CSCI 5525 Project Proposal

Human Activity Classification

Gurkan Kilicaslan
kilia064@umn.edu

1 Motivation: Why this project?

Understanding what people are doing based on how they move is important in many areas like healthcare, sports analysis, and automation. Being able to classify these activities can help create personalized plans and make systems work better. In this project, I want to build a model that can tell us what activity a person is doing by looking at their movements over time.

2 Problem and Goal

The main goal of this project is to figure out and classify different activities people are doing. These activities are:

-Going downstairs
-Sitting
-Going upstairs
-Jogging
-Walking
-Standing

I'll do this by using data from three sensors that measure movement over time.(Pre-measured data needed.)

3 Why Use Machine Learning?

Machine learning is a great tool for finding complex patterns in data without being explicitly told what to look for. For this project, I intend to use Recurrent Neural Networks which are really good at handling data that comes in a series. They'll help with understanding the patterns in how people move.

4 Initial Idea on How to Solve it/Algorithms

To solve this, I plan to use basic RNNs like Long Short-Term Memory and Gated Recurrent Units. These RNNs will learn from the movement data using Backpropagation Through Time. I'll try to implement these RNNs and see which one works best.

5 Data is Needed!

There are many data sets for information about how people move over time. One of them, I think the most suitable one for this project, has both training and testing set. The data comes from three sensors recording movement, and we'll use this data to train and test our classification models. This data set comes from three sensors recording movement as I needed for this project.

References

[1] Jayasinghe, U., Janko, B., Hwang, F., & Harwin, W. S. (2023). Classification of static postures with wearable sensors mounted on loose clothing. *Scientific Reports, 13*(1). https://doi.org/10.1038/s41598-022-27306-4