

# ABSTRACT

**THESIS:** PARAMETRIC AND NON-PARAMETRIC CLASSIFICATION METHODS WITH APPLICATION TO ACCELEROMETER DATA

**STUDENT:** Shafayet Shariar Hossain

**DEGREE:** Master of Science

**COLLEGE:** Science and Humanities

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Physical Activity has been associated with fatal diseases such as cancer and heart disease. Therefore, prediction of physical activity intensity levels is of paramount importance. This study utilizes raw accelerometer data of 28 healthy individuals of ages 18-79 years to predict physical activity intensity levels. Parametric and non-parametric approaches were used to develop predictive models from the accelerometer data. As a parametric approach the proportional odds cumulative logit model was considered both in the frequentist and Bayesian paradigm. Tree-based methods: bagging, random forest, boosting and Generalized Unbiased Interaction Detection and Estimation (GUIDE) were considered as non-parametric methods. All the models were built from four accelerometer placements, i.e., left wrist, right wrist, right hip and right ankle. In terms of the placement, right ankle has significantly highest prediction accuracy and right wrist has the lowest prediction accuracy. The parametric and non-parametric models have mixed performance with no particular method outperforming the others. However, considering overall prediction accuracy, the proportional odds cumulative logit model has the highest prediction accuracy.