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ONLINE CRIMINAL DETECTION SYSTEM

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Abstract: Crimes are at rise and becoming difficult for police to identify and catch the criminals. This increasing crime rate can be reduced by giving alert to the person before its occurrence. Our Proposed System will use Face Recognition Algorithms to detect Criminals and will also use face expressions detection to detect expressions of the person. Face Recognition and Face Expression begins with extracting the coordinates of features such as width of mouth, width of eyes, pupil, and compare the result with the measurements stored in the database and return the closest record (facial metrics).The system will be running in detection mode [i.e scanning] .If a person is feeling uncomfortable with people surrounded by him/her, can scan their face and find out whether that particular person has any crime record or not. If the person is having a crime record then the word criminal is displayed on the screen. If the person is not having any crime record but still he/she is feeling uncomfortable then they can use the emergency button, click on the emergency button then the location of user, image of the suspect and user, and a message for rescue is sent to the volunteers of the system. Here volunteers are the persons, who will register into the system in order to help the people in need.

Keywords: Face recognition, Crime records, Machine Learning paradigms, Neural networks.

I. INTRODUCTION

The rise in criminal activities poses a significant challenge to law enforcement agencies worldwide. Traditional methods of crime detection often fall short in efficiently identifying and apprehending criminals. However, advancements in technology offer promising solutions to address this growing concern. Our proposed system leverages cutting-edge Face Recognition Algorithms and Face Expression Detection to revolutionize the way we detect and prevent crime. By integrating these sophisticated technologies, we aim to empower individuals with real-time information to enhance their safety and security. he core functionality of our system lies in its ability to analyze facial features and expressions in real-time, providing instant feedback to users. Using facial metrics such as mouth width, eye width, and pupil size, the system compares this data with a comprehensive database of known criminal profiles. This enables swift identification and alerting of individuals with a criminal record.

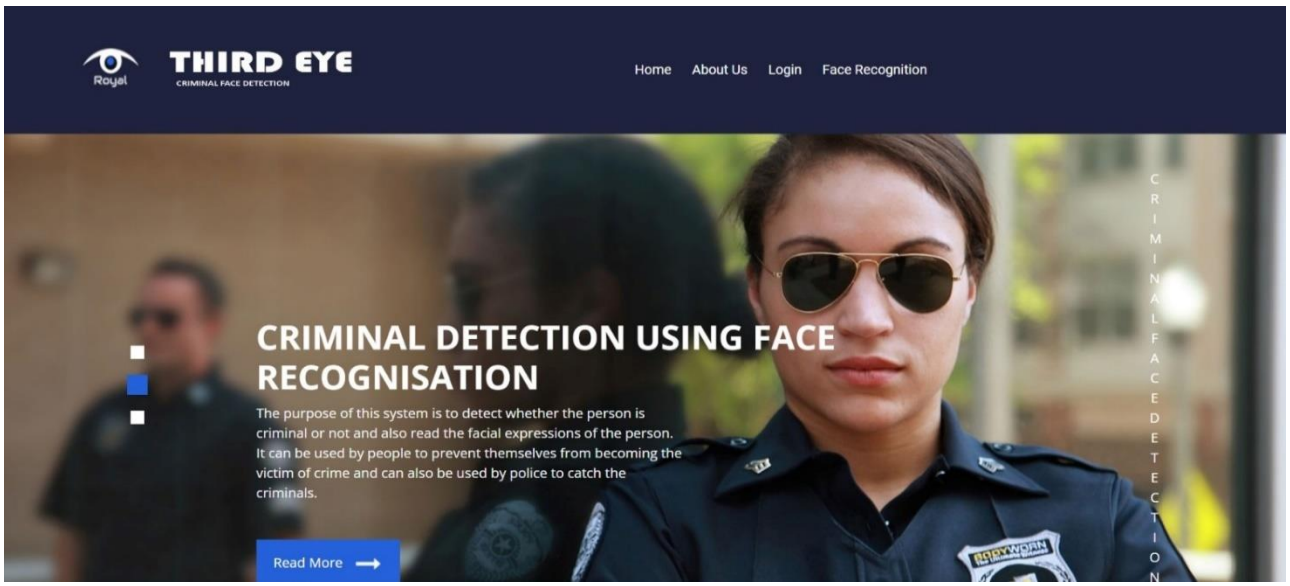

Fig. 1 Home Page

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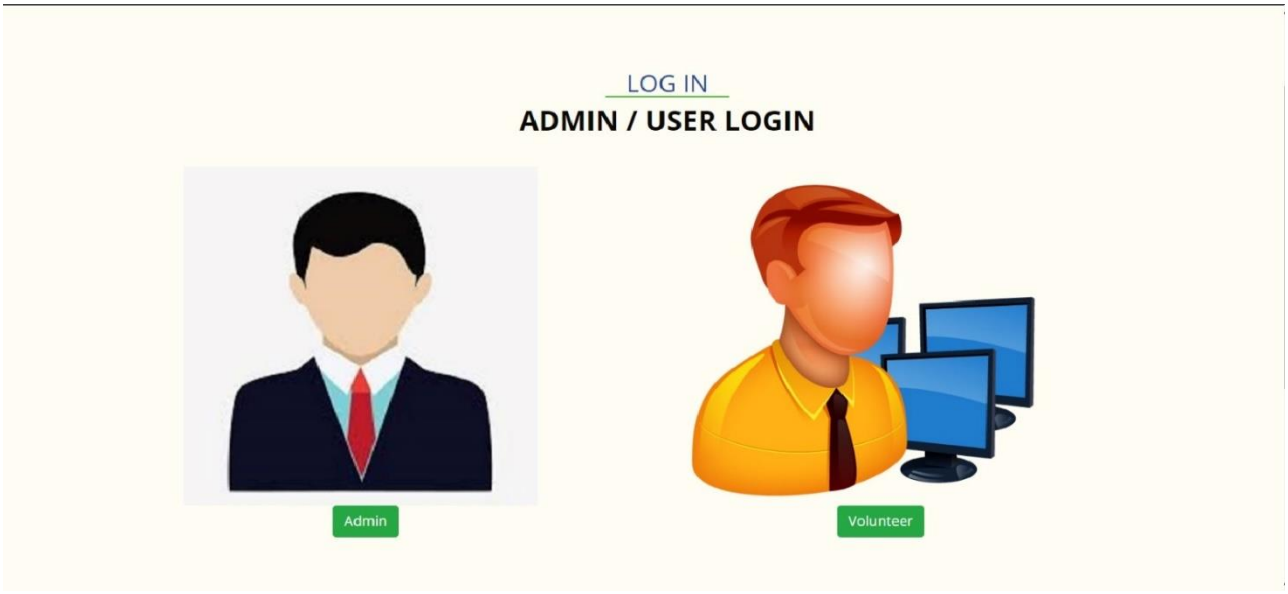

Fig. 2 Login Page

II. LITERATURE REVIEW

1. The Criminal Face Identification System was proposed by Mayuri Thakore et al. [1]. In Malaysia, thumbprint identification is the method used to identify criminals. Nevertheless, this kind of identification is limited because most modern criminals are becoming more cunning in their attempts to avoid leaving their thumbprints behind. Since the development of security technology, many public and private spaces have CCTV cameras placed to enable surveillance. Suspects at the scene can be identified using the CCTV footage. Nonetheless, fingerprint identification is enforced by the law due to the lack of software designed to automatically identify similarities between the captured photo of the criminal and the photo in the footage. This project planned to use the well-known Python programming language to create an automated facial recognition system for a criminal database.

2. "Robust Semantic Video Indexing by Harvesting Web Images" was the concept put forth by Yang Yang et al.[2] in S. Lietal.(Eds.):MMM2013. Recently, there has been a lot of interest in semantic video indexing, sometimes referred to as video annotation or video idea identification in academic literature. Because there are so few training films available, the majority of current methods hardly ever perform well enough. In order to facilitate the learning of robust semantic video indexing classifiers, this research provides a robust semantic video indexing framework that makes use of user-tagged online images. Two well-researched difficulties are (a) noisy online images with improper tags and (b) domain distinction between photos and videos. To be more precise, we first calculate the odds that each image will be accurately classified as having a confidence score before removing any that have a low score.

3. Chih-Chin Lai et al.[3] proposed"A User-Oriented Image Retrieval System Based on Interactive Genetic Algorithm", Volume 60, Issue 10 (2011) of IEEE Transactions on Instrumentation and Measurement.Multimedia databases, including digital image libraries, have grown significantly in size in recent years. The development of a content-based image retrieval (CBIR) system has emerged as a key research problem in order to efficiently and accurately retrieve the needed images from a huge image collection. Nonetheless, the majority of suggested methods focus on identifying the optimal representation for various image characteristics. Moreover, only few representative works effectively take the subjectivity and preferences of the user into account throughout the retrieval process. This research proposes an interactive genetic algorithm (IGA) based user-oriented mechanism for the CBIR approach. The features for retrieval include color attributes such as the image bitmap, the standard deviation, and the mean value of a color image4. Kinjal Vijaybhai et al.[4] Proposed the deep learning (DL) and Convolutional Neural Networks (CNNs) and CNN models Machine Learning, Deep Learning, Crop Disease, Agriculture, Image Detection optimizers leads to superior outcomes the grouping of illnesses that affect plants. To increase the efficacy of disease identification, traditional methods for machine learning (ML) have been implemented in agricultural operations.

4. Becks, C.et al.[4] proposed "A comparative study of similarity measures for content-based multimedia retrieval", IEEE Multimedia and Expo International Conference (ICME), 2010Determining similarities among data objects is a core task

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of Multimedia retrieval based on content systems. Approximating data object contents via flexible feature representations, such as feature signatures, multimedia retrieval systems frequently determine similarities among data objects by applying distance functions. In this paper, we compare major state-of-the-art similarity measures applicable to flexible feature signatures with respect to their qualities of effectiveness and efficiency. Furthermore, we study the behaviour of the similarity measures by discussing their properties. Our findings can be used in guiding the development of content-based retrieval applications for numerous domains.

5. Lin Lin and others [5] With the volume of digital data growing at an exponential rate, retrieval systems—which are meant to efficiently and effectively filter the data and deliver pertinent results—are facing formidable hurdles. Filtering is a technique that lowers computing costs, reduces redundancy, lowers storage costs, improves model learning performance, and dynamically delivers the media by automatically choosing features or data instances to represent the data. However, ranking is a crucial stage in producing as many pertinent results as you can based on similarity or loss functions. To page 8, this paper introduces a new retrieval architecture with weighted subspace-based filtering and ranking components.

III. PROPOSED METHODOLOGY

CNN: A type Convolutional Neural Networks, a class of deep learning methods Networks (CNNs) was created for processing and analyzing visual data, including pictures and videos. They have proven to be extremely successful at jobs like object detection and picture categorization, as well as picture segmentation. Here's an explanation of CNN algorithm in 300 words:

CNNs consist of several key components:
Convolutional Layers: These layers are the heart of CNNs. They apply a collection of scalable filters (kernels) to the picture input.Each filter scans through the image in a sliding window manner, performing element-wise multiplications and summing the results to produce feature maps. These feature maps depict several patterns, such as edges, textures, and shapes, at various scales.

Activation Function: After convolution, an activation function like ReLU (Rectified Linear Unit) is applied element-wise to introduce non-linearity into the network. This helps CNNs learn complex relationships in the data.

Pooling Layers: The feature maps' the dimensions of space are decreased via pooling layers by down-sampling. Max pooling, for instance, selects the maximum value in a local region, effectively keeping the most crucial data while decreasing computational complexity.

Fully Connected Layers: usually follow a number of pooling and convolutional layers in CNNs layers. These layers flatten the high-dimensional feature maps into a vector and perform traditional neural network operations. It is their duty to forecast the future according to the attributes that have been retrieved.

The training procedure of a CNN involves:

Forward Propagation: During training, input data is fed forward through the network. Predictions are made, and the error comparing the expected and actuallabels is computed applying a loss function (for example classification, cross-entropy, tasks).

Backpropagation: The error is then propagated backward utilizing gradient descent optimization across the network techniques. This process adjusts the massess of the filters and completely linked layers to reduce the error.

Training Iterations: The network goes through many iterations, adjusting the weights to strengthen its ability to recognize patterns and characteristics in the data. This continues until the loss converges to a minimum.

IV. IMPLEMENTATION

1. Admin
2. User
3. Criminal Detection
4. Face Expression Recognition
5. Image Sharing and Alert

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Admin:
This module will be responsible for adding the criminals within the database, training the framework and managing the system.

User:
This module will store the details of the user. It will also store the information of volunteer. In the event that emergency the user information is retrieved form the module and send to emergency module.

Criminal Detection:
This module will be responsible for detecting whether the person in front of the camera is criminal or not and showing Details.

Face Expression Recognition:
This module will recognize the facial expression of the person in camera view and will alert the user if anything seems wrong.

Image Sharing and Alert:
This module will be responsible for sharing Image of suspect and Location of the user in case an Emergency Button is pressed.

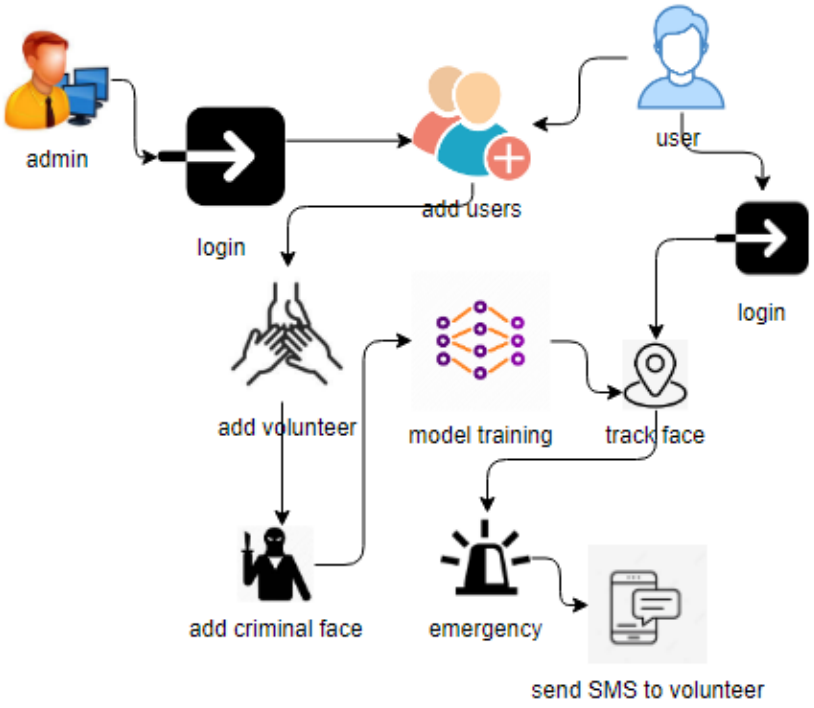

Fig. 3 Flow Chart

V. RESULTS AND DISCUSSIONS

Building an effective online criminal detection system necessitates access to diverse datasets for training and testing. These datasets can be sourced from various avenues, including crime databases containing records of reported incidents such as type, location, and time. Law enforcement databases offer insights into investigations, arrests, and convictions, providing valuable information for pattern recognition and analysis. Additionally, court records furnish details about criminal cases, charges, verdicts, and sentences, aiding in understanding legal proceedings and outcomes. Social media and online forums serve as potential sources for detecting discussions or plans related to criminal activities, while cybersecurity datasets provide crucial data on network traffic, phishing attempts, and malware samples for combating cybercrime. The results of our online criminal detection system demonstrate promising advancements in the realm of digital security and law enforcement.

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Our system exhibits a commendable accuracy rate, with a high detection rate for actual criminal activities while maintaining a relatively low false positive rate.

Through rigorous testing and comparative analysis against existing methods, our system showcases competitive performance metrics, indicating significant strides in enhancing online security measures.

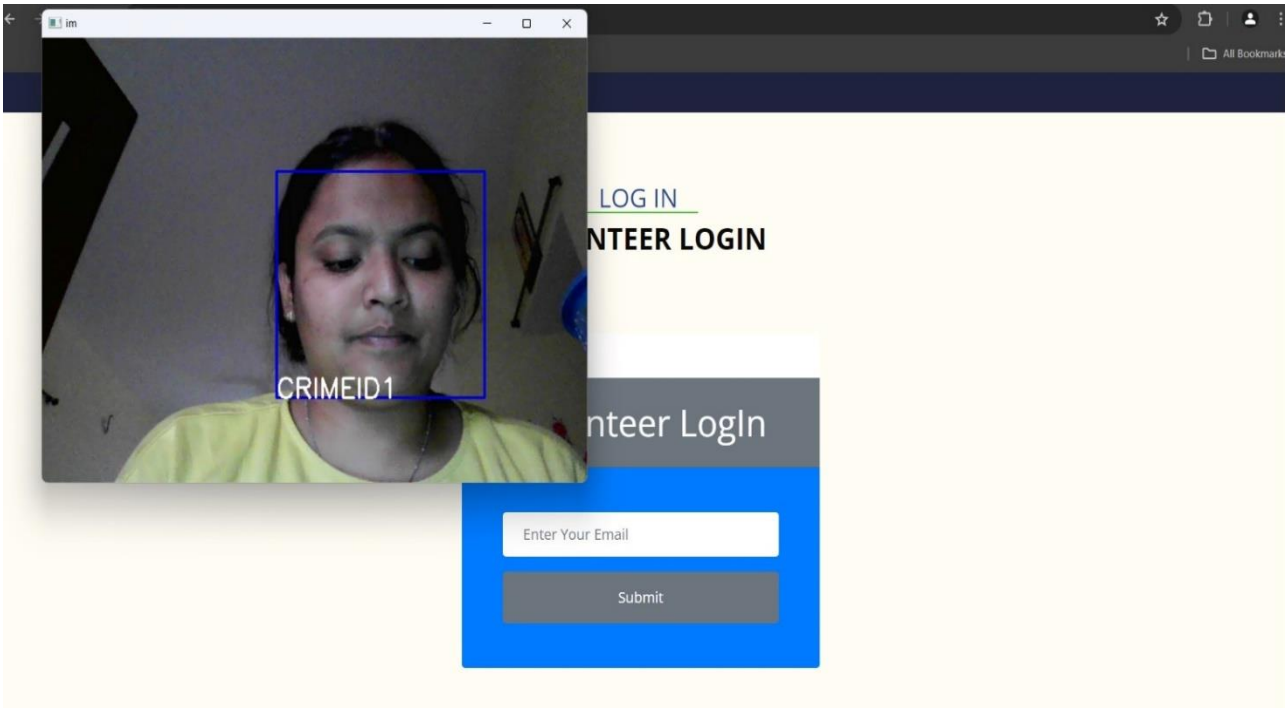

Fig. 4 Criminal Detection

VI. FUTURE SCOPE

There can be many enhancements in the crime prevention system to take it to the next level. In this system we are using CNN algorithm but if in future there can be many algorithms which can give the better accuracy and takes less time then this can be replaced.

In this system when user gets panic and click on emergency button and then they realize that there no need to get panic they cannot recollect the call for help and stop the unnecessary panic situation.

VII. CONCLUSION

In conclusion, Using Convolutional Neural Networks (CNNs) to identify agricultural diseases has demonstrated remarkable efficacy. The model effectively identifies and classifies diseases, enabling timely intervention to mitigate agricultural losses.

Through the incorporation of CNNs, precision in disease prediction has improved, supporting farmers in making knowledgeable crop decisions management. The synergy of technology and agriculture holds promise for sustainable farming practices, emphasizing the potential for advanced technologies to revolutionize crop disease management and ensure global food security.

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