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Identifying Missing Individual using AI

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Abstract: *In recent days, the daily increase in many of the missing persons has made it increasingly challenging to locate them. To get over this challenge, machine learning algorithms, particularly facial recognition, can be employed to identify missing individuals. This approach aims to simplify the search process for both parents or guardians and the police. In this system, parents or guardians of the missing person upload a photo, which is stored in a database. The facial recognition algorithm then utilizes k-nearest neighbors (k-NN) to search for a match within the database. If a match is detected, both the police and the parents or guardians are alerted. Experimental outcomes tells that users appreciate the new features of the application and find the system user-friendly.*

Keywords: K-nearest neighbors (k-NN), Machine learning, Facial recognition algorithms

I. INTRODUCTION

This work aims to tackle the global challenge of locating missing individuals, a unique problem for law enforcement agencies, humanitarian organizations, and communities. Each year, many people vanish under various circumstances, leaving their families without answers. Recent advancements in facial recognition algorithms present a promising solution to aid in the search and recovery efforts for missing persons. Facial recognition technology offers immense potential due to its power of swiftly analyze and compare facial features across large datasets. By analyzing deep learning techniques and sophisticated algorithms, new facial recognition systems can accurately identify individuals, even under critical situations such as poor image quality or changes in appearance over time. Missing individuals often include children or adults who are lost, either intentionally or unintentionally. In India, no support for dedicated budget for locating missing persons, according to a government source. These individuals face numerous severe risks, including death, assault, and other forms of harm. Enhancing efforts to address these challenges through advanced technology, increased resources, and increased merging among law enforcement agencies, humanitarian organizations, and communities is crucial for reducing the risks faced by missing persons and reuniting them with their families.

II. LITERATURE SURVEY

S. Ayyappan et. al. in [1] utilized a group of face recognition technology and web scraping techniques to identify criminals and missing children. The system captures pictures from different sources, like social media and public databases, and compares them against a database of missing persons and criminal records using facial recognition algorithms. In 2021, Shefali Patil et. al. in [2] developed a system using Machine Learning algorithms to identify missing persons, training a neural network with a large dataset of images and applying image processing techniques to enhance detection accuracy. Sarthak Babbar et. al. in [3] proposed using deep residual networks (ResNets) to address the challenge of cross-age face recognition, training the network to recognize faces despite changes over time by learning robust deep features. Bharath Darshan Balar et. al. in [4] created an efficient face recognition system utilizing advanced image processing and machine learning techniques to identify lost individuals, integrating multiple stages of preprocessing, feature extraction, and classification to enhance accuracy. Sanskar Pawar et. al. in [5] focused on developing an AI-based system using convolutional neural networks (CNNs) to detect and identify missing persons from images and videos, processing real-time video feeds and static images to extract facial features for comparison against a database. The authors in [6] also used deep residual networks to handle cross-age face recognition challenges, fine-tuning the ResNet model to enhance robustness to aging effects. Roshin John et. al. in [7] worked on face detection and

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tracking algorithms to locate missing persons, using a combination of Haar cascades and deep learning-based methods to detect and track faces in real-time video streams. M. Bharathwaj et. al. in [8] developed a system using Deep Learning techniques for identifying missing children, employing convolutional neural networks (CNNs) to recognize and match faces. Abhinay Chaukade et. al. in [9] implemented a combination of AI and machine learning techniques to develop a system for finding and matching lost victims, training models on various datasets to improve recognition accuracy using the K-NN algorithm. Swarna Bai Arnikar et. al. in [10] used an RFID-based system for identifying missing persons, merging information from different sensors and databases to track individuals. The authors in [11] proposed developing a mobile-based web service to search for missing people, utilizing mobile technology to collect and disseminate information, including photos and descriptions, to the public and law enforcement agencies. The authors in [12] used an Android-based application to assist in finding missing persons, integrating facial recognition, a database of missing persons, and real-time notifications to alert users when a match was found. The authors in [13] developed an AI-based system for locating missing persons, using machine learning algorithms for image and video analysis, facial recognition techniques for identifying individuals, and geographic information systems (GIS) for tracking locations. The authors in [14] used Local Binary Patterns (LBP) for periocular recognition to enhance face recognition performance under challenging conditions, focusing on the eye region to mitigate the impact of occlusions and facial expression variations. The work in [15] investigated the Local Binary Patterns Histogram (LBPH) algorithm for face recognition, applying it to a dataset of missing persons in Zimbabwe.

III. PROPOSED METHOOLOGY

Machine Learning (ML) is a field of study that gives computers to seek from information without explicit programming. ML stands out as one of the most groundbreaking technologies, providing computers with the chance to seek and adapt in a manner similar to human learning. As illustrated in Fig. 1, the model diagram for Machine Learning demonstrates the structured nature of this process. The term "Machine Learning" itself implies that ML imparts computers with learning abilities similar to those of humans. Some popular machine learning algorithms include k-Nearest Neighbor (k-NN), Convolutional Neural Network (CNN), Random Forest algorithm, Linear Regression, Logistic Regression, and Decision Tree, among others. In this work, the k-NN algorithm was employed to detect photos.

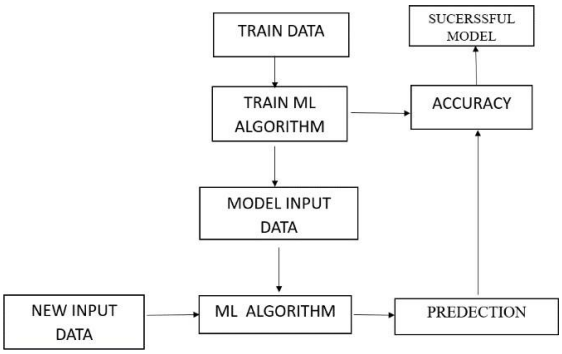

Fig 1: Machine learning model diagram

k-Nearest Neighbors (k-NN)

k-Nearest Neighbors (k-NN) is a supervised machine learning algorithm used for classification and regression both of tasks. As illustrated in Fig. 2, the k-NN algorithm functions by evaluating the distance of the nearest 'k' data points within the feature space. When encountering an unseen data item, k-NN assigns it to a particular class based on the majority vote of its nearest neighbors. This non-parametric method doesn't involve the information to stick to a specific distribution. Known as a lazy learner algorithm, k-NN doesn't rapidly learn from the training set. Instead, it relies on distance calculations, such as the Euclidean distance, to identify files with high similarity. Its simplicity and straightforward approach make k-NN user-friendly and easy to understand

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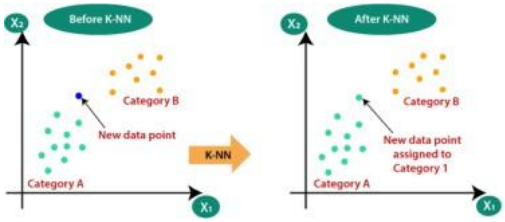

Fig 2: k-Nearest Neighbors (k-NN)

This work employs the k-Nearest Neighbors (k-NN) algorithm to detect and identify missing persons. The system enables individuals or their families to manually upload an image of the missing person. Pre-trained models, such as shape_predictor_68_face_landmarks.dat and dlib_face_recognition_resnet_model_v1.dat, are used to match or identify the missing individual. Using these pre-trained models, image features are extracted and analyzed using the k-NN algorithm. Fig. 3 illustrates the flow chart for identifying a missing individual with the k-NN algorithm. Fig. 3 illustrates the flow chart for identifying a missing individual using the k-NN algorithm. To classify the image there are few steps to follow: First step is, the new image needs to be pre-processed to ensure it is in the correct format for analysis. Then one need to get the image from the user which has been provided manually. The next step is to identify the Euclidean distance to find the k-Nearest Neighbors. Finally, the result is obtained from these steps. Using pre-trained models for feature extraction hold the ability of deep learning models trained on large datasets, providing robust features for k-NN classification.

The system workflow begins with a new user being provided with a username and password. Upon successful validation of the password, the user logs into the main page and fills in the details of the missing person, which are kept in the storage database. The model then matches the new image of the missing person using the k-NN algorithm. If a match is found, the result is returned; if not, the image is kept in the database for future reference.

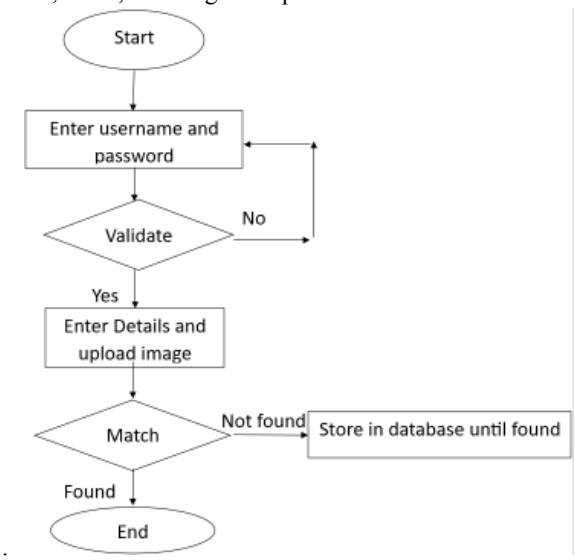

Fig 3: Flow Chart

IV. RESULT

The user will first log in using a username and password. Fig. 4 shows the layout of the login page in the application. After logging in, the system will navigate to the main page where the user can upload an image. Fig 5 illustrate the application interface where users can register a new case. The user registers a new case by uploading an image, filling in the details, and saving the information. Fig. 6 illustrates how users can register a new issue of a missing person. Finally, the stored image is made comparison with the images in the missing person database. Fig. 7 shows the identified individuals who were found.

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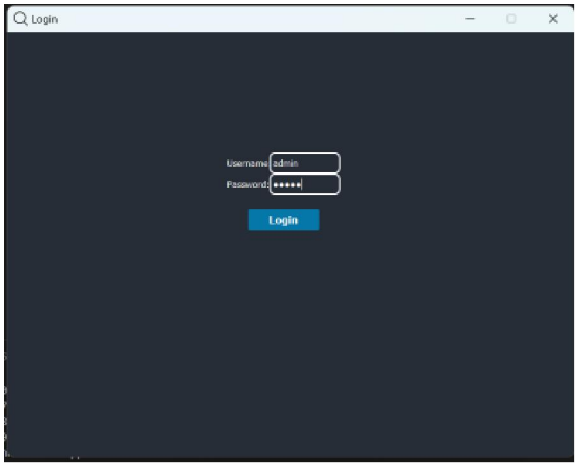

Fig 4: It's a login page

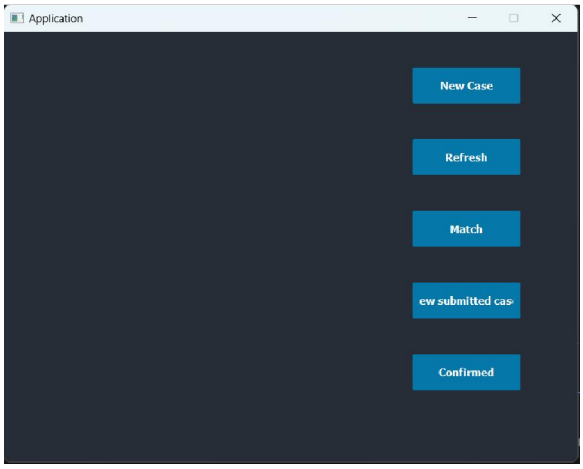

Fig 5: The application where the user will register a new case

Fig 6: To register new case of the missing person

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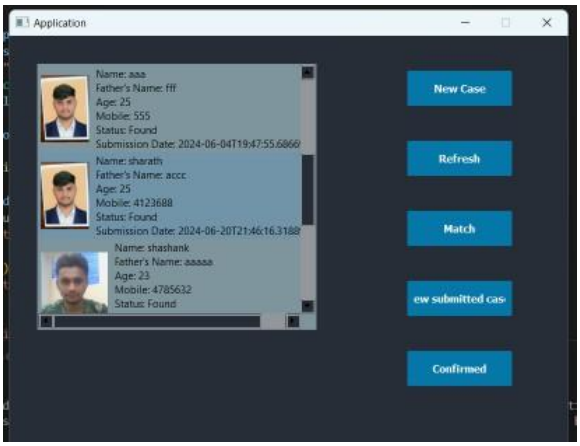

Fig 7: This is the found person

V. CONCLUSION

The area of using Machine Learning for locating missing individual has shown significant advancements through various methodologies and technologies. ML can search for missing individuals faster and more accurate. By using various Machine Learning techniques algorithm like k-NN (k-Nearest Neighbor), CNN (Convolutional Neural Network), Random Forest algorithm, Linear regression, Logistic Regression, Decision Tree etc., one can find the missing individual

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