

ABSTRACT

Human motion recognition in the context of sports, specifically Human Activities Recognition in Sports (HAR), has been the focus of significant research due to its potential in improving performance analysis of athletes and exercise monitoring. Although previous studies have explored various methodologies for HAR, there is still a gap in the use of current technology to identify specific movements in sports with a high degree of accuracy. This research discusses the development of a system "Classification of Athlete Poses in Badminton Using LSTM Based on MediaPipe Features" system, which aims to address the gap by identifying and classifying the activities of serve, lob, and smash badminton athletes based on video data of their movements.

Different from previous research, this study integrates Long Short-Term Memory (LSTM) technology with MediaPipe to process the video data, identifying 33 keypoints that reflect the athlete's posture of the athlete's body. This integration overcomes the challenge of complex gesture recognition by generating a model that can distinguish the nuances of movement with higher accuracy. The training dataset includes the motions of professional and amateur badminton athletes and amateur badminton athletes which, after preprocessing, were analyzed using the LSTM, highlighting significant improvements in dynamic movement understanding.

This research is unique in its application of MediaPipe as a feature extraction tool combined with the capabilities of LSTM to overcome the vanishing gradient problem that often occurs in recurrent neural networks (RNN), resulting in a model that is not only effective in recognizing athlete activity but also in classifying movements with a high level of detail. Experimental results show that the model with 150 LSTM hidden layer units yields the highest accuracy, with training accuracy of 97% and validation accuracy of 98%, confirming the effectiveness of this approach in the classification of badminton athletes' serve, lob, and smash motions.

Keywords: Athlete Pose Classification, LSTM, MediaPipe, Gesture Recognition, Sports.