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ENHANCING VIOLENCE DETECTION ON SURVEILLANCE CAMERAS USING YOLOV7

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ABSTRACT

In this research, a unique real-time gun identification technique based on one more YOLOv7 deep learning algorithm is presented. The primary objective of the system is to promptly identify firearms in live streams in order to enable prompt responses to potential security threats. When the gun is identified, the system dynamically extracts the data from the streaming video using the SMTP library and sends out an email alert with important details and images to support the claim. By harnessing the potent capabilities of YOLOv7, this technology achieves exceptional precision and efficacy in firearm recognition, strengthening security standards in a range of contexts. With its use of state-of-the-art object detection technology, this approach represents a significant advancement in proactive threat mitigation strategies. This violence detection system needs several key parts in order to integrate and function properly. First off, guns can be swiftly and latency-freely identified thanks to the YOLOv7 model, which is the basis for real-time object detection. With constant refinement and enhancement, the model performs remarkably well in identifying weapons of various kinds, dimensions, and orientations. Additionally, the system has sophisticated post-processing techniques to reduce incorrect detections and enhance the accuracy of firearm location. Advanced screening methods and contextual analysis also improve identification results, ensuring consistent alerts and minimizing unnecessary disturbances. The integration with the SMTP libraries also makes it possible to promptly notify security personnel or authorized authorities of any suspected firearm incidents. Based on all the information provided in the email alerts—including the location, time, and cropped photo of the discovered firearm—respondents can act quickly. All things considered, real-time gun detection technology enhances social safety and security by taking precautionary steps. The system provides a robust defense against the threats posed by weapons in numerous scenarios by employing advanced detection methods and YOLOv7. This research eventually aids ongoing efforts to develop effective surveillance and intervention methods by safeguarding communities and lowering the risks connected with firearm-related occurrences.

KEYWORDS: *YOLOv7, Deep Learning, Object Recognition, Security System, SMTP Email Alerts, Surveillance Technology, Proactive Safety Measures*

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