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EYES ON SAFETY: ENHANCING VIOLENCE DETECTION IN SURVEILLANCE SYSTEMS WITH YOLOV7

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ABSTRACT

In order to detect human violence in public CCTV footage in real time, this research looks into the execution of a deep learning-based system that makes use of the YOLOv7 (You Only Look Once version 7) algorithm. Effective monitoring systems are critical since the average yearly death rate from violence worldwide is estimated to be 7.9 per 10,000 persons. The difficulties of prompt involvement are made worse by the fact that violent episodes frequently happen unexpectedly and in remote areas. Response times from traditional surveillance techniques are severely hampered by their heavy reliance on manual monitoring. The suggested method uses cutting-edge computer vision methods to autonomously evaluate streams of video from public security cameras in order to address this problem.

A number of essential elements make up the technique, such as a parameter module that analyses footage, an initial processing module that gets ready information for evaluation, and an assault detection module that uses YOLOv7 to identify violent acts and the people who commit them. Furthermore, a visualization tool offers real-time overlays of violence that has been detected, making it simpler to analyse the findings. The technology produces and transmits email notifications to the appropriate authorities when assault is detected, enabling prompt action.

The goal of this project is to improve public safety by using automation and sophisticated detecting skills to speed up the reaction time to violent situations. The YOLOv7 model's ability to identify both violent behaviours and related items is impressive and highlights how deep learning can revolutionize surveillance methods. This work provides a comprehensive answer to the urgent problem of human aggression in urban areas, contributing to the ongoing attempts to incorporate AI technologies into safety frameworks.

KEYWORDS: *YOLOv7, Violence Detection, Deep Learning, Surveillance Systems, Computer Vision, Public Safety, Object Detection, Real-Time Monitoring, Automation, CCTV Footage*

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