

From Movement to Mind

Predicting Depression with AI-Enhanced Motor Activity Analysis

A.

Introduction

Many things we do in our daily lives can increase the risk of developing depression, this makes depression one of the most common mental illnesses. if depression is allowed to get worse, there will be many negative impacts that arise either from thoughts or actions.

B.

Objective

Create a hybrid CNN and LSTM model to help predicting depression at the earliest stage by using motor activity data

C.

Methodology

The data would be preprocessed by adding variants, replacing outliers and oversampled using SMOTE, lastly k-fold cross-validation will be used as validation technique for the model.

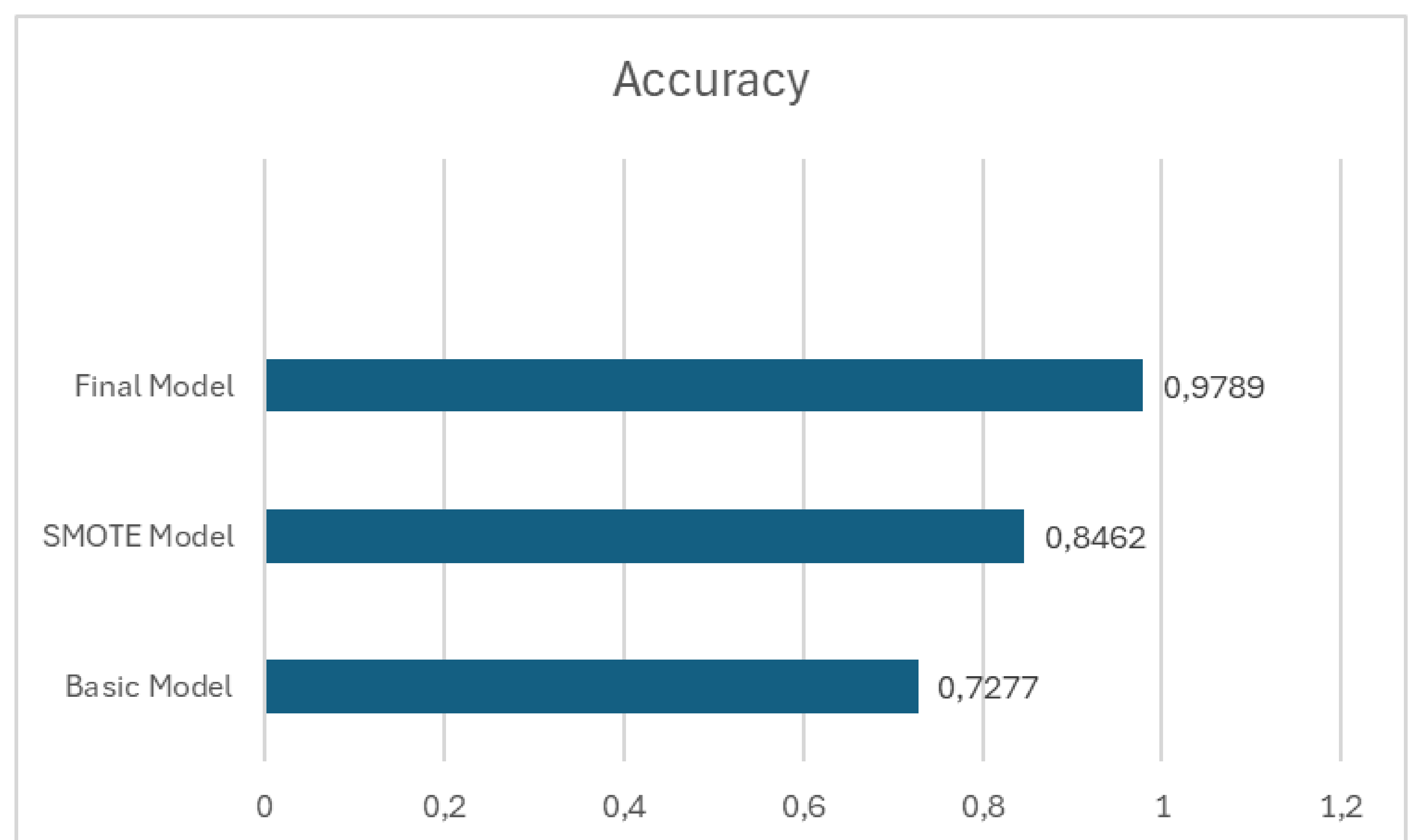
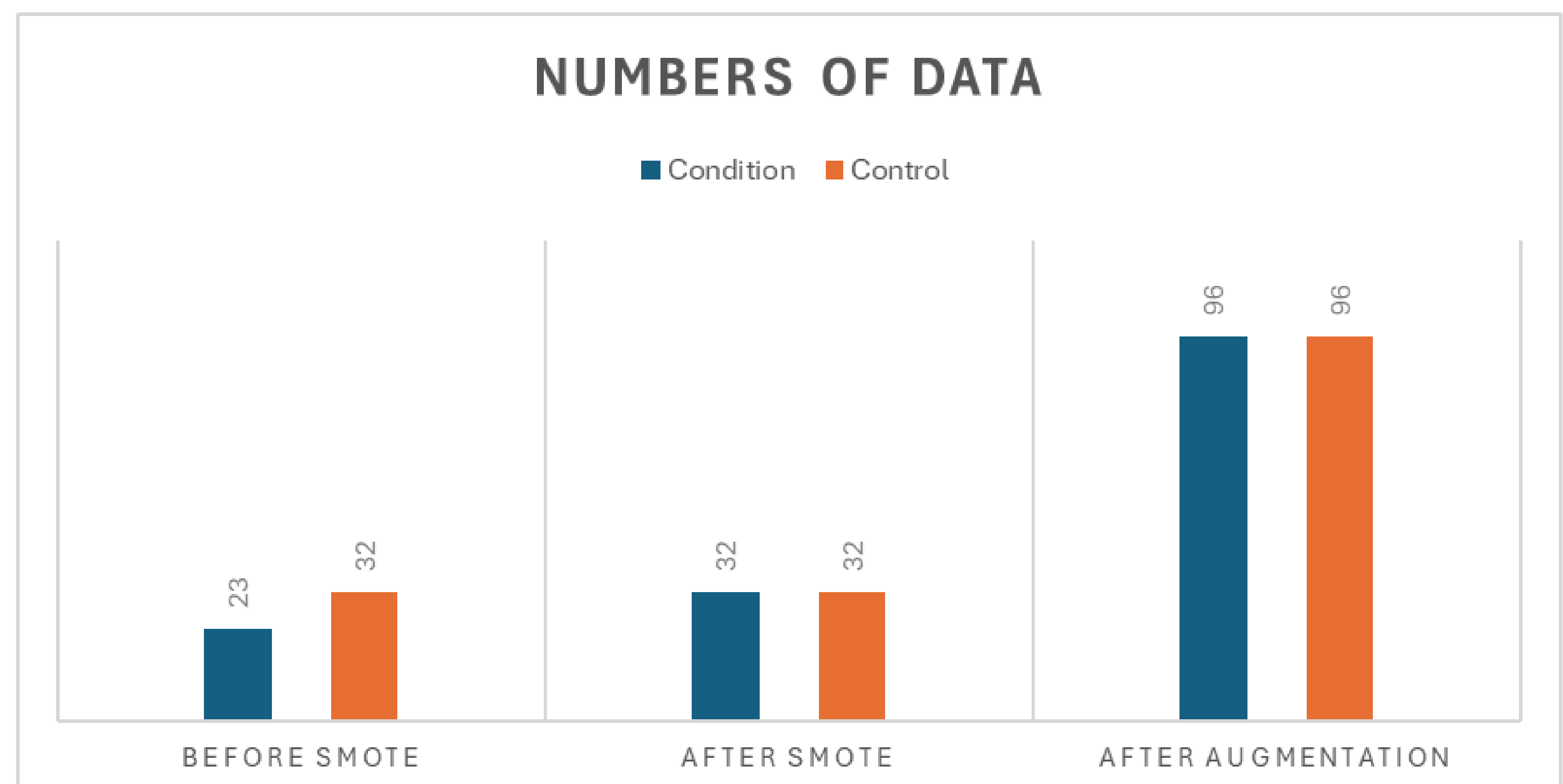
E.

Analysis

Three models were created, and six in total if modification is counted. The first model is Basic Model it achieved 72% accuracy, and improved to 84% after balancing the data using SMOTE. it improved further to 97% in the final model after k-fold is applied along with others validation and preprocessing methods.

D.

Results



F.

Conclusion

Based from the evaluation result of the model achieving 97% in accuracy, the model created shown a potential to be used for predicting depression or even classifying it further into unipolar or bipolar by analyzing person activity data.

Reference:

J. I. Frogner et al., "One-dimensional convolutional neural networks on motor activity measurements in detection of depression," in HealthMedia 2019 - Proceedings of the 4th International Workshop on Multimedia for Personal Health and Health Care, co-located with MM 2019, Association for Computing Machinery, Inc, Oct. 2019, pp. 9–15. doi: 10.1145/3347444.3356238.