International Journal on Science and Technology (IJSAT)
E-ISSN: 2229-7677 ● Website: www.ijsat.org ● Email: editor@ijsat.org

Face Detection of Lost Person & Criminals Using Image Processing

Wasim Shaikh[1], Suraj Shedge[2], Akash Temgire[3], Prathamesh Shinde[4], Dr. Anita Mahajan[5]

[1,2,3,4,5]UG students and Professor at Computer Engineering Department, Dr. DY Patil School of Engineering and Technology, Pune, Maharashtra, India

ABSTRACT:
The "Face Detection System of Lost Person & Criminals" project is an example of a multipronged strategy to improve security and safety for the general population. In order to monitor and enforce the wearing of face masks in public places, particularly during the present pandemic, it makes use of computer vision and artificial intelligence technology. The method can simultaneously detect lost people by comparing their faces to a database of missing people and identify possible offenders by comparing law enforcement databases with facial data. In addition to improving public health, this cutting-edge system helps law enforcement detect and detain those with criminal histories, creating a safer and more secure environment for communities. This technology enables authorities and businesses to manage health protocols and promptly respond to occurrences involving missing individuals and suspected criminals by integrating real-time monitoring and advanced picture recognition algorithms. The synergistic integration of criminal recognition, lost person identification, and face mask detection into a single system provides a comprehensive solution for enhancing public safety and well-being.

Keywords: Face Detection, Criminal Person, Lost Person, Image Processing, Surveillance System**.**

1. INTRODUCTION

Creating a Face Detection System for Lost Persons and Criminals has become a major project in a time when public safety is becoming more and more important and sophisticated technology solutions are required. This project combines state-of-the-art deep learning and computer vision technology to tackle the many complex issues that society faces today. A system that can detect people without masks, find lost people, and flag possible criminals in public areas is an essential tool to improve safety and enforce adherence to health standards as the world struggles with security and health challenges.

Additionally, this research makes use of surveillance technologies and artificial intelligence to discover lost people and possible dangers in addition to improving mask detection. It provides a holistic solution for enhancing public safety and security by integrating these qualities, which makes it especially pertinent in a world where these issues are of utmost importance. This project report explores the creation, deployment, and performance assessment of this cutting-edge Face Detection System for Lost Persons & Criminals, demonstrating its ability to meet the changing issues facing society. Innovative applications in

public safety and security have been made possible by the convergence of artificial intelligence and surveillance systems in the current environment of technology-driven solutions.

A key tool for law enforcement agencies, public areas, and private businesses is the combination of Face Mask Detection technology with Lost Person and Criminals Detection. The Automated detection systems are essential because of the continuing global health crisis, which has highlighted the need of wearing a face mask in preventing the spread of infectious diseases. At the same time, growing public safety concerns call for intelligent systems that can quickly and correctly identify lost people and possible threats. In order to establish a smart Face Detection System of Lost Persons & Criminals, this project goes into the development and execution of a comprehensive solution that combines the accuracy of face recognition technology with sophisticated algorithms.

1. LITERATURE SURVEY

Facial recognition and other biometric technologies are utilized by criminal person identification systems, which are frequently used in law enforcement and surveillance, to identify people with criminal histories or suspicious activity [1]. By helping law enforcement find wanted criminals, these tools improve public safety and efforts to prevent crime. They do, however, raise serious privacy and ethical issues. One of the main issues with criminal person detection is the possibility of false positives and identification, which can result in innocent people being wrongfully implicated or targeted. Concerns over the use of this technology for surveillance are also present, posing issues with civil liberties and individual privacy. The goal of a safer society continues to challenge policymakers and technologists to strike a compromise between safeguarding individual rights and ensuring the efficacy of criminal person detection systems. Facial recognition and other biometric technologies are utilized by criminal person identification systems, which are frequently used in law enforcement and surveillance, to identify people who have criminal histories or engaged in suspicious activity [1]. These systems help law enforcement find criminals who are want to track and find missing people, lost person detection systems make use of cutting-edge technology like GPS, RFID, and wireless connection. In search and rescue operations, these technologies are essential since they assist [3] authorities in locating old people with cognitive disabilities, children, and lost persons. These systems suffer a number of difficulties in spite of their significance. The short battery life of tracking devices is a significant problem, particularly in isolated locations with restricted power supplies. The quality of location data is another issue since natural obstructions like mountains or dense forests, as well as crowded urban areas, can disrupt GPS signals and produce inaccurate location estimations. Continuous improvements in communication networks, signal processing algorithms, and battery technology are necessary to overcome these obstacles and guarantee the accurate and prompt discovery of missing persons.

In recent years, face mask detection technologies have drawn a lot of interest, particularly during the present global epidemic. These systems recognize people wearing or not wearing masks in public settings including airports, shopping malls, and medical facilities using computer vision and deep learning techniques. These methods have proven useful in a variety of situations, but they are not without problems. [2] The accuracy of the algorithms is a frequent issue in face mask identification, particularly when dealing with variable face forms, lighting circumstances, and mask varieties. Furthermore, the system may

mistakenly label someone as not wearing a mask or vice versa, a problem known as false positives and negatives. Making sure facemask detection technologies are accurate and dependable is essential to their widespread adoption and efficacy in advancing public health.

2. METHODOLOGY

A multi-step procedure utilizing cutting-edge computer vision techniques and deep learning algorithms is the suggested methodology for image processing-based face mask detection, lost person detection, and criminal person detection. First, the face mask detection module uses surveillance cameras or other imaging equipment to capture real-time video frames or photos. After pre-processing these frames to improve image quality and lower noise, face detection is done using methods like Haar cascades or deep learning-based face detectors like MTCNN or SSD. The detected face areas are then subjected to a mask detection model, which has been trained on a dataset of masked and unmasked faces, in order to determine whether or not a person is wearing a mask. The system uses facial recognition techniques for lost person identification, identifying possible matches by comparing observed faces with a database of missing persons.

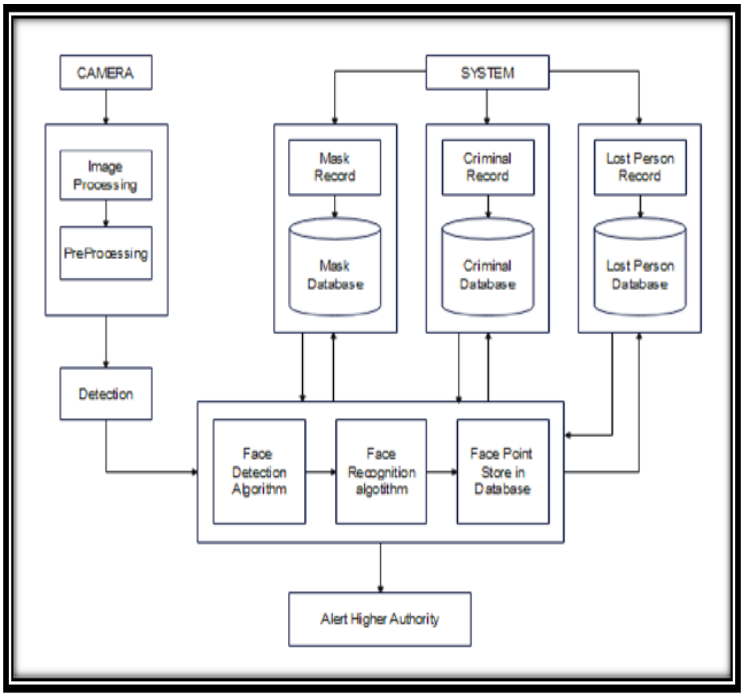

Figure 1: Proposed System Architecture

For precise facial identification, deep learning models such as Face Net or VGGFace are frequently used. Similar to the last person detection module, the criminal person detection module uses face recognition algorithms to identify and notify authorities if a match is detected in a database of known criminals' facial photographs. Using hardware acceleration techniques and parallel computing, the entire process is tuned for real-time processing, guaranteeing prompt and effective detection. Furthermore, during the training phase, strategies including data augmentation, transfer learning, and model ensemble methods can be used to improve the accuracy of the system. By smoothly integrating these modules, the suggested technique

improves public safety and security measures by developing a comprehensive image processing solution for face mask detection, lost person detection, and criminal person detection.

To evaluate the correctness of the findings, a thorough comparison of different image kinds was carried out in this study, producing very positive results. The system performed exceptionally well in both images and videos analysis, attaining a remarkable 90% accuracy rate. Interestingly, this system runs much quicker than other approaches and uses very little memory space to implement. Technology plays a crucial role in identifying offenders and missing persons, guaranteeing prompt and effective identification. Additionally, for increased efficacy, the system works dynamically, updating its information constantly. The analysis, which used real criminal photos from the internet, consistently yielded positive results. The researchers are sure that using this methodology will be crucial to lowering crime rates in our community. A large dataset of various facial photos, both with and without masks, is then carefully selected in order to efficiently train the deep learning models. Face recognition algorithms are used to find missing people and possible criminals, while Convolutional Neural Networks (CNNs) are used for mask detection and facial feature extraction. The system is included sensors and real-time video surveillance cameras to record live feeds. Techniques for image pre-processing are used to improve the quality of input images.

3. Working Module

Our goal in this project is to use cutting-edge image processing techniques to create a complete Face Mask Detection System that is integrated with Lost Person and Criminals Detection capabilities. Face mask detection, lost person identification, and criminal detection are the three main stages of the process. Convolutional Neural Networks (CNNs) will be used in the initial phase of the Face Mask Detection System to recognize people wearing masks in real time. In order to differentiate between masked and unmasked faces, we will use deep learning techniques to pre-process input photos in order to identify facial areas. To improve accuracy and speed, the system will make use of pre-trained models such as ResNet and MobileNet. In order to ensure strong performance, we will further adjust the model to handle different lighting circumstances, angles, and mask types.

The Lost Person Identification module will use facial recognition techniques like OpenFace and Dlib in the second phase. The device will detect lost people by matching captured facial traits with a database of missing people. Through iterative training and fine-tuning, the identification process' accuracy will be determined, guaranteeing dependable outcomes even in congested or partially veiled surroundings. In the last stage, the Criminals Detection module will match collected faces with a database of known offenders using facial recognition technology. The system will be integrated with law enforcement databases during this phase, allowing for the real-time identification of people with criminal histories. We will use cutting-edge algorithms to manage big datasets effectively, guaranteeing quick and precise identification. Additionally, machine learning techniques will be included into the system for ongoing enhancement, allowing it to adjust to changing criminal profiles and new faces.

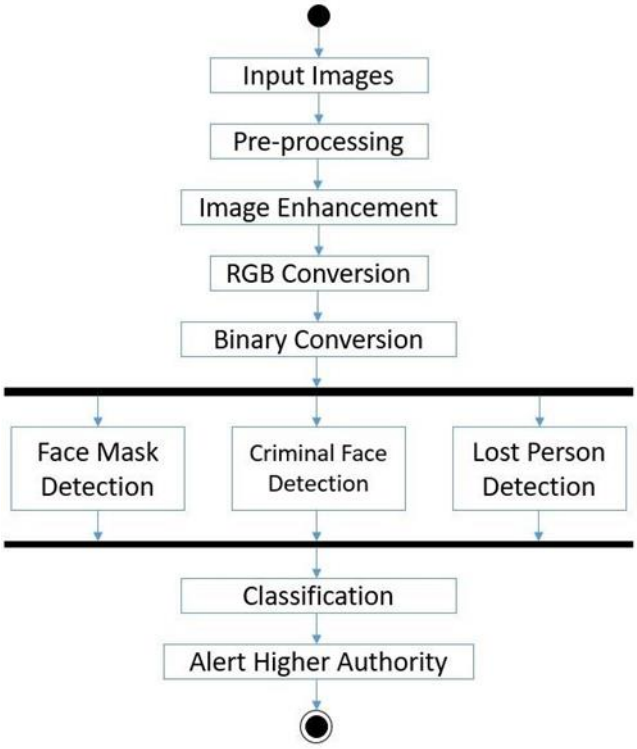

Figure 2Working Flow Diagram

To improve public safety and security, the suggested Face Mask Detection System coupled with Lost Person and Criminals Detection makes use of cutting-edge image processing algorithms. The system's use of computer vision algorithms allows it to reliably determine if a person is wearing a mask in real time, guaranteeing that safety procedures are followed throughout the continuing pandemic. In addition, the technology has facial recognition features that allow it to detect lost people and possible criminals in crowded areas. The system's ability to quickly match faces against databases using comprehensive image processing helps law enforcement agencies find missing people and apprehend perpetrators.By effectively recognizing and monitoring individuals of interest in a variety of contexts, this creative approach not only enhances public security but also promotes health and safety by imposing masks.

4. ARCHITECTURE

The architecture of existing system contains:

- Image Data
- Image Acquiring
- Pre-processing
- Feature Extraction
- Classification

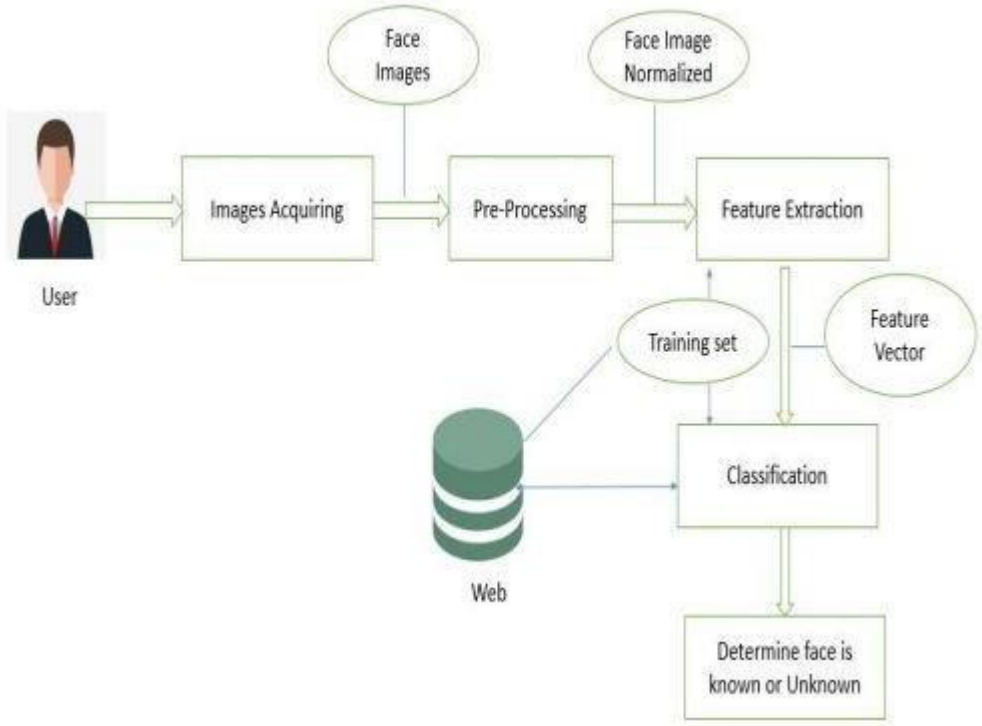

Figure 3: Existing System Architecture

5. CONCLUSION

In conclusion, a major development in public safety and security technology is the Face Mask Detection System coupled with Lost Person and Criminals Detection through image processing. The solution not only guarantees adherence to health rules during the ongoing pandemic but also significantly aids law enforcement efforts by seamlessly integrating mask compliance monitoring with the identification of missing persons and suspected criminals.

Its real-time, tailored detection capabilities give authorities crucial support, improving public safety protocols and facilitating speedier reactions to urgent circumstances. This creative idea demonstrates how image processing technologies may be used to solve complex problems and improve the safety and security of our communities.

REFERENCES

1. S.AYYAPPAN, Dr.S.MATILDA,(2020) “Criminals And Missing Children Identification Using Face Recognition and Web Scrapping” in International Conference on System, Computation, Automation and Networking (ICSCAN)
2. PVivek Aswal, Omkar Tupe, Shifa Shaikh, Nadir Charniya,(2020)” Single Camera Mask Face Identification” in IEEE International Conference on Machine Learning and Applications

3. Rajeev Ranjan, Ankan Bansal, Jingxiao Zheng, Hongyu Xu, Joshua Gleason, Boyu Lu, Anirudh Nanduri, Jun-Cheng Chen, Carlos D. Castillo, Rama Chellappa,(2015) "A Fast and Accurate System for Face Detection, Identification, and Verification" in JOURNAL OF LATEX CLASS FILES, VOL. 14, NO. 8.
4. K. He, X. Zhang, S. Ren, and J. Sun, "Deep residual learning for image recognition," in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016, pp. 770– 778.
5. R. Ranjan, V. M. Patel, and R. Chellappa, "A deep pyramid deformable part model for facedetection," in International Conference on Biometrics Theory, Applications and Systems,2015.
6. MING Ju-wang (2018), "Face Feature Dynamic Recognition Method Based on IntelligentImage". International Conference on Virtual Reality and Intelligent Systems.