Patent Search

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Abstract:

[031] The present invention relates to a system and method for human activity recognition (HAR) using IoT-connected wearable cameras integrated with deep learnin techniques. The system comprises a wearable camera that captures video data of the user's environment and an edge computing unit that processes the data locally learning models for real-time activity classification. The system combines visual data with contextual information from external IoT sensors, such as accelerometers a improve activity recognition accuracy. Recognized activity labels and minimal contextual data are transmitted to a cloud platform for storage and further analysis. The employs federated learning to continuously improve the models without compromising user privacy. The invention is applicable across multiple domains, including h monitoring, fitness tracking, workplace safety, and security surveillance, providing a scalable, privacy-preserving, and efficient solution for human activity recognition. Accompanied Drawing [FIGS. 1-2]

Complete Specification

Description:[001] The present invention relates generally to the field of human activity recognition (HAR) and wearable technology. More specifically, the invention p to a deep learning-based system and method for recognizing and analyzing human activities using Internet of Things (IoT)-connected wearable cameras. The invent further integrates edge computing techniques, lightweight deep learning models, and privacy-preserving mechanisms to enable real-time or near real-time recogni human activities with high accuracy and minimal transmission of sensitive data. The invention finds application across healthcare monitoring, fitness tracking, work safety, security surveillance, and other domains requiring intelligent activity recognition.

BACKGROUND OF THE INVENTION

[002] Human Activity Recognition (HAR) has emerged as a critical area of research and development with applications spanning healthcare monitoring, fitness track security surveillance, workplace safety, smart homes, and assisted living environments. Traditional HAR systems have predominantly relied on sensor-based approa utilizing accelerometers, gyroscopes, and magnetometers embedded in smartphones or wearables. While effective for capturing motion-related data, these conven sensor-based systems are often limited in their ability to comprehend complex activities and lack the ability to interpret contextual information surrounding the act

[003] Advancements in camera technology and the miniaturization of wearable devices have introduced a new paradigm for HAR—vision-based activity recognition Wearable cameras can capture rich visual information, offering a more comprehensive understanding of the user's actions, environment, and interactions. Howeve processing video data presents significant challenges, including high computational demands, large storage requirements, concerns regarding user privacy, and the intelligent data management, particularly in resource-constrained wearable devices.

[004] Deep learning, particularly convolutional neural networks (CNNs) and recurrent neural networks (RNNs), has revolutionized the field of computer vision, enab

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