Abandond Person Detection Using Raspberry PI

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Abstract- *This project addresses the critical need for automated abandoned person detection in video surveillance, leveraging computer vision techniques implemented through OpenCV. The objective is to enhance public safety and emergency response, particularly in scenarios such as floods. The methodology incorporates background subtraction, contour analysis, and edge-based object recognition for robust abandoned person detection.*

The system is designed to integrate seamlessly with existing video surveillance infrastructure, providing real-time alerts to facilitate swift and efficient emergency response. The adaptability of the system allows for continuous monitoring of evacuation routes during floods, contributing to overall public safety.

Through rigorous testing under various conditions, the project evaluates the accuracy and efficiency of abandoned person detection. The user-friendly interface ensures easy interpretation of detected persons and alerts, making it a valuable tool for emergency response teams.

The outcomes of this project demonstrate the feasibility and effectiveness of utilizing OpenCV in video surveillance for abandoned person detection. The system's adaptability and real-time capabilities position it as a valuable asset for enhancing public safety and aiding search and rescue operations in emergency situations. Future enhancements may explore machine learning integration and collaboration with emergency response agencies for real-world deployment and feedback.

Keywords- Video surveillance, Computer vision, OpenCV, Public safety, Raspberry pi

I. INTRODUCTION

In recent years, there has been a growing emphasis on leveraging technological advancements to enhance public safety and emergency response systems. One critical area of focus is the automated detection of abandoned persons in video surveillance footage, particularly in scenarios such as floods where rapid response is essential. Traditional methods of manual monitoring and analysis are time-consuming and prone to errors, highlighting the need for automated solutions.

This project addresses this pressing need by leveraging computer vision techniques implemented through OpenCV (Open Source Computer Vision Library) to detect abandoned persons in real-time video surveillance footage. By harnessing the power of computer vision, the system aims to improve public safety and emergency response efforts, especially in high-risk environments like flood-prone areas.

The methodology employed in this project integrates background subtraction, contour analysis, and edge-based object recognition to achieve robust abandoned person detection. These techniques allow the system to accurately identify and track individuals who may be in distress or require assistance.

Furthermore, the system is designed to seamlessly integrate with existing video surveillance infrastructure, including platforms such as Raspberry Pi, to provide real-time alerts to emergency responders. This integration facilitates swift and efficient emergency response, enabling authorities to take timely action to mitigate risks and ensure public safety.

Through rigorous testing under various conditions, this project evaluates the accuracy and efficiency of abandoned person detection. The user-friendly interface of the system ensures easy interpretation of detected persons and alerts, making it a valuable tool for emergency response teams and law enforcement agencies.

The outcomes of this project demonstrate the feasibility and effectiveness of utilizing OpenCV in video surveillance for abandoned person detection. The system's adaptability and real-time capabilities position it as a valuable asset for enhancing public safety and aiding search and rescue operations in emergency situations.

Moving forward, future enhancements may explore the integration of machine learning algorithms to further improve detection accuracy and efficiency. Additionally, collaboration with emergency response agencies for real-world deployment and feedback will be crucial for optimizing the system's effectiveness and ensuring its successful implementation in emergency situations.

II. LITERATURE SURVEY

The automated detection of abandoned persons in video surveillance systems is a critical aspect of enhancing public safety and emergency response, particularly in scenarios such as floods where swift intervention is essential. In recent years, significant research efforts have been devoted to developing effective techniques for identifying abandoned objects and individuals in surveillance footage.

Wu et al. [2] introduce real-time abandoned object detection methods that address challenges such as crowded scenes and varying object scales by employing scale-adaptive feature pooling. Their approach utilizes background subtraction and object tracking to accurately detect abandoned objects in complex surveillance environments. By leveraging scale-adaptive techniques, Wu et al. [2] demonstrate improved detection accuracy and efficiency, making their method suitable for real-time applications in crowded scenes.

Tang et al. [3] focus on abandoned object detection in crowded environments, leveraging scale-invariant saliency detection and superpixel segmentation techniques to overcome occlusion and object size variations. Their methodology combines scale-invariant features with superpixel segmentation to accurately identify abandoned objects amidst cluttered backgrounds. Tang et al. [3] highlight the importance of scale-invariant techniques for abandoned object detection in challenging scenarios, providing valuable insights for improving detection accuracy in crowded environments.

Bhattacharya et al. [4] provide a comprehensive review of existing abandoned object detection techniques, shedding light on the strengths and limitations of different methods. Through their review, Bhattacharya et al. [4] analyze various approaches, including background subtraction, motion detection, and object tracking, offering valuable insights into the state-of-the-art in abandoned object detection. Their comprehensive overview serves as a valuable resource for researchers and practitioners in the field.

Overall, these studies contribute to the advancement of automated abandoned person detection systems, offering valuable insights and methodologies for enhancing public safety and aiding emergency response efforts. By addressing challenges such as crowded scenes, varying object scales, and occlusion, these approaches pave the way for more effective and reliable abandoned person detection in video surveillance systems.

EXSISTING SYSTEM

The existing system for automated abandoned person detection in video surveillance primarily relies on conventional video processing techniques. These techniques involve analyzing video feeds captured by surveillance cameras without the use of advanced machine learning algorithms or specialized computer vision libraries like OpenCV.

One key aspect of the existing system is motion detection. Surveillance cameras continuously capture video footage, and the system detects any changes or movements in the scene. When significant motion is detected, the system flags the corresponding area as a potential region of interest for further analysis.

After motion detection, the system applies basic image processing techniques such as background subtraction. Background subtraction involves comparing the current frame of the video with a reference frame to identify pixels that have changed. Any significant changes in pixel values are considered potential objects in the scene.

Following background subtraction, the system may employ simple object tracking algorithms to monitor the movement of detected objects over time. This allows the system to differentiate between transient movements, such as passing vehicles or animals, and stationary objects, which may indicate abandoned persons.

While the existing system lacks the sophistication of machine learning-based approaches, it provides a basic yet effective means of detecting abandoned persons in video surveillance footage. By leveraging motion detection and basic image processing techniques, the system can identify potential instances of abandoned persons and raise alerts for further investigation or intervention by authorities.

III. METHODOLOGY

PROPOSEDMETHODOLOGY

The proposed methodology for automated abandoned person detection in video surveillance integrates fundamental computer vision techniques and basic image processing algorithms to develop a reliable detection system. Initially, the system detects motion within the surveillance footage by comparing consecutive frames to identify areas of significant pixel value changes indicative of movement. Following motion detection, foreground segmentation techniques are applied to isolate moving objects from the background,

enabling the system to focus on dynamic elements within the scene. Object tracking algorithms are then employed to monitor the movement of detected objects over time, facilitating continuous tracking of potential abandoned persons. Features such as object size, shape, and motion trajectory are extracted from the tracked objects, serving as descriptors for identifying potential instances of abandonment. By applying predefined rules or thresholds to these extracted features, the system classifies objects as potential abandoned persons if they remain stationary beyond a specified duration. Upon detecting a potential abandoned person, the system generates alerts to notify security personnel or relevant authorities, thus enabling prompt intervention. Continuous monitoring and evaluation of the surveillance footage allow the system to refine its detection algorithms iteratively, enhancing detection accuracy and minimizing false alarms over time. Through this methodology, the system aims to provide a cost-effective and efficient solution for automated abandoned person detection in diverse surveillance environments, leveraging basic computer vision techniques to achieve reliable detection results without the need for complex machine learning models or specialized libraries.

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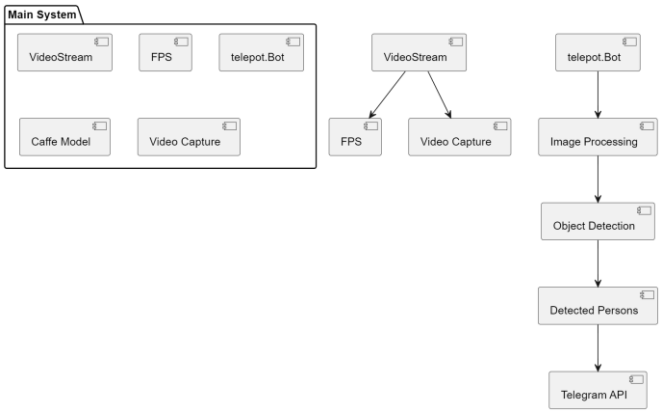
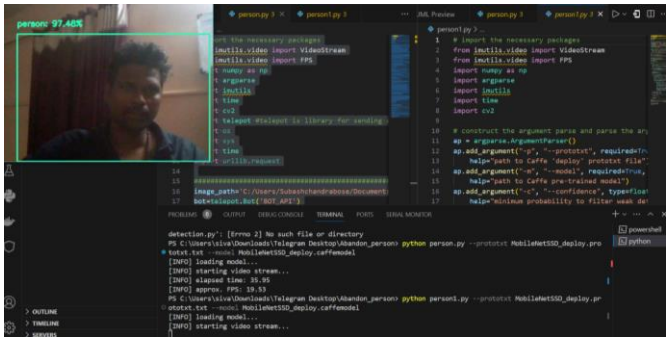
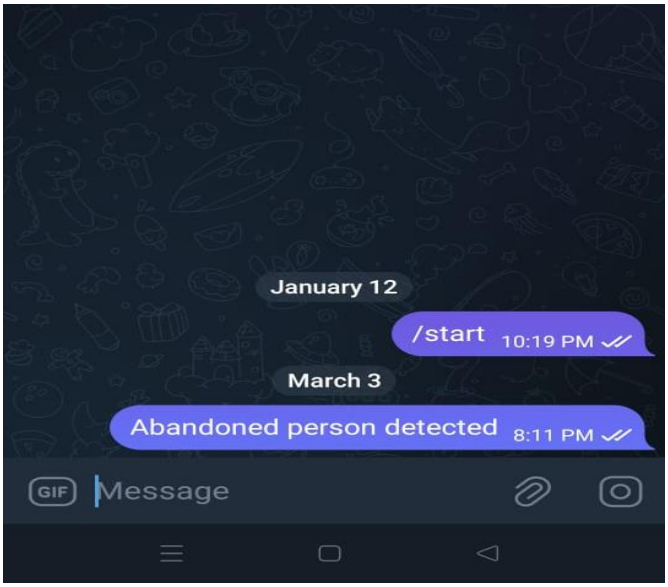


RESULTS AND OUTPUT





IV. CONCLUSIONANDFUTUREWORK

In conclusion, the development of an automated abandoned person detection system in video surveillance represents a critical advancement in enhancing public safety and emergency response capabilities. Through the integration of fundamental computer vision techniques and basic image processing algorithms, the proposed methodology offers a practical and efficient solution for identifying potential instances of abandonment in surveillance footage. By leveraging motion detection, foreground segmentation, object tracking, and feature extraction, the system can effectively detect and classify stationary objects as potential abandoned persons. The generation of alerts enables swift intervention by security personnel or relevant authorities, thereby mitigating potential risks and ensuring timely assistance. Continuous monitoring and evaluation further refine the system's detection algorithms, improving accuracy and minimizing false alarms over time. Overall, the proposed methodology presents a cost-effective and scalable approach to automated abandoned person detection, with the potential to enhance public safety and aid in emergency response efforts across various surveillance environments. Future research may explore the integration of advanced technologies to further enhance detection capabilities and

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