California State University San Bernardino
School of Computer Science & Engineering
Masters Project Presentation

Date/Time
December 2, 2021, 2:00PM

Location
https://csusb.zoom.us/j/84159057125

Topic
Improved Sensor Based Human Activity Recognition via Hybrid Convolutional and Recurrent Neural Networks

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Abstract

Non-intrusive sensor based human activity recognition (HAR) is utilized in a spectrum of application including fitness tracking devices, gaming, health care monitoring, and smartphone applications. Deep learning models such as Convolutional Neural Networks (CNNs) and Long Short Term Memory (LSTM) recurrent neural networks (RNNs) provide a way to achieve HAR accurately and effectively. This project designed and explored a variety of multi-layer hybrid deep learning architectures which aimed to improve the recognition performance by integrating local features and scale invariant with dependencies of activities. We achieved a 94.7% activity recognition rate on the 6 activity UCI HAR dataset with a 2 layer CNN and 1 layer LSTM hybrid model. Additionally, we achieved an 88.0% activity recognition rate on the 27 activity UTD-MHAD dataset with a 4 CNN and 1 layer LSTM hybrid model. For both datasets, our hybrid models outperformed other deep learning models and traditional machine learning methods.