Human Behaviors Classification Using Deep Learning Technique

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Abstract Human behaviors is an action performed by human. There are various types of human behaviors such as running, walking, jumping, sitting and the others complex movement. In this paper, human behaviors video-based classification using Long Short Term Memory (LSTM) model with multiple layers were proposed to classify the human behaviors. A pre-trained pose estimation model, OpenPose was used to extract the body key points from the Berkeley Multimodal Human Action Database, MHAD database. Six activities, jumping, jumping jacks, punching, waving with two hands, waving with right hand and clapping hands of MHAD database were used for the training and testing. The individual frame of MHAD database will group into 32 window width. Dataset had been increased by creating the 26 of 32 frame overlapping. The performance of 2 layers LSTM model, 3 layers LSTM model, 4 layers LSTM model without dropout layers and 4 layers LSTM model with dropout layers were evaluated and compared. Result shows that 4 layers LSTM model with dropout layers had better performance as compared to 2 layers LSTM model, 3 layers LSTM model and 4 layers LSTM model without dropout layers reached the testing accuracy of 95.86%. With adding of dropout layers in the LSTM model with 4 layers, generalization performance in training process had been increased.

Keywords LSTM · Machine learning · Pose estimation · Human behaviors · Action classification

1 Introduction

Human activity classification is an analysis of human action from ongoing events such as video data or sensor data and interpret the data collected to identify the human actions either using video-based technique or sensor-based technique. Human activity classification provides information about the personality and identity of a person. Human activity classification can be applied in the surveillance system in

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