Human Activity Recognition with Wrist-Based Accelerometers

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Today’s Presentation

Purpose and Problem Statement

Data Set used and Setup

EDA and Preprocessing

Modeling and Results

Conclusions and Next Steps

Purpose and Problem Statement

Regular activity throughout the day is extremely beneficial to maintaining health

Exercise boosts the immune system, which is now particularly important

In this project, I sought out to build a Human Activity Recognition System that identifies a task as sitting, standing, walking, jogging, upstairs or downstairs based on data from an accelerometer worn on the wrist

Data

Data came from the UCI Machine Learning Repository

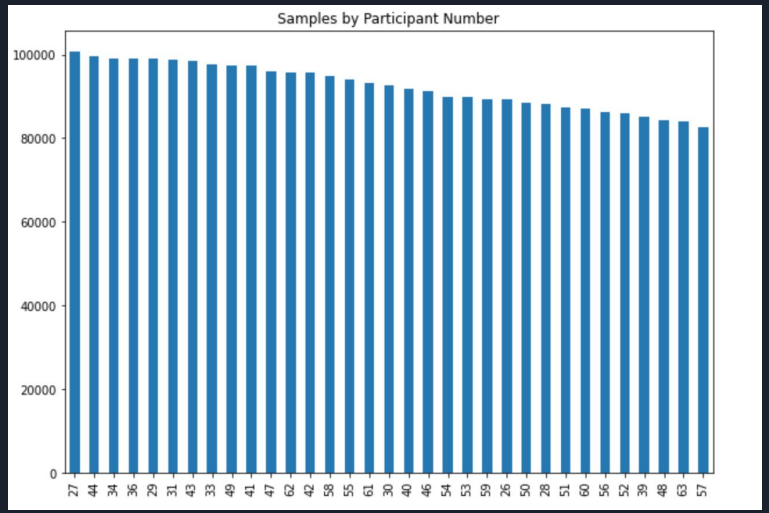
Accelerometers were affixed to the wrist and thigh of participants.

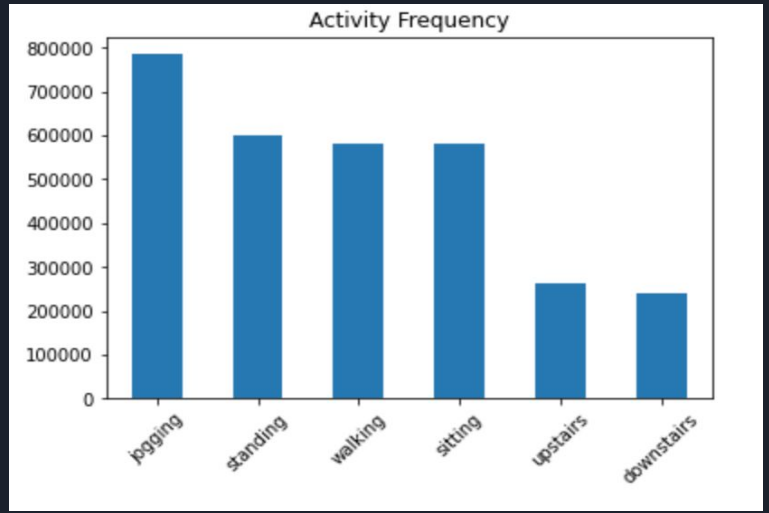
Activities were carried out for about three minutes at a time.

EDA

Considerably fewer data points for upstairs and downstairs

Participants each had about equal amount of data collected

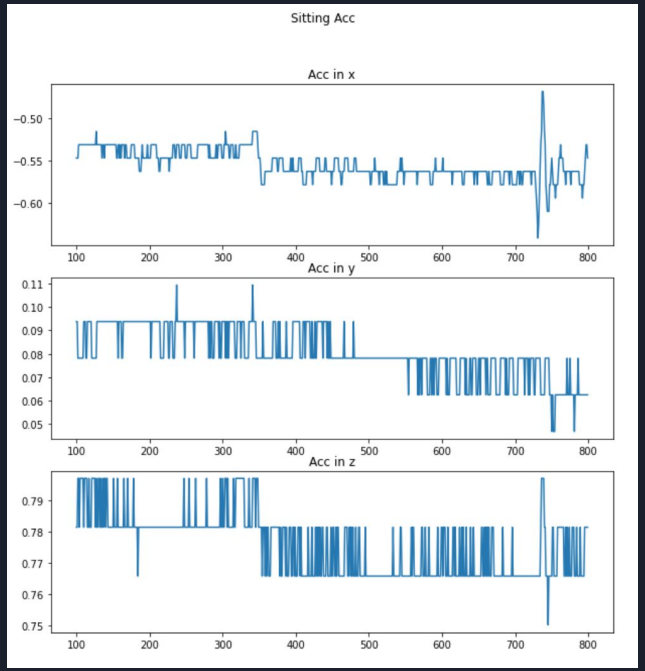


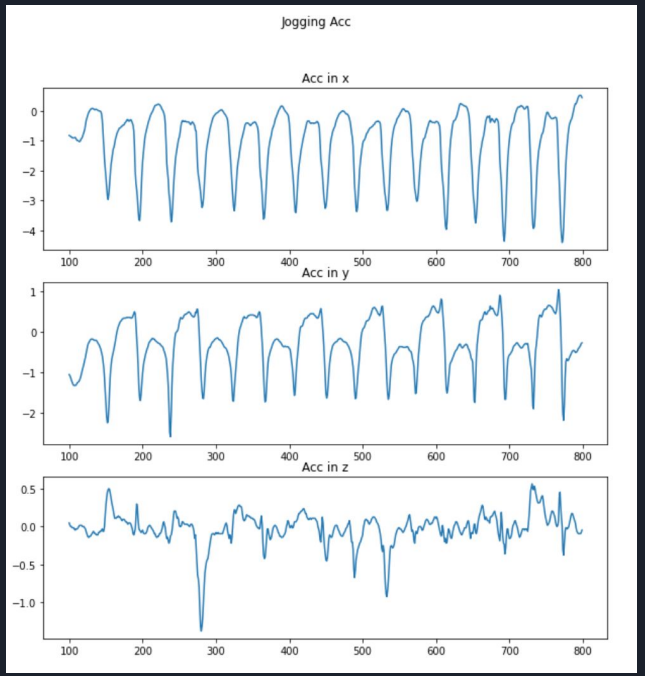


Preprocessing

Raw accelerometer data is difficult to generate predictions on

“Sliding” windows were used instead to feed into the model



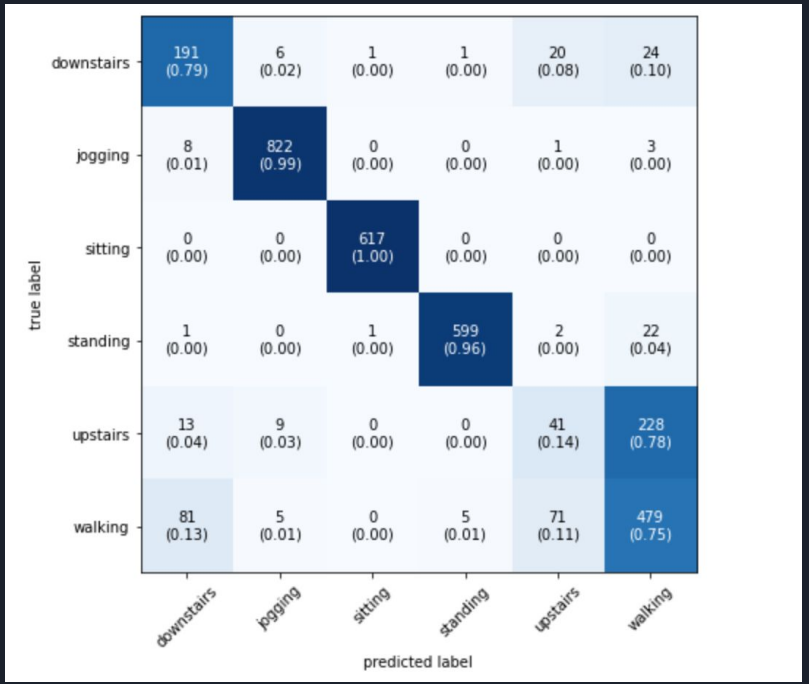


Modeling and Results

Model used: Convolutional Neural Network

Accuracy: 85%

Weaknesses: Confusion between walking, going upstairs, and going downstairs.



Conclusion and Next Steps

Filtering data before preprocessing

The model performed decently, with an accuracy score of 85%

Imbalance of data may have made it challenging to correctly identify going up, or down stairs

Inclusion of gyroscopic sensor data

Deployment with scoring

Testing whether phone accelerometers perform better than devices worn on the wrist

Thanks!