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DESIGN AND DEVELOPMENT OF EFFECTIVE FACE RECOGNITION FROM VIDEO USING DEEP CONVOLUTIONAL NEURAL NETWORK TECHNIQUE

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Abstract:

Convolutional neural networks (CNNs) have become the main machine learning approach. CNNs have excelled in a range of tasks, including voice recognition; face identification, and picture categorization. Nearly all of the best performing techniques on the Labeled Faces in the Real Time dataset employed convolutional neural networks (CNNs). In this study, we recommend smart face identification and recognition using deep learning, and we update each student's system's attendance data in accordance with the outcomes of that technique. The system works using machine learning algorithms for face recognition and deep learning algorithms for object identification. The proposed system is effectively accurate thanks to the two separate algorithms.

Keywords: Deep Neural Networks, Convolutional neural networks, Polynomial Time, Hyper Text Transfer Protocol.

I. INTRODUCTION:

Nevertheless, this issue is likewise quite challenging, and it has only been in recent years that good outcomes have been attained. In truth, this challenge is often broken down into smaller ones to make it simpler to handle. The key ones to be broken down are face detection in a picture and face recognition itself. Other activities, like formalizing faces or extracting more characteristics from them, may be carried out in the meantime. Numerous algorithms and methods, including Eigen faces or Active Shape models, have been used throughout time. However, Deep Learning (DL), particularly the Convolutional Neural Networks, is the one that is now most popular and producing the greatest results (CNN). After examining the current state of the art, we chose to concentrate our study on these approaches since they are presently producing outcomes of excellent quality. We present a smart attendance system that uses face recognition. It also collected face images from cameras, used deep learning to recognize faces, and dealt with the face recognition algorithm to update the current attendance.

II. SYSTEM DESIGN:

The system architecture which works on optimization algorithms for face detection administration also more especially this method deals with public method. Systems first detect the student face using camera and store into hard drive. The CNN framework executes training module using feature extraction as well as feature selection technique and store individual feature into the tainting database. To detect the face from given input image and capture the frame for object recognition. The test feature has map with entire training dataset and generate the similarity weight for each object, and according to achieved weight system recommend the actual student id. Based on given id system automatically update the attendance for respective student. Convolutional Neural Network (CNN) for training and testing respectively.

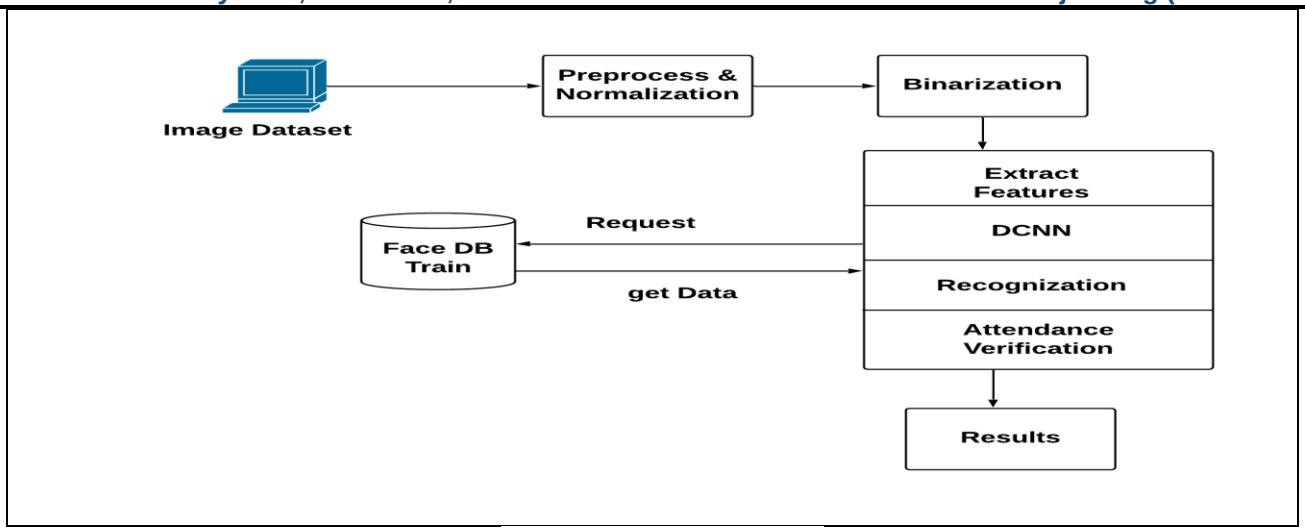

Figure 1: System Architecture

Module 1: Data Collection: We created various student faces using a camera and stored them on the hard drive.

Module 2: Data Training: We collect artificial and real using students' faces Train with time and any in-depth classification.

Module 3: Testing with deep learning: Using any deep learning classifier, we achieved weight system recommends the actual student id system automatically update the attendance for the respective student.

Module 4: Analysis: We demonstrate the accuracy of the proposed system and evaluate it with other existing methods.

Algorithm

Input: Test Dataset which contains various test instances TestDB-Lits [], Train dataset which is built by training phase TrainDB-Lits [] , Threshold Th.

Output: HashMap < class label, Similarity Weight > all instances which weight violates the threshold score.

Step 1: For each testing records as given below equation

$$testFeature(k) = \sum_{m=1}^{n} (.\ featureSet[A[i] \dots \dots A[n] \leftarrow \text{TestDBLits})$$

Step 2: Create feature vector from $testFeature(m)$ using below function.

Extracted_FeatureSetx [t.….n] = $\sum_{x=1}^{n}$(t) ← $testFeature$ (k)

Extracted_FeatureSetx[t] holds the extracted feature of each instance for testing dataset.

Step 3: For each train instances as using below function

$$trainFeature(l) = \sum_{m=1}^{n} (.\ featureSet[A[i] \dots \dots A[n] \leftarrow \text{TrainDBList})$$

Step 4: Generate new feature vector from $trainFeature(m)$ using below function

Extracted_FeatureSet_Y[t……n] = $\sum_{x=1}^{n}$(t) ← $TrainFeature$ (l)

Extracted_FeatureSet_Y[t] holds the extracted feature of each instance for training dataset.

Step 5: Now evaluate each test records with entire training dataset

$$weight = calcSim\ (\text{FeatureSetx} \,||\, \sum_{i=1}^{n} \text{FeatureSety[y]})$$

Step 6: Return Weight

III. METHODOLOGY:

- The system first detects the student's face using a camera and stores it in the hard drive.
- The CNN framework executes the training module using feature extraction and selection techniques and stores individual features in the tainting database.
- To detect the face from the given input image and capture the frame for object recognition.

- The test feature has a map with the entire training dataset. It generates the similarity weight for each object and recommends the actual student id according to the achieved weight system.
- Based on the given id system automatically update the attendance for the respective student.

Mathematical Model:

Let S is the Whole System Consist of

S= {I, P, D, O}

I = Input fake news data.

P = Process:

D = Dataset

Step1: User will enter the query.

Step2: After entering query the following operations will be performed.

Step3: Data Preprocessing.

Step4: Feature extraction and feature selection.

Step5: Training and Testing dataset.

Step6: Detection process.

Step7: Final output optimized classifier and its performance indicator.

O= Output (Predicted class label)

$$testFeature(k) = \sum_{m=1}^{n} (. \, featureSet[A[i] \ldots\ldots A[n] \leftarrow \text{TestDBLits})$$

$$trainFeature(l) = \sum_{m=1}^{n} (. \, featureSet[A[i] \ldots\ldots A[n] \leftarrow \text{TrainDBList})$$

$$weight = calcSim\ (\text{FeatureSetx} \,||\, \sum_{i=1}^{n} \text{FeatureSety[y]})$$

IV. RESULT:

The entire process of developing an automatic attendance system in detail is explained in this section. The system consists of Windows over which OpenCV 2.0 runs. Program is developed in Python 3.6 or higher version for the algorithm and implementation in real time. Is used in our system to predict and detect faces in an image. Face recognition and MySQL libraries comes with standard in Python Library. The first module is counting students in an image whether known or unknown. The second module is the recognition of a person in an image. The algorithm detects all faces within an image by marking it with a rectangle. Attendance is done in an image in a real-time environment, as shown in below Figure 2.

Figure 2: Result

V. CONCLUSION:

The creation of a comprehensive face recognition system that can operate on any kind of picture and is always becoming better was our aim. This enhancement has to be self-sufficient in order for it to detect the persons it already contained more accurately and to add new ones. Additionally, because this recognition must be performed as near to in real-time as feasible, the time requirements were a problem. Face recognition is a very challenging job, particularly outside of controlled environments. In fact, there have been several strategies throughout history that have failed. It is difficult to pinpoint what distinguishes a face from others, apart from variations in facial hair, expression, and lighting across images of the same person's face. As a result, when we first started working on this project, we intended to exploit some of the research that had previously been done rather than to start from scratch. This would enable us to expedite the procedure and increase the likelihood that we could get outcomes of high quality.

VI. ACKNOWLEDGMENT:

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VII. REFERENCES:

[1] Y. Ban, S. K. Kim and S. Kim, "Face detection based on skin color likelihood", Pattern Recognition, vol. 47, no. 4, (2014).
[2] D. N. Chandrappa, M. Ravishankar and D. R. RameshBabu, "Face detection in color images using skin color model algorithm based on skin color information", Electronics Computer Technology (ICECT), 2011 3rd International Conference on. IEEE, (2011) April, pp. 254-258.
[3] K. M. Lee, "Component-based face detection and verification", Pattern Recognition Letters, vol. 29, no. 3, (2008).
[4] R. Aliradi, N. Bouzera and A. Meziane, "Detection of Facial Components Based on SVM Classification and Invariant Feature", Web Intelligence (WI) and Intelligent Agent Technologies (IAT), IEEE/WIC/ACM International Joint Conferences on IEEE, (2013) November, pp. 30-36.
[5] G. E. Hinton, "Learning multiple layers of representation", Trends in cognitive sciences, vol. 11, no. 10,(2007).
[6] Y. Kang, S. Kim and S. Choi, "Deep Learning to Hash with Multiple Representations", ICDM, (2012) December, pp. 930-935.
[7] D. Ciresan, U. Meier and J. Schmidhuber, "Multi-column deep neural networks for image classification", Computer Vision and Pattern Recognition (CVPR), 2012 IEEE Conference on. IEEE, (2012) June, pp. 3642-3649.
[8] S. Zhong and Y. Liu, "Bilinear deep learning for image classification", Proceedings of the 19th ACM international conference on Multimedia, ACM, (2011) November, pp. 343-352.
[9] G. E. Hinton, "Deep belief networks", Scholarpedia, vol. 4, no. 5, (2009).
[10] K. Ichikawa, T. Mita and O. Hori, "Component-based robust face detection using AdaBoost and decision tree", Automatic Face and Gesture Recognition, FGR 7th International Conference on. IEEE, (2006) April, pp. 413-420.