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DEEP FACE RECOGNITION BASED NON-VACCINATED POPULATION FINDER AND ALERT SYSTEM

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Abstract - Vaccines are an important and effective part of preventative medical care COVID -19 pandemic transmission can be slowed with vaccination. To combat the spread of corona infection around India, government has vaccination. As a result, in addition to vaccine about research and its supply, critical that enough people are willing to get vaccinated, but it affects a large percentage of the world's population. To attain population immunity, we must first identify non-vaccinated individuals, purpose of this study has been proposed using an Aadhaar based facial recognition system to identify non–vaccination citizen AI is being used to notify them for the face recognition is performed deep learning in the form of (CNNs)Convolutional Neural Networks and it is a Deep Neural Network (DNN) that is designed to do difficult tasks image processing, which is essential for the facial recognition .-based person's current vaccination status to defend against COVID- in the context of the coronavirus illness due to the (COVID - 19) pandemic. FDR technology and sample Aadhaar will be used to authenticate the people before they can access any services. So, in this project uses their face to provide COVID - 19 vaccination status and attest whether are not they have had a vaccine, as well as remind people to get vaccinated.

Keywords - Vaccine, DCNN, FDR

1.INTRODUCTION

By encouraging the immune system to attack the agent, vaccine can provide active protection against a specific dangerous agent. The antibody-producing cells, known as B cell (B lymphocytes), stay and ready to respond the chemical if it ever enters the body after being triggered by a vaccination. A vaccination can also to provide passive immunity by supplying antibodies/lymphocytes that have already been produced by a human or animal donor. Vaccines administered to mucosal surfaces such as the lining the stomach or nasal passages, appear to induce a stronger antibody response and may be the most effective administration vaccines. Vaccines for the first time in 1796, British physician Edward Jenner Developed first vaccination which employed to the cowpox certain in vaccine development is to create a vaccination that is effective enough to prevent infection without making the person sick. To that end, scientists have developed a variety of vaccines. Weakened, or attenuated, vaccinations are made up of microbes that have lost their potential to cause significant illness but still promote immunity. They may cause a subclinical or mild form of the disease. Vaccines for measles, mumps, polio (the Sabin vaccination), rubella, and tuberculosis are attenuated. Vaccinations that have been killed or inactivated with heat or chemicals are known as inactivated vaccines. Immune responses are elicited by inactivated vaccinations, but they are often less complete than those elicited by attenuated vaccines. Because inactivated vaccinations aren't as effective at preventing disease as live immunizations, Vaccines against the human papillomavirus (HPV) are

created using virus-like particles (VLPs) created using recombinant technology. Because the vaccines do not include live HPV biological or genetic material, they are unable to infect people. A bivalent HPV vaccine, created with VLPs from HPV types 16 and 18, and a tetravalent vaccination, made with VLPs from HPV types 6, 11, 16, and 18, have both been developed. Another method, known as naked DNA therapy, involves infusing DNA into muscle cells that encode a foreign protein. The foreign antigen is produced by the cells, which triggers an immunological response. Near the end of 2019, a novel coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified as the source of a cluster of pneumonia cases in Wuhan, Hubei Province, China. It quickly spread over the world, resulting in a pandemic. COVID-19, which stands for coronavirus illness 2019, was called by the World Health Organization in February 2020. Every year, vaccines save millions of lives. Vaccines work by teaching and preparing the immune system, the body's natural defences to recognise and attack the viruses and bacteria they are designed to tackle. The objective of the project is to find non-vaccinated citizens and alert them using Face Recognition enabled Aadhar system. To provides COVID-19 vaccination status using their face and that an individual has received a vaccine or not and alert them to get vaccinated.

2.LITERATURE SURVEY

1.A Hybrid Algorithm for Face Detection to Avoid Racial Inequity Due to Dark Skin 2021.

During the last couple decades, facial recognition technology has advanced significantly. Different organisations and countries have employed this technology for defence, security, and surveillance applications. It has also been integrated into our daily lives, such as consumer applications, personal data protection, and cyber-security, especially while using smartphones. The majority of these systems are quite effective, but there are significant issues with the accuracy of facial recognition system results when evaluated on photographs of people with dark complexion. When applied to dark-skinned people, existing facial recognition algorithms have varying degrees of accuracy. It also makes a significant addition by presenting a hybrid approach based on Gaussian and Explicit rule models that increases face detection accuracy for persons with dark skin The results revealed that a hybrid algorithm combining Gaussian and Explicit Rules increased the face detection rate for those with dark skin the most.

2.Exposing Fake Faces Through DNN Combining Content and Trace Feature Extractors 2021.

With the advancements in computer vision and deep learning, there has been an explosion of realistic-looking fake face media modified by AI, such as Deep Fake or Face2Face, which modify facial identities or expressions. Although the phoney faces were largely made for amusement, their misuse has generated social instability. Some celebrities, for example, have fallen prey to Deep Fake's bogus pornography. Fake political speech videos developed by Face2Face are also causing alarm. It is critical to build models that recognise false faces in media in order to protect individual privacy as well as social, political, and international security. To improve manipulation detection performance, this paper develops a hybrid face forensics system based on a convolutional neural network that combines the two forensics methodologies.

3.Face Recognition Attendance System Based on Real-Time Video Processing 2021.

College attendance management for students has become a big topic in society, thus college student management should be enhanced. However, most college students still use traditional manual attendance for daily attendance, relying on paper signatures or teacher orders, but with the advancement of technology, some new methods predict that a few colleges and universities will eventually adopt punch card fingerprints and smart attendance methods. Although there are several methods for increasing attendance, they are ineffective. To address the aforementioned concerns, this paper presents a linear discriminant analysis (LDA) algorithm. The goal of this technique is to identify a set of linear transformations that reduce intra-class dispersion while increasing inter-class dispersion.

4.Face Detection Based on Receptive Field Enhanced Multi-Task Cascaded Convolutional Neural Networks 2020

Face detection algorithms have made the most progress with the ongoing growth of deep learning. Cascade CNN based on the lightweight model is still the dominant structure for real-time detection, predicting faces in a coarse-to-fine way with good generalisation capabilities. In comparison to

other approaches, there is no requirement for a specific input size. MTCNN, on the other hand, still has trouble detecting small targets. This paper introduces RFEMTCNN, a new face detection model that uses the Inception-V2 and receptive field blocks to improve feature discriminability and resilience for tiny targets.

5.Improving Face Recognition Systems Using a New Image Enhancement Technique, Hybrid Features and the Convolutional Neural Network 2020.

In uncontrolled contexts, most facial recognition systems (FRSs) are commonly acknowledged to perform poorly. The lack of very effective picture pre-processing procedures, which are normally required before the feature extraction and classification steps, could be one cause for this poor performance. Furthermore, most FRSs often evaluate only minor facial recognition difficulties, limiting their relevance in real-life circumstances. As a result, installing more effective pre-processing algorithms, as well as selecting the proper characteristics for classification, is expected to considerably increase FRS performance. Using state-of-the-art convolutional neural networks, this research suggests a new enhancement strategy for improving the performance of face recognition systems in unconstrained situations. To improve recognition performance, a set of effective hybrid features that may be derived from improved photos has been given.

3. PROPOSED SYSTEM

This project uses their face to provide COVID-19 vaccination status and attest whether they have had a vaccine, as well as remind people to get vaccinated. Database from sample Aadhaar-based facial recognition system is proposed for locating and alerting non-vaccination citizens using Artificial Intelligence. Face recognition is performed via deep learning in the form of Convolutional Neural Networks (CNNs).

DCNN - CNNs are a type of Neural Network that has shown to be particularly effective in image recognition and classification. CNNs are feed-forward neural networks with a large number of layers. CNNs are made up of filters, kernels, or neurons with programmable weights, parameters, and biases. Each filter takes a set of inputs, performs convolution, and optionally adds non-linearity to the mix. As shown in Fig.3.1, a typical CNN architecture may be seen. Convolutional, pooling, Rectified Linear Unit (ReLU), and Fully Connected layers make up CNN's structure.

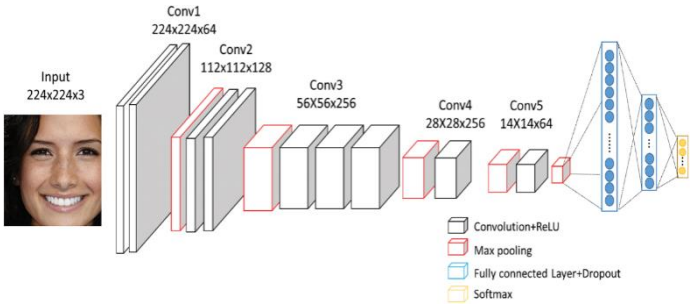

Fig 3.1: DCNN Architecture

- The basic building component of a Convolutional Network, the Convolutional Layer, handles the majority of the computational hard lifting.
- Each activation map's dimensionality is reduced by the pooling layer, but the most crucial information is retained.
- ReLU is a non-linear operation that comprises rectifier-based units. It's an element-by-element operation, meaning it's applied per pixel and replaces all negative values in the feature map with zero.
- Every filter in the previous layer is connected to every filter in the following layer, which is referred to as a fully connected layer (FCL).
- The sum of the Fully Connected Layer's output probabilities is 1. The SoftMax is used as the activation function to ensure this. The SoftMax function squashes a vector of arbitrary real-valued scores into a vector of zero to one value that add to one.

4. ARCHITECTURE DESIGN

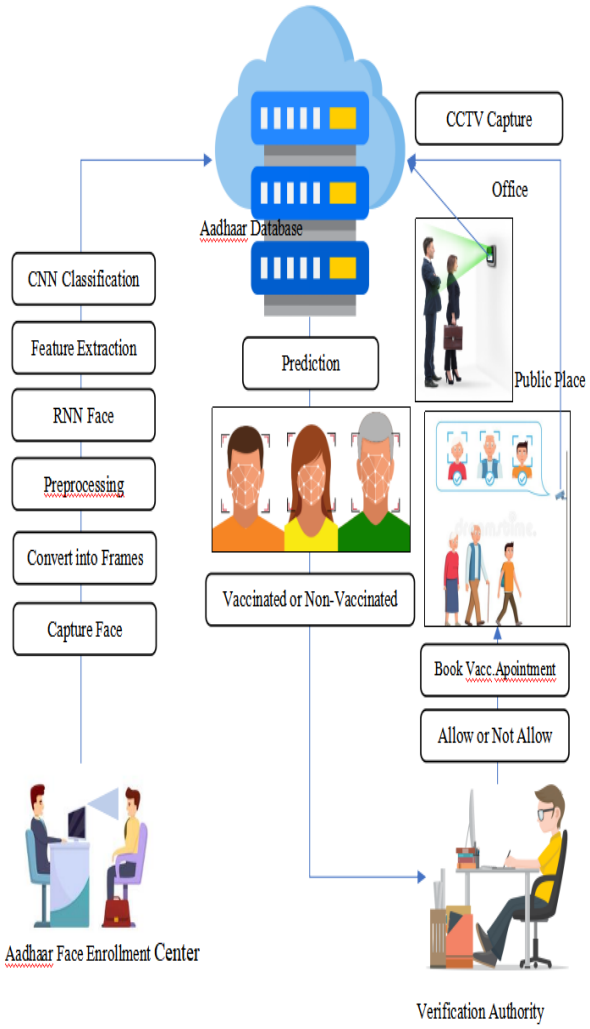

Fig 4.1: Architecture design for proposed system

Once the facial recognition models have been trained, they are applied following the results obtained in the second stage. In this way, in addition to defining whether the person uses the bio safety material, it is possible to know their identity. This as long as the face is within the selected database. These obtained models are applied to the previously identified faces, and a label is returned with the name and the probability of a match in the face.

4.1 Face Recognition

1.Face Enrollment

This module starts by registering a few Aadhar UIDAI frontal face templates. The templates for the other poses, such as tilting up/down, moving closer/further, and turning left/right, are then evaluated, and registered using these templates as a guide.

2. Face Image Acquisition

CCTV cameras should be used to capture important video. A webcam is used to connect the computer and the camera.

3. Frame Extraction

From the video input, frames are extracted. The video must be separated into a series of pictures, each of which must be processed separately. Individual implementation determines the speed at which a video must be divided into pictures. We can estimate that 20-30 frames per second are captured and sent to the next phase.

4.Pre-processing

The actions taken to format images before they are used by model training and inference are known as face image pre-processing.

5.Face Detection

The Region Proposal Network (RPN) creates RoIs by sliding windows on the feature map through anchors of various scales and aspect ratios. Based on improved RPN, a method for detecting and segmenting faces has been developed.

6. Feature Extraction

Following face detection, the face image is fed into the feature extraction module, which extracts the key features for classification. Each position automatically extracts facial information such as the eyes, nose, and mouth, which is then utilised to determine the impacts of the variation based on its relationship to the frontal face templates.

7. Face Classification

During the enrolment process, DCNN algorithms were developed to automatically recognise and reject incorrect facephotos. This will guarantee appropriate enrolment and, as a result, the best potential results.

5. EXPERIMENTAL RESULT

A comparison of the proposed Deep Convolutional Neural Network (DCNN) system's accuracy to Support Vector Machine (SVM), Linear Discriminant Analysis (LDA), Principal Component Analysis (PCA), as statistical approaches, Multi-Layer Perceptron (MLP), Combined Radial Basis Function (CRBF), as neural network approaches, Deep Restricted Boltzmann Machine (DRBM), Deep Belief Neural Nets, as neural network approaches, Deep Restricted

Boltzmann Machine (DBNN). The results suggest that the proposed DCNN outperforms existing techniques in terms of accuracy.

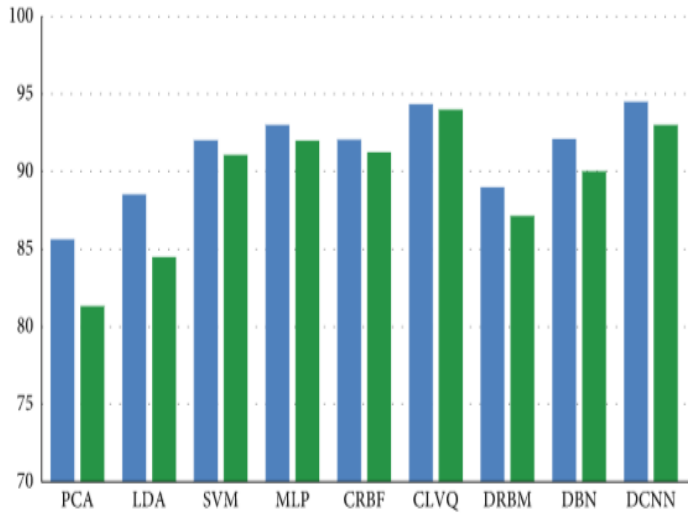

Fig 5.1: Face Recognition Accuracy

Fig 5.2: Face capture

Fig 5.3: Face verification

Fig 5.4: Vaccination Status

6. CONCLUSION

A facial recognition system is a technology that can match a human face from a digital image or a video frame against a database of faces. It works by locating and measuring facial features from a given image and is commonly used to verify users through ID verification services. A facial recognition-based person's current vaccination status to defend against COVID-19 can subsequently be used for continuity of care or as proof of vaccination for purposes other than health care in the context of the coronavirus illness (COVID-19) pandemic. Facial recognition technology (FRT) and Aadhaar will be used to authenticate people before they can access any services. This project uses their face to provide COVID-19 vaccination status and attest whether or not an individual has got a vaccine, as well as to alert them.

7. FUTURE ENHANCEMENT

For the future, we will proceed to enhance the proposed classifier performance to be able to handle the spoof attacks problem that may be occurred by fake subjects. Also, we can apply this technique to vote anywhere in India.

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