



Senior Design Project

A Comparative Study of Machine Learning Techniques for Autism Spectrum Disorder (ASD) Detection

Zahid Hasan

ID # 1911509042

Towsif Muhtadi Khan

ID # 1911576042

Faculty Advisor:

Dr. Atiqur Rahman

Associate Professor

Department of Electrical and Computer Engineering

CSE 499- Senior Design

Fall 2022

DECLARATION

This is to certify that the project "**A Comparative Study of Machine Learning Techniques for Autism Spectrum Disorder (ASD) Detection**" has not been used anywhere else or for any other purpose other than to be submitted as a part of the Senior Design course at North South University in the summer of 2022. In this project, the resources that were collected from external sources are properly acknowledged. If there are any phrasing parallels to other articles that aren't cited, they are purely coincidental.

Student's name & Signature

Zahid Hasan (ID: 1911509042)
Department of Electrical and Computer Engineering
North South University

Towsif Muhtadi Khan (ID: 1911576042)
Department of Electrical and Computer Engineering
North South University

APPROVAL

The This is to declare that this CSE499 report entitled "**A Comparative Study of Machine Learning Techniques for Autism Spectrum Disorder (ASD) Detection**" submitted by

Zahid Hasan (ID: 1911509042)

Towsif Muhtadi Khan (ID: 1911576642)

are undergraduate students of the Department of Electrical & Computer Engineering, North South University. This report partially fulfils the requirements for the degree of Bachelor of Science in Computer Science and Engineering in Summer 2022 and has been accepted as satisfactory.

Supervisor's Signature

Dr. Atiqur Rahman

Associate Professor

Department of Electrical and Computer Engineering, North South University
Dhaka, Bangladesh.

Department Chair's Signature

Dr. Rajesh Palit

Professor & Chair

Department of Electrical and Computer Engineering, North South University
Dhaka, Bangladesh.

ACKNOWLEDGMENT

First of all, we wish to express our gratitude to the Almighty for giving us the strength to complete our Senior Design Project titled "**A Comparative Study of Machine Learning Techniques for Autism Spectrum Disorder (ASD) Detection**".

It is imperative to show our appreciation to our honorable Project Supervisor Dr. Atiqur Rahman, Associate Professor & Undergraduate Coordinator (EEE/ETE), for his undivided attention and help in achieving this milestone. Without his motivation and insightful suggestions, this project would not have been completed with integrity.

Our gratefulness is divine to the North South University, ECE department for providing us with a course such as CSE 499 in which we could really work on this project and materialize it the way we have dreamt of and also for giving us a chance to demonstrate our design skills and the application of our theoretical knowledge as a part of our undergraduate program's curriculum.

We thank our friends and family for their moral support in carving out this project and always offer their support.

ABSTRACT

Autism Spectrum Disorder (ASD) is a developmental impairment caused by brain differences. ASD patients may have a recognized difference, such as a genetic disease [1]. Autism can be diagnosed at any age and is referred to as a "behavioral disorder" since symptoms often develop within the first two years of life [1]. In this study, we have implemented different classifier algorithms such as Decision Tree Classifier, Logistic Regression, and Multi-layer Perceptron classifier (MLP Classifier) for detecting ASD in three types of people - adults, adolescents, and children. The proposed techniques are evaluated on publicly available three different non-clinically ASD datasets [2]. After applying various machine learning techniques and handling missing values, results strongly suggest that ANN-based prediction models work better on all these datasets with higher accuracy of 98.58%, 98.30%, and 95.24% for Autistic Spectrum Disorder Screening Data for Adults, Children, and Adolescents, respectively.