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Deep Learning in Surveillance Systems: A Review

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Abstract: *Deep learning has revolutionized the field of surveillance systems, enabling the automation and enhancement of security, monitoring, and detection capabilities. Traditional surveillance systems, which often rely on basic algorithms for image processing and object recognition, are increasingly being replaced by deep learning models that offer higher accuracy, adaptability, and scalability. This paper explores the applications of deep learning techniques, particularly convolutional neural networks (CNNs) and recurrent neural networks (RNNs), in modern surveillance systems. We discuss their effectiveness in tasks such as real-time object detection, facial recognition, anomaly detection, and behavior analysis. The integration of these technologies has led to improved decision-making processes, faster threat identification, and enhanced operational efficiency. Furthermore, the paper highlights the challenges in deploying deep learning models in surveillance environments, such as data privacy concerns, computational resources, and model generalization. The potential future developments in this field, including the use of edge computing and federated learning, are also considered. By examining both current applications and future trends, this paper provides a comprehensive overview of the transformative impact of deep learning on surveillance systems.*

Keywords: Deep Learning, Computer vision, CNN

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