MISSING CHILD IDENTIFICATION USING FACE RECOGNITION

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Abstract- ***Face recognition is an eminent technology for identification of individuals from digital images or videos, and has become increasingly important due to advances in digital cameras, mobile devices, and the Internet. This technology is particularly useful for security purposes, and is also used for locating missing children. To create a facial recognition system, computer algorithms are used to reduce the complexity of images and extract important features, which are referred to as Eigen faces. These characteristics represent the main elements of a collection of faces, but they may not directly relate to actual facial attributes such as ears, noses, and eyes. One popular algorithm for facial recognition is the Local Binary Patterns Histograms (LBPH) recognizer, which uses a combination of texture and color information to identify individuals. Facial recognition systems are frequently implemented using OpenCV, which is a computer vision library that is available as an open-source software.***

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Keywords--- Face recognition, Missing child and open cv, LBPH Recognizer.

I. INTRODUCTION

Facial recognition technology has proven to be an invaluable tool in finding missing children. By analyzing images and videos captured from surveillance cameras, social media, and other sources, facial recognition algorithms can identify and match a missing child's face with images from different locations and times. This technology has been used by law enforcement agencies and non-profit organizations around the world to reunite missing children with their families.

One of the major advantages of using facial recognition for finding missing children is its ability to analyze vast amounts of visual data in a short period of time. In situations where time is of the essence, this technology can quickly sift through images and videos to identify potential matches and help focus search efforts. Moreover, facial recognition algorithms can detect and analyze facial features, even when a child's face is partially obscured, which can help in situations where only limited information is available.

In addition to its speed and accuracy, facial recognition is also a non-invasive and passive technology that can be used without causing any harm to the missing child. Unlike traditional identification methods, such as fingerprinting, facial recognition does not require physical contact, making it a more comfortable and less traumatic experience for the child. This is especially important in cases where the child has been traumatized or is in a vulnerable state.

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So, facial recognition technology provides a powerful tool for finding missing children quickly and efficiently. Its ability to analyze vast amounts of data, detect and match facial features accurately, and do so without causing any harm to the child make it an invaluable asset in the fight against child abduction and trafficking.

II. LITERATURE SURVEY

Face detection and recognition are crucial tasks in computer vision with various practical applications such as security, surveillance, and biometrics. This literature survey presents an overview of some of the recent works in these areas.

The survey by Hjelmas and Low [1] provides a comprehensive review of various face detection techniques. They categorize the techniques based on the underlying principles such as template matching, feature-based approaches, and appearance-based methods. The paper also covers various challenges such as varying illumination, occlusion, and pose, and discusses some of the popular face databases used for benchmarking.

Mishra and Dubey [2] present a survey of face recognition approaches that includes both traditional and deep learning-based methods. They discuss the advantages and limitations of various feature extraction methods such as PCA, LDA, and Gabor filters, and describe the popular classification techniques such as SVM, KNN, and neural networks. The paper also covers the challenges in face recognition such as pose, expression, and lighting variations.

Jafri and Arabnia [3] provide a survey of various face recognition techniques with an emphasis on the recent advancements in the field. The paper covers both traditional and deep learning-based methods and discusses the advantages and limitations of various approaches. The authors also provide a comparison of some of the popular face recognition databases used for evaluation.

Principal Component Analysis (PCA) is one of the popular feature extraction methods used in face recognition. Smith [4] provides a tutorial on PCA that explains the underlying principles and applications of this method. Bahurupi and Chaudhari [5] describe the use of PCA for face recognition and compare its performance with other feature extraction techniques. Abdullah et al. [6] propose an optimization technique for PCA-based face recognition that improves the accuracy of the system.

Wong et al. [7] propose an efficient algorithm for face detection and facial feature extraction that is robust to variations in illumination, pose, and expression. The algorithm uses a combination of skin color modeling and edge detection to detect faces and facial features. Ahonen et al. [8] propose a face recognition method based on local binary patterns that achieves high recognition accuracy with a low computational cost. Viola and Jones [9] propose a cascade of boosted classifiers for rapid face detection that has become a popular method in the field. Zhang and Zhang [10] provide a review of face detection methods in unconstrained environments, including the challenges in this area and the recent advancements.

In conclusion, this literature survey highlights some of the recent works in face detection and recognition. The survey covers various techniques and methods, including traditional and deep learning-based approaches, feature extraction and classification techniques, and challenges in face detection and recognition.

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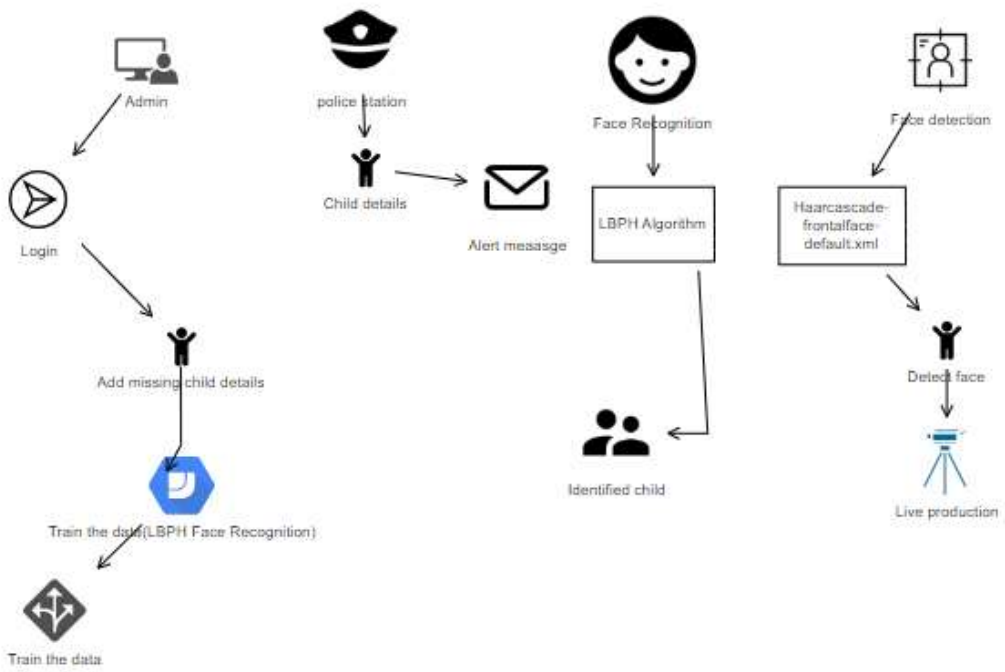
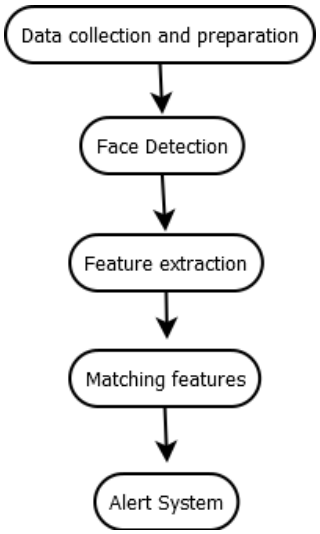
III. ARCHITECTURE DIAGRAM



IV. METHODOLOGY



Data collection and preparation: The dataset contains images of missing children and their potential matches. The images are pre-processed to improve the quality and reduce the noise. The pre-processing steps include resizing, grayscale conversion, and histogram equalization.

Face detection: The OpenCV library and Haar Cascade classifier are used to detect faces in the images. The Haar Cascade classifier is a popular method for object detection and is trained to recognize frontal faces.

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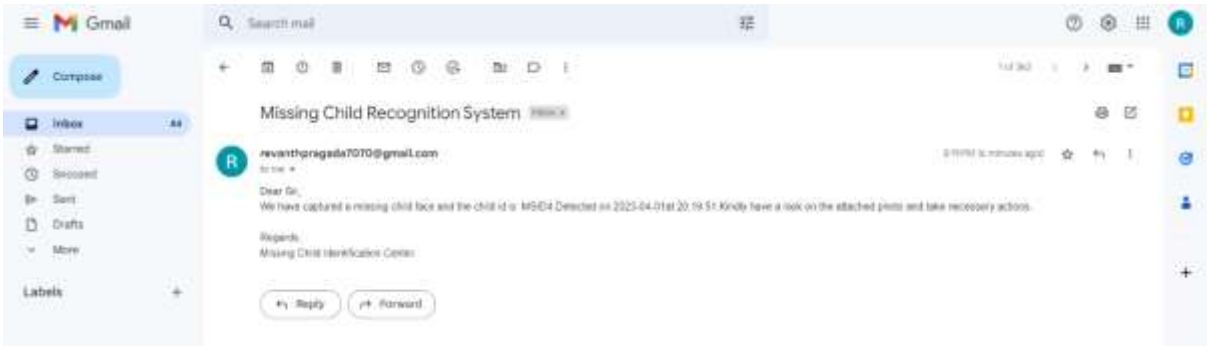
Feature extraction: Once the faces are detected, the LBPH algorithm is used to extract features from the detected faces. LBPH is a robust face recognition algorithm that is computationally efficient and requires minimal training data.

Matching: The detected faces are matched with the missing children's database by comparing the features extracted from the detected face with the features of the missing children's database. The Euclidean distance is used as the distance metric for comparing the features. If the distance between the detected face and a missing child's face is below a threshold, the two faces are considered a match.

Alert system: When a missing child is found and recognized on the screen with their name, an email alert is immediately sent to notify the relevant authorities and parents. This helps to ensure that the child is found and returned safely.

V. RESULTS AND ANALYSIS

The result of the system described is a real-time facial recognition system that uses OpenCV, a deep learning and machine learning technique, along with the Local Binary Patterns Histograms algorithm. The system then produces an output on the screen with the identity of the recognized person and trigger a SMS to parent phone number and trigger a email to concern authorities.



This email will be triggered to the authority who handles the website.

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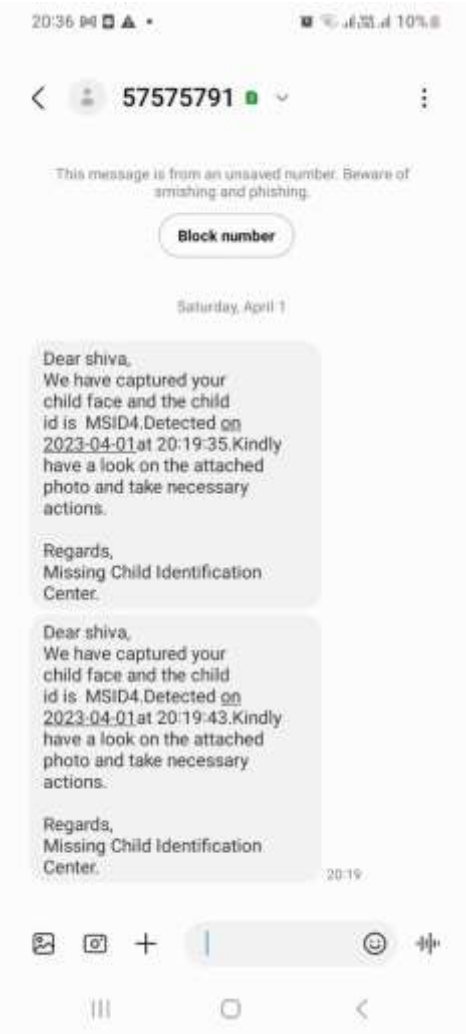

This message will be sent to the parent mobile number entered in the website while registering the child details in website.

VI. CONCLUSION AND FUTURE SCOPE

This project demonstrates the ability to detect and recognize the faces of children in real time using images and video streams obtained from a camera. In this approach, face detection is performed through feature-based Haarcascade classifiers, which is a machine learning technique that involves using a cascade function trained on a collection of positive and negative images to detect objects in other images. The implementation of this approach was done using OpenCV. Additionally, Local Binary Patterns Histograms (LBPH) were used for face recognition, allowing the model to recognize multiple faces in a single frame or video. As an example, if a missing child is passing through an area under surveillance, the model can be trained with the child's face to identify them if detected.

VII. REFERENCES

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