvelous progress in solving these troublesome issues. Specifically, the model called a deep convolutional neural network can accomplish reasonable performance on troublesome visual recognition tasks which are coordinating or exceeding human performance in certain spaces [1].

Nawaf Hazim Barnouti proposed face acknowledgment is one of the hugest utilizations of the biometrics-based validation system in the recent couple of decades.

Face recognition is a kind of acknowledgment task design, where a face is ordered as either known or obscure after comparing it with the images of a known individual put away in the database. Face recognition includes a range of activities from different aspects of human life.

Humans can recognize faces, but excessive number of faces sometimes being difficult to memorized, machine learning is currently being improved to carry out this responsibility. Researcher attempt to understand the design of the human face when fabricating or creating face acknowledgment frameworks [2].

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W. Zhao, R. Chellappa, J. Phillips and A. Rosenfeld recommended that, as one of the best utilizations of image analysis and understanding, face recognition has recently got critical attention, particularly during the past previous years. This is evidenced by the development of face recognition conferences such as the International Conference on Audio and Video-Based Authentication since 1997 and the International Conference on Automatic Face and Gesture Recognition conventions, and numerous commercially accessible systems. There are at least two applications behind this pattern; the first is the wide scope of business and law enforcement applications and the second is the accessibility of possible technologies following 30 years of research [3].

III. PROPOSED METHOD

In the last decade, deep learning models start getting more attention, especially in the image processing. In this investigation, the model using is Convolution Neural Network (CNN) a layered Neural Network based on image process.

A. Methodology

For developing the system certain methodologies have been used. The methodology used in this project is image classification using CNN.

The development of a security device that would be capable enough to detect facial expressions using motion-sensing camera using machine learning and alarm the owner with an alert message along with the captured image of that instance of motion. The device will be a real-time system along with easy to use interface, which will be proved useful in terms of security of people as well as their valuable things/objects. In this Smart security using Image Recognition, the methodology that we follow is at first we are going to train the model by giving some images which contain pictures of the persons. This model predicts whether a person is authorized or not. If a person is not authorized then security alert must be generated. For this we have used CNN.

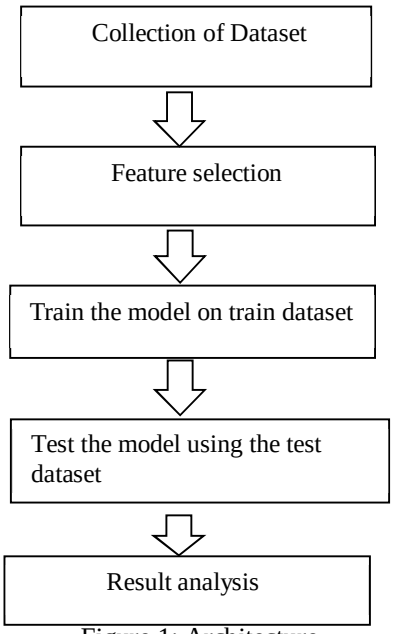


Figure 1: Architecture

1) *Step 1*-Collection of Dataset To prepare our model, we need a lot of information so that our machine can pick up from them by recognizing out specific relations and features related to the objects. Here we created our dataset which consists of 500 images. This will help in preparing and furthermore testing of the model.
2) *Step 2*-Importing Libraries and splitting the dataset For successful utilization of the libraries, we first need to import them. After importing the libraries, we need to isolate our information into two segments one is training-set and another is test-set. The preparing set has 300 pictures of two individuals while the test set has 80 photos of each.
3) *Step 3*- This is the most significant step for our network. It consists of three sections -

a) Convolution
b) Pooling
c) Flattening

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4) *Step 4*-Building CNN The Full connection is interfacing our convolutional system to a neural system and afterward compiling the network.
5) *Step 5*-Data Augmentation Data augmentation is a manner by which we can reduce over-fitting on models, where we increment the measure of training data utilizing information only in our training data. The field of information augmentation isn't new, and indeed, various data augmentation strategies have been applied to explicit issues.
6) *Step 6*- Training the Network Along these lines, we finished all the steps of construction and it's time to prepare our model. If you are preparing with a decent video card with enough RAM, this will be done in under 60 minutes. If you are training with an ordinary CPU, it may take significantly more. With an increasing number of epochs, the accuracy will increase.
7) *Step 7*- Testing Yes, our network effectively anticipated the image of the individual!! Despite the fact that it isn't 100% accurate it will give correct predictions most of the time. Including more convolutional and pooling layers may get high accuracy results [3].

IV. RESULTS AND DISCUSSION

The produced system is related with an easy to understand site where client will transfer photograph for identification purpose and it gives the desired output. The proposed CNN system deals with the standard dependent on detection of a part and removing CNN features from different convolutional layers. These features are totaled and afterward given to the classifier for classification reason. Here the proposed system collects data using web cameras in different angles and positions to build the system to produce good accuracy. If the image is found then the accuracy is predicted and also indexes are displayed as 0 or 1 based on the image given from either test set or training set, if the image is not found it shows "shape not found".



Figure 2: The Predicted image of a user

Here, Tensor Flow is used which is flexible, powerful and imagining. By using CNN, robust accuracy is reached compared with other algorithms.
Furthermore, gathering information from online networking is one of the favorable circumstances as web based life has the biggest open information, for example, Facebook. With the utilization of Facebook, we can gather basic information easily. Also, can collect the data from the smartphone's such as pictures and recordings can take and can be used to prepare the model

V. CONCLUSION

Smart security using image recognition is used for security purposes whether the person is authorized or not. As far as this model is tested, this system received exact outputs and working efficiently. Comparing with other algorithms CNN gives better prediction value. So, this system uses a Convolution Neural Network (CNN). On premise of results which has been delivered, the system has provided the 90% accuracy in expectation of finding an individual.

VI. FUTURE SCOPE

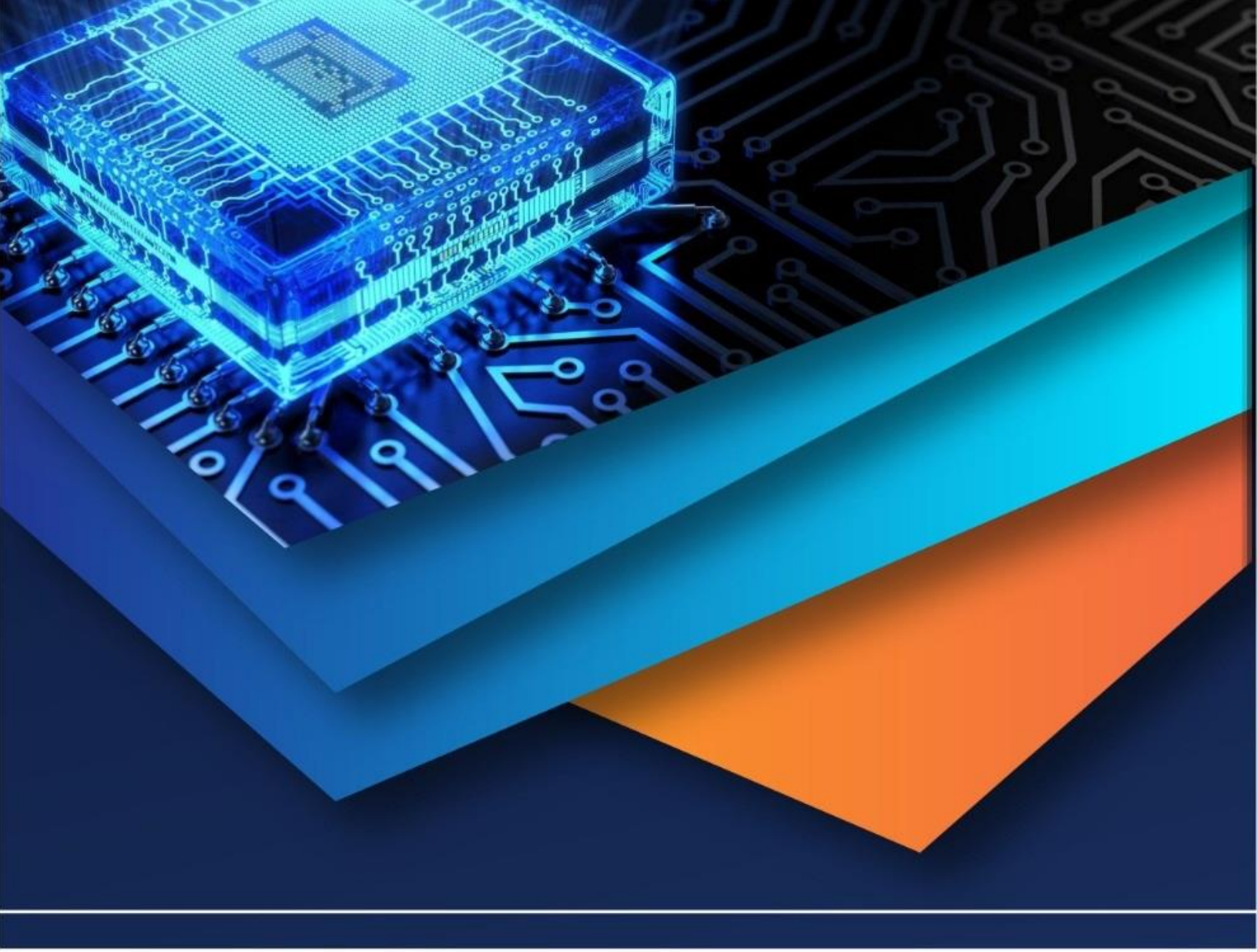
The same concept can be applied to a broad range of things with more training data and a suitable network. You can even replace the dataset with the pictures of companions and family members. One interesting course for future work is to gather the information from the owner's cell phone such as, captured images and recordings and to prepare the system naturally. Another heading for future work is to identify fake-face by utilising step speed and eye following.

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