ABSTRACT

THESIS: Human Activity Recognition Based on Accelerometer and Gyroscope sensors

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Human Activity Recognition (HAR) is a key component in smart health in that it is valuable to solve many real-life, human-centric problems such as eldercare and healthcare. HAR aims to recognize common human activities in real life settings. Accurate activity recognition is challenging because human activity is difficult to model and highly diverse. Many modern devices can be used to collect the data of human daily activity such as a smartphone, computer vision, smart watch, etc. HAR has been investigated with different algorithms proposed. In our thesis, we focus on recognizing ambulation types of activities based on the data gathered from the accelerometer and gyroscope sensors of smart phones. These ambulation types of activities include walking, running, sitting, standing, walking upstairs and walking downstairs. The research on HAR in this thesis include the activity classifications and the abnormal movements identification by employing deep learning algorithms such as Convolutional Neural Network Deep algorithm (CNN).

The data that used in this thesis is from a previous project providing open access to the public. The data was collected with experiments carried out with a group of 30 volunteers. They have ages of 19-48 years. Each person performed these six activities. The obtained dataset was randomly partitioned into two sets, where 70% of the volunteers were selected for generating the training data and 30% the test data. This thesis design a deep learning solution to mine the data for activity recognition, analyze and evaluate the performance of the solution.