**Project Title:** Automated Weapon Surveillance System using Deep Learning

**Title of Journal:** **Weapon Detection Using YOLO V3 for Smart Surveillance System**

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**Abstract:**

The paper discusses the development of a fully automated weapon detection system using the YOLO V3 (You Only Look Once) deep learning model. This system aims to identify basic armaments, specifically handguns and rifles, from surveillance footage. The research leverages recent advancements in deep learning and transfer learning to achieve high accuracy in object detection without requiring extensive computational resources.

**Literature Review:**

The paper reviews various approaches to smart surveillance systems and object detection. Traditional methods often rely on manual monitoring, which is less efficient. Modern techniques using convolutional neural networks (CNNs) have shown promising results in detecting and identifying objects in real-time, even in complex scenes.

**Methodology:**

The core of the weapon detection system is the YOLO V3 model, which is known for its real-time object detection capabilities. The authors created a custom dataset of weapon images to train the model. The training process involved using transfer learning, which allowed the model to leverage pre-trained weights from large datasets such as COCO and ImageNet, reducing the computational resources required.

**Data Collection: The dataset was manually compiled from Google images, focusing on different types of firearms.**

**Model Architecture**: YOLO V3 uses a convolutional neural network architecture called Darknet-53, which consists of 53 layers designed to extract high-level features from images.

**Training Process**: The model was trained on the custom dataset, fine-tuning the pre-trained weights to improve detection accuracy for the specific task of weapon detection.

**Results:**

The trained YOLO V3 model demonstrated superior performance in detecting weapons compared to its predecessor, YOLO V2, and traditional CNN-based approaches. The system was able to accurately identify and localize firearms in surveillance footage with minimal computational resources.

**Applications:**

The proposed weapon detection system can be integrated into existing surveillance infrastructures to enhance security. It can alert security personnel in real-time, allowing for rapid response to potential threats. The system can also be used in high-end security robots to autonomously detect and respond to dangerous situations.

**Conclusion:**

The implementation of the YOLO V3 model for weapon detection in smart surveillance systems represents a significant advancement in security technology. By leveraging deep learning and transfer learning, the system provides a reliable and efficient solution for detecting firearms in real-time, potentially reducing the incidence of gun-related violence.