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Impact of Integrated Signals for Doing Human Activity Recognition Using Deep Learning Models

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Abstract : Human Activity Recognition (HAR) is having a growing impact in creating new applications and is responsible for emerging new technologies. Also, the use of wearable sensors is an important key to exploring the human body's behavior when performing activities. Hence, the use of these dispositive is less invasive and the person is more comfortable. In this study, a database that includes three activities is used. The activities were acquired from inertial measurement unit sensors (IMU) and motion capture systems (MOCAP). The main objective is differentiating the performance from four Deep Learning (DL) models: Deep Neural Network (DNN), Convolutional Neural Network (CNN), Recurrent Neural Network (RNN) and hybrid model Convolutional Neural Network-Long Short-Term Memory (CNN-LSTM), when considering acceleration, velocity and position and evaluate if integrating the IMU acceleration to obtain velocity and position represent an increment in performance when it works as input to the DL models. Moreover, compared with the same type of data provided by the MOCAP system. Despite the acceleration data is cleaned when integrating, results show a minimal increase in accuracy for the integrated signals.

Keywords : HAR, IMU, MOCAP, acceleration, velocity, position, feature maps
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