A Deep Learning Model on Face Matching

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Abstract -This study provides an overview of the Face Matching Model (FMM) stages, methods, and datasets that are currently available. A crucial topic in the realms of computer vision and Deep learning, FMM has been acknowledged for decades. The majority of applications, including those in healthcare, education, criminal investigation, etc., benefit from automatic FMM. This essay seeks to comprehend the fundamental ideas behind FMM and to contrast recent findings. Recognition of face Recognition has recently become a crucial topic in many applications. The study of facial expression recognition has grown significantly in recent years. Face recognition identification attempts to determine a person's face state (such as Fake or Real Images) based on specific facial images. Expression of Individuals is crucial in communication, which enhances the standard of human contact. In the near future, the research of face detection may also improve social feedback and interactions between Human Robot Interfaces (HRI). The geometric portion of the face is mostly used for identity detection (eg; eyes, lips, mouth and nose).

***Key Words*:** Deep Learning, Face Matching, Video Surveillance and Security purposes etc.

1. INTRODUCTION

It is a system that runs using Deep learning algorithms to detect the face. **Artificial Neural Network (ANN)**, the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of human's Artificial Neural Network (ANN) refers to the simulation of human intelligence in machines that are programmed to think like humans and observe their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

The ideal characteristic of artificial neural network is its ability to rationalize and take actions that have the best chance of achieving a specific goal. A subset of artificial intelligence is deep learning (DL), which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as text, images, or video.

The replication of human intelligence by machines, particularly computer systems, is known as artificial neural network. Expert systems, machine learning, speech recognition, natural language processing, and vision are a few examples of specific DL applications. Deep learning is a subset of machine learning, which is essentially a neural network with three or more layers. These neural networks attempt to simulate the behavior of the human brain—albeit far from matching its ability—allowing it to "learn" from large amounts of data.

We gathered the information from the database, which includes data of the celebrity and others that occur across the world. We begin by figuring out the individual person for each data point that is provided and then determining the corresponding Face Matching for that person. In order to match the face of person in any given place, we have developed a model that can match the face for each available data point in the dataset. With this ml model, different information about the data is collected using different methodologies to determine the regions that are most severely affected in a specific location (cluster). By including the suggested parameter-reducing formulations into our model, we outperformed the traditional regression models in terms of performance. On the currently available dataset for predicting the air quality index for all of India, our model has a 97% accuracy rate.

2. RELATED WORK

In deep learning, a convolutional neural network (CNN) is a special type of neural network that is designed to process data through multiple layers of arrays. A CNN is well-suited for applications like image recognition and is often used in face recognition software.

The paper [1] by Francis Galton etal., "A Deep Learning" used ANN, CNN, MTCNN, NMS, BBR and other algorithms for Face Matching Model with competent data processing and implementation of Deep Learning algorithms with distinct parameters; MTCNN scored the highest accuracy of 97%.

The paper W. Zhao et al. [2] In this presented paper we try to conduct a survey on several ML algorithms that are used to solve the problem of accurate face detection as it try to see the solutions which are provided by several other methods From the results, concluded that the Random Forest algorithm gives better result of face matching. It also summarizes and analyses the existing techniques critically to identify gaps based on two groups: traditional statistical machine learning and deep learning methods.

Moreover, the paper [3] by L Zheng et al. "Face Matching Model using Deep Learning over Big Data" proposed a MTCNN algorithm which combined structured and unstructured data and proved that MTCNN, CNN is more precise than earlier prediction algorithm.

Furthermore, the paper [4] by L Wiskot etal. "Application of Deep Learning experimental results on two benchmark datasets show that the performs about 7% better than the state-of-the-art methods in a mixed domain for the deception dataset with the highest accuracy of 91.2%. L. Zheng et al.

Moreover, the paper [5] by Apeksha Khopkar etal. "Methods are able to leverage very large datasets of faces and learn rich and compact representations of faces, allowing modern models to first perform as-well and later to outperform the face recognition capabilities of humans.

Moreover, the paper [6] by James Pao etal. ".With the exception of the final dense layer, all other layers use of their activation function.

Moreover, the paper [7] Ashish Adholiya Saxena etal. However, the model appears to focus on negative emotions like anger and fear during the work week. For fear and anger, the model provides poor precision scores of 43% and 45%, respectively.

The paper [8] by Min S Zhang Lee et.al." The first layer is the input layer, which only accepts input with a maximum size of 48x48 and black-and-white photos.

Moreover, the paper [9] by G.J. Edwards et.al, "Robust System for face recognition system".

Moreover, the paper [10] by Kyu Choi et.al, "Face Matching Classification Using deep CNN".

The Paper [11] by T. Sim and T. Kanade and Nur Nabila Abu Mangshor etal. "face Recognition Using MTCNN".

Moreover, the paper [12] by Kottilingam kottursamy etal. "A Review on finding efficient approach to detect customer emotion analysis using deep learning".

Moreover, the paper [13] by J.M. Fellous etal. "Face Recognition and Detection using MTCNN". Quickly reducing the spatial dimension and learning greater characteristics is the 5x5 Kernel.

Furthermore, the paper [14] by Mohammad Adnan Adil etal. "Facial Detection using MTCNN", ©Mohammed Adnan Adil, 2021 University of Victoria.

Lastly, the paper [15] by Illiana Azizan and Fatimah etal. "Khalid proposed "A typical pooling 2D layer with a pool size of 3x3 and strides of 2x2 follows the second layer, which accepts input from the first layer and convolves with a 3x3 kernel and filter 64.

3. PROPOSED MODEL

Our proposed methodology includes the following steps:
i. First I will collect the records of different person from the website or other sources.
ii. Then I will perform preprocess operation to extract information from the data.
iii. Then I will perform the cleaning operation to solve the problem.
iv. The system then displays the results.
The flowchart of the methodology is shown below:-

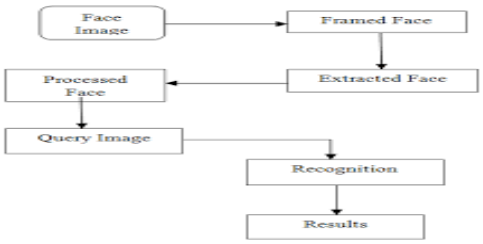

Fig 1: Flow chart of proposed mode

ALGORITHM USED

As the name suggests, we use MTCNN algorithm for predicting the result.

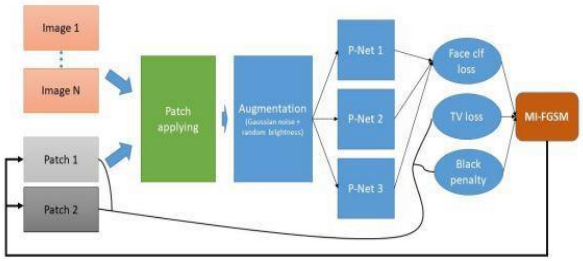

Fig -2: MTCNN Algorithm

4. RESULTS ANALYSIS

Result analysis in our proposed system is an essential part of this research paper. The performances measures of the proposed methodology are discussed in detail and the major goal of this work is to detect both normal and fake images in an accurate manner. For this purpose a multi – task convolution neural network is utilized in this work. This CNN compromises four layers which were – The convolution layer, Pooling layer, Activation layer and Soft Max layer.

The main purpose or outcome of this project is to provide air quality index to use in different organizations and sectors. The overview of this model describes that the deep learning tools help you to train your own MTCNN from scratch or use a pre trained model to conduct transfer learning. This model usually work in controlled environments and recognition algorithm can take advantage of the environmental constraints to obtain high recognition accuracy. This implies that future smart environments should use the same modalities as humans, and have approximately the same limitations.

Above diagram shows the accuracy of AQI from year 1999 to 2017 using Random Forest Regressor Algorithm.

Fig -2: Dataset for Face Matching Model

In the above A popular component of computer vision and deep learning revolves around identifying faces for various applications from logging into your phone with your face or searching through surveillance images for a particular suspect. This dataset is great for training and testing models for face detection, particularly for recognize facial attributes such as finding people with brown hair, are smiling, or wearing glasses. Images cover large pose variations, background clutter, diverse people, supported by a large quantity of images and rich annotations. This data was originally collected by researchers at MMLAB, The Chinese University of Hong Kong (specific reference in Acknowledgment section).

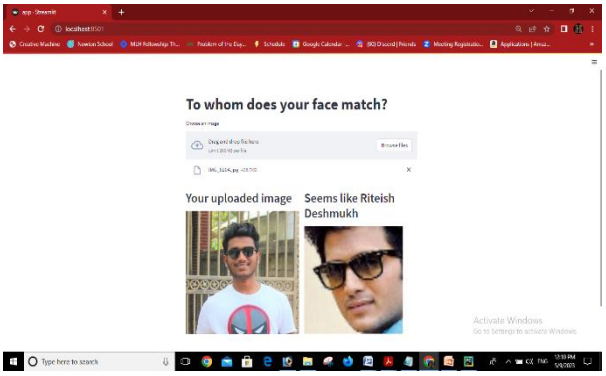

Fig -3: The final/output page

5. CONCLUSIONS

In our research, This implies that future smart environments should use the same modalities as humans , and have approximately the same limitations. These goals now appear in reach – however , substantial research remains to be done in making person recognition technology work reliably , in widely varying conditions using information from single or multiple modalities. Expression of Individuals is crucial in communication, which enhances the standard of human contact. In the near future, the research of face detection may also improve social feedback and interactions between Human Robot Interfaces (HRI). The geometric portion of the face is mostly used for identity detection (eg; eyes, lips, mouth and nose).Our accuracy can be up to 97%.The performances measures of the proposed methodology are discussed in detail and the major goal of this work is to detect both normal and fake images in an accurate

manner. For this purpose a multi – task convolution neural network is utilized in this work. This CNN compromises four layers which were – The convolution layer, Pooling layer, Activation layer and Soft Max layer.

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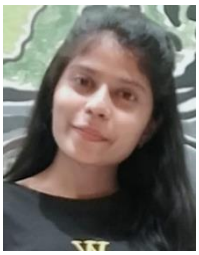
BIOGRAPHIES

Mayank Tripathi is an undergraduate and his areas of interests are data structures, cloud computing, java developer and Deep learning, He has done training in Java from Great Learning and have the knowledge of java, C, SQL.

Richa Singh is an undergraduate and her areas of interests are Machine Learning, data structure and python. She has done training in Python from Coursera.



Shambhavi Srivastava is an undergraduate and her areas of interests are Machine Learning and Web Development. She has a knowledge of Python and MySQL. She has done training in Python from Coursera.

Pawan Mishra is an undergraduate and his areas of interests are machine learning and Web Development. He has done training in Java from Great Learning and have the knowledge of Java.