

# Classification of Smartwatch Motion Using Machine Learning

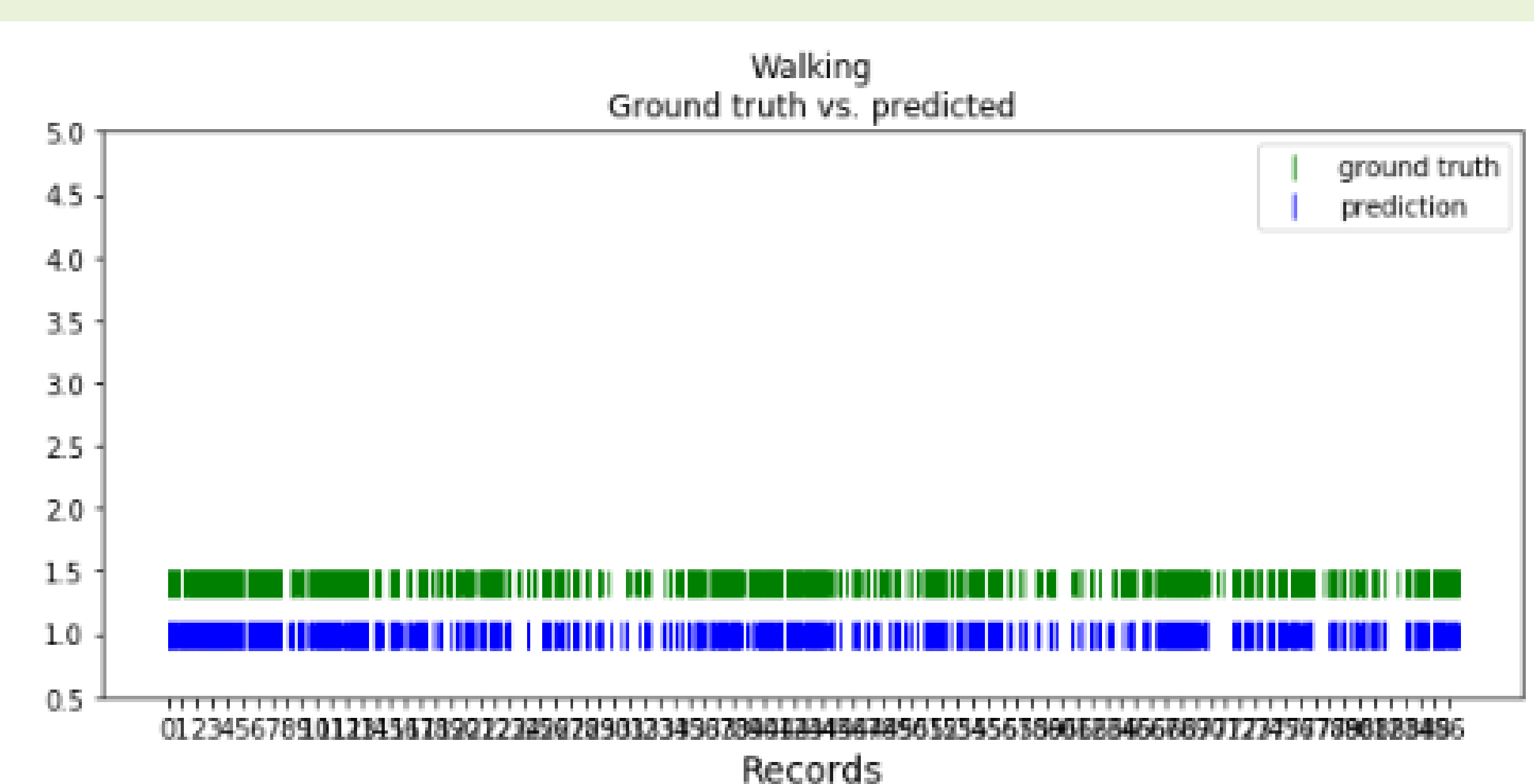
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## Introduction

- Different products have been produced to assist neurodiverse and intellectually disadvantaged students.
- The WeLi app has been created to facilitate discrete communication between a student and their in-class aid.
- This method of intervention helps to optimize the student's learning experience and assimilate them into the classroom.
- This research focused on finding a classification model to accurately contextualize the student's actions during class.

## Method

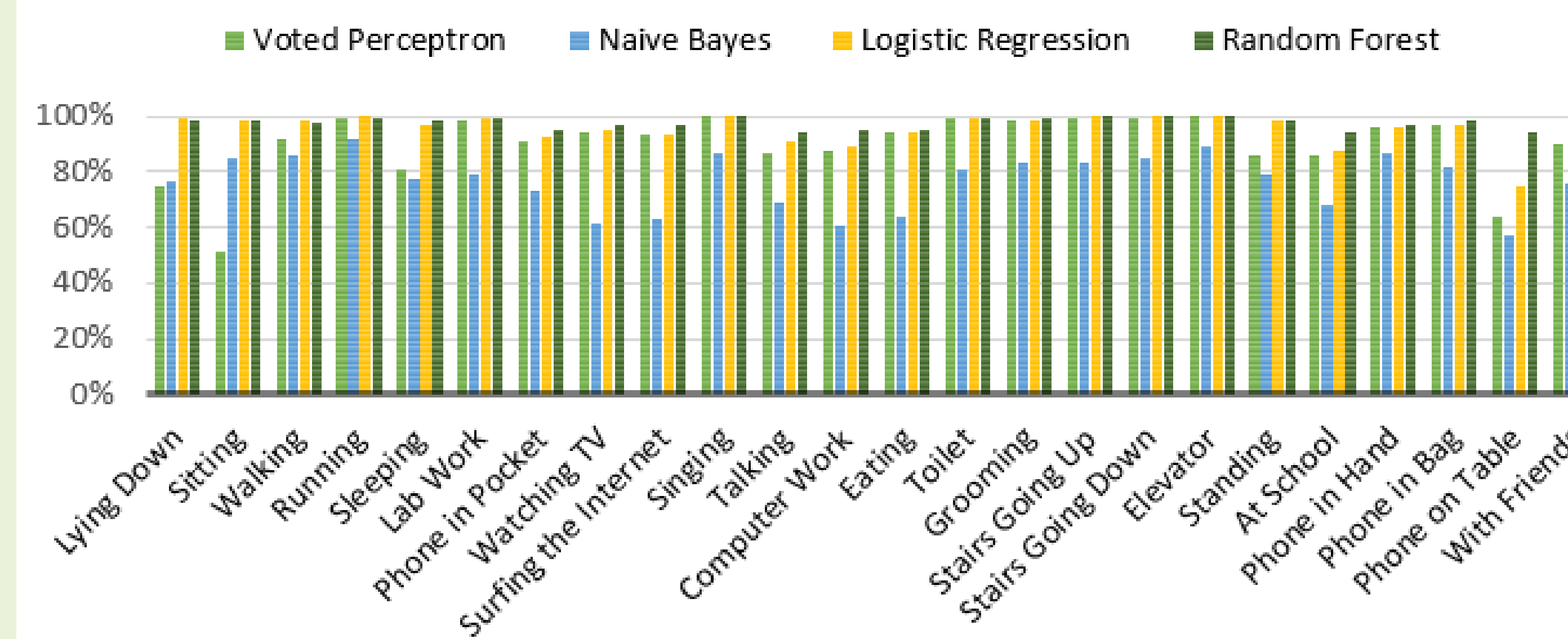
- The use of supplementary data was needed
- The ExtraSensory Dataset Repository was used
- The data was vetted for relevant sensors
- Compass, watch accelerometer, audio
- Machine Learning software Weka was used to find the highest performing algorithms
- Naïve Bayes, Voted Perceptron, Random Forest, Logistic Regression
- Tutorial code was altered to run Python3 and the top two algorithms were tested for accuracy and precision.



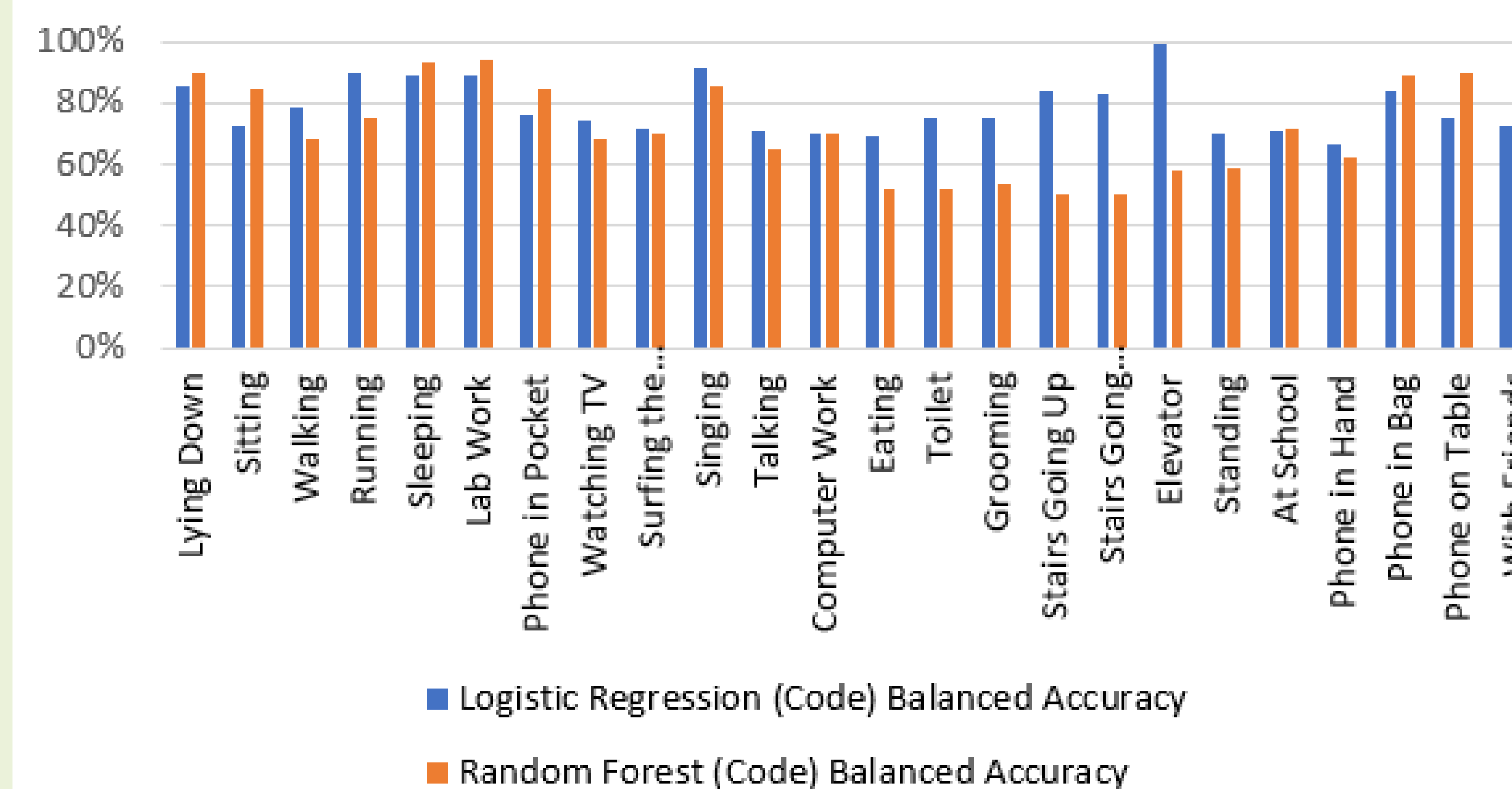
## Results

After creating models through Weka and the tutorial code, it was obvious that both the random forest and logistic regression models were high performing. The metric of success was decided to be the balanced accuracy for each model. With that it became obvious that although both performed almost identically in Weka, the logistic regression was higher performing through the code. The slight discrepancies can be attributed to the different approaches. The Weka approach used a five fold cross validation while the code used a train and test approach.

### CLASSIFICATION RESULTS WITH WEKA



### Balanced Accuracy



## Future Work

- Data will be collected via smartwatch to test the effectiveness of the model
- Test on new, raw data
- Specific interventions should be mapped to certain actions
- Then the model and mapping can be included into the WeLi application



## Acknowledgements

Extrasensory Dataset

Hui Zheng

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This work is funded by a NSF REU Site on Educational Data Mining at George Mason University; Grant No. 1757064

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