

Computer Vision-Based Human Activity Recognition

Prerna Nagpal, Assistant Professor, Department of Computer Science, Sunrise University, Alwar

Abstract

Human Activity Recognition (HAR) is an important research area in computer vision and artificial intelligence that focuses on automatically identifying and classifying human activities from visual data. It has applications in healthcare monitoring, smart homes, surveillance, sports analytics, human-computer interaction, and assisted living environments. Traditional activity recognition approaches often rely on handcrafted features and predefined rules, which can be limited when dealing with complex activities, variations in human behaviour, changes in camera viewpoints, and environmental conditions. Recent advances in deep learning and computer vision have enabled the development of more robust systems capable of learning discriminative spatial and temporal features directly from video data. This paper explores a computer vision-based framework for human activity recognition using deep learning techniques. The proposed approach considers video frames as input and applies convolutional neural networks to extract spatial features, while temporal information can be captured using sequential or attention-based architectures. The system is designed to classify common human activities such as walking, running, sitting, standing, jumping, and other daily actions. Performance can be evaluated using accuracy, precision, recall, and F1-score on publicly available activity-recognition datasets. The study also discusses challenges including occlusion, variations in illumination, background complexity, viewpoint changes, computational requirements, and real-time processing. The research highlights the potential of computer vision and deep learning to provide accurate and automated activity recognition for intelligent monitoring and human-centered applications.

Keywords: Human Activity Recognition, Computer Vision, Deep Learning, Convolutional Neural Networks, Video Analysis, Artificial Intelligence, Action Recognition, Pattern Recognition.

