

DESIGN AND IMPLEMENTATION OF AN ONLINE PAYMENT SYSTEM USING FACE RECOGNITION TECHNIQUE

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ABSTRACT:

The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals

Face recognition has become a popular topic of research recently due to increases in demand for security as well as the rapid development of mobile devices. There are many applications which face recognition can be applied to such as access control, identity verification, security systems, surveillance systems, and social media networks. Access control includes offices, computers, phones, ATMs, etc. Most of these forms currently do not use face recognition as the standard form of granting entry, but with advancing technologies in computers along with more refined algorithms, facial recognition is gaining some traction in replacing passwords and fingerprint scanners. As for surveillance systems, the same point can provide research on be made if there are criminals on the loose. Surveillance cameras with face recognition abilities can aide in efforts of finding these individuals. Alternatively, these same surveillance systems can also help identify the whereabouts of missing persons, although this is dependent on robust facial recognition algorithms as well as a fully developed database of faces. And lastly, facial recognition has surfaced in social media applications on platforms such as Facebook which suggest users to tag friends who have been identified in pictures. It is clear that there are many applications the uses for facial recognition systems. In general the steps to achieve this are the following: face detection, feature extraction, and lastly training a model.

Keywords:

Artificial Intelligence ,Opencv , Tensorflow, Computer Vision, Face Recognition, Image/Object Recognition, Deep Learning ,Convolutional Neural Network , Artificial Neural Network , Machine learning.

INTRODUCTION:

Face Recognition (FR) is one of the areas from Computer Vision (CV) that has drawn more interest for long. The practical applications for it are many, ranging from biometrical security, to automatically tagging your friends pictures, and many more. Because of the possibilities, many companies and research centers have been working on it.

The Face Recognition Problem

That being said, this problem is also a really difficult one, and it has not been until recent years that quality results are being obtained. In fact, this problem is usually split into different sub-problems to make it easier to work with, mainly face detection in an image, followed by the face recognition itself. There are also other tasks that can be performed in-between, such as frontalizing faces, or extracting additional features from them. Through the years, many algorithms and techniques have been used, such as eigen faces or Active Shape models. However, the one that is currently mostly used, and providing the best results, consists in using Deep Learning (DL), especially the Convolutional Neural Networks (CNN). These methods are currently obtaining high quality results, so, after reviewing the current state of art, we decided to focus this project on them.

PROBLEM STATEMENT:

To detect and identify the faces from set of images.

To recognize the objects with certain accuracy and make predictions from the image.

PROPOSED APPROACH:

Face recognition is really a series of several related steps:

First, look at a picture and find all the faces in it

Second, focus on each face and be able to understand that even if a face is turned in a weird direction or in bad lighting, it is still the same person.

Third, be able to pick out unique features of the face that you can use to tell it apart from other people— like how big the eyes are, how long the face is, etc.

Finally, compare the unique features of that face to all the people you already know to determine the person's name.

As a human, brain is wired to do all of this automatically and instantly. In fact, humans are *too good* at recognizing faces and end up seeing faces in everyday objects.

Computers are not capable of this kind of high-level generalization (*at least not yet...*), so we have to teach them how to do each step in this process separately.

We need to build a *pipeline* where we solve each step of face recognition separately and pass the result of the current step to the next step. In other words, we will chain together several machine learning algorithms:

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