Department of Electrical and Computer Engineering
North South University

Senior Design Project
Early Detection of Mental Health over Social Media Using Machine Learning

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Md. Tashfiq H. Choudhury **ID# 1611508042**

Faculty Advisor:
Md. Shahriar Karim
Assistant Professor
ECE Department

Fall, 2020

LETTER OF TRANSMITTAL

October, 2020

To
Dr. Rajesh Palit
Chairman,
Department of Electrical and Computer Engineering
North South University, Dhaka

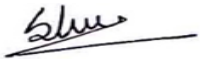
Subject: **Submission of Capstone Project Report on "Early Detection of Mental Health over Social Media Using Machine Learning"**

Dear Sir,

With due respect, we submit our **Capstone Project Report** on **"Early Detection of Mental Health over Social Media Using Machine Learning"** as a part of our BSc program. The report focuses on analyzing Human Emotion states. This project has been exceptionally valuable to us as it has enabled us to gain experience from practical fields and apply our knowledge in real life situations. We have made every effort to ensure that this report meets all the required criteria to the best of our abilities.

We would greatly appreciate it if you could kindly review and assess this report. It would be our immense pleasure if you find this report useful and informative in gaining a clear understanding of the subject matter.

Sincerely Yours,



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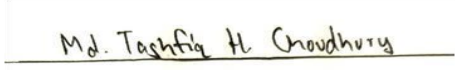
Sabbir Hasan
ECE Department
North South University, Bangladesh



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Md. Tashfiq H. Choudhury
ECE Department
North South University, Bangladesh

APPROVAL

Sabbir Hasan (ID# 1411107042) and Md. Tashfiq H. Choudhury (ID# 1611508042) from the Electrical and Computer Engineering Department of North South University has worked on the Senior Design Project titled "Early Detection of Mental Health over Social Media Using ML" under the supervision of Md. Shahriar Karim as a partial fulfillment of the requirements for the degree of Bachelor of Science in Engineering. The project has been accepted as satisfactory.

Supervisor's Signature

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Md. Shahriar Karim
Assistant Professor
Department of Electrical and Computer Engineering
North South University
Dhaka, Bangladesh.

Chairman's Signature

…….

Dr. Rajesh Palit
Professor
Department of Electrical and Computer Engineering
North South University
Dhaka, Bangladesh.

DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project-related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names and signatures

1. Sabbir Hasan

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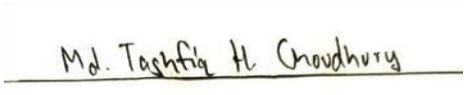
2. Md. Tashfiq H. Choudhury



ACKNOWLEDGEMENTS

All praises and gratitude to the Almighty. The authors would like to express their heartfelt gratitude towards their project and research supervisor, Dr. Md. Shahriar Karim, Assistant Professor, Department of Electrical and Computer Engineering, North South University, Bangladesh, for his invaluable support, precise guidance and advice pertaining to the research and theoretical studies carried out during the course of the current project and also in the preparation of the current report.

Furthermore, the authors would like to thank the Department of Electrical and Computer Engineering, North South University, Bangladesh for facilitating the research.

ABSTRACT

Early Detection of Mental Health over Social Media Using Machine Learning

In this project, we have worked on the use of machine learning algorithms that may indicate the mental state or sentiment of the users of social media. The current linguistic research on tweets or statuses shows distinct language patterns talks much about the sentiments of the users. As such, we are encouraged to use the available social media dataset repository for performance analysis of the supervised learning models generally applied in the case of large datasets. We have captured the texts and preprocessed the text data using Python tools for feature selection that provides clues to sentiment and subsequently, the subjective sentences are classified as positive or negative. We built machine learning (ML) models out of the classified text features for random forest and LSTM algorithms. The accuracy of the classification in both cases is encouraging, particularly the LSTM algorithm. The whole work is carried out using rich libraries of Python machine language modules.

A prototype web application is developed with a front end (input and output) and back end (ML models and classification) using a rapid prototype web application framework for testing the algorithms that enable us to check the mental status of a social media user to determine if they may require medical or emotional support.

Social media emerges as the most critical source of information, reflecting people's expressions and communication through textual content. This work contributes to the application of machine learning to further enhance the early detection of the mental health of users.