

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	iii
	LIST OF FIGURES	viii
	LIST OF TABLES	x
	LIST OF ABBREVIATION	xi
1	INTRODUCTION	1
	1.1 CYBERBULLYING	1
	1.1.1 Different Types Of Cyberbullying	2
	1.1.2 Main Effects Of Cyberbullying	4
	1.2 TWITTER	5
	1.3 CYBERBULLYING IN TWITTER	5
	1.4 SENTIMENT ANALYSIS	7
	1.5 TEXT CLASSIFICATION	9
	ALGORITHMS FOR SENTIMENT ANALYSIS	
	1.6 SCOPE	12
	1.7 CHALLENGES	12
2	LITERATURE REVIEW	13
	2.1 REVIEW OF RESEARCH PAPERS	13
	2.2 SUMMARY OF EXISTING PAPERS	20
3	PROPOSED WORK	22
	3.1 TWITTER DATASET	22
	3.2 ARCHITECTURE DIAGRAM	23
	3.2.1 Preprocessing Tweets	24

	3.2.2 Feature Extraction	25
	3.2.2.1 Term Frequency-Inverse Document Frequency	25
	3.2.2.2 Tokenizers	26
	3.2.3 Supervised Text Classification Models	27
	3.2.4 Evaluation Metrics	30
	3.2.5 Classifying Tweets	32
4	SYSTEM REQUIREMENTS	33
	4.1 HARDWARE REQUIREMENTS	33
	4.2 SOFTWARE REQUIREMENTS	33
	4.2.1 Visual Studio Code	33
	4.2.2 Tensorflow	34
	4.2.3 Transformers	34
	4.2.4 Angular JS	35
	4.2.5 Selenium	35
5	IMPLEMENTATION MODULES	36
	5.1 WEB SCRAPING	36
	5.2 TWEETS COLLECTION AND PREPROCESSING	38
	5.3 FEATURE EXTRACTION	39
	5.4 REAL-TIME TWEETS CLASSIFICATION	40
	5.5 REPORT GENERATION	40

6	RESULTS AND DISCUSSIONS	41
	6.1 PERFORMANCE METRICS	41
	6.2 VISUALIZATION	42
	6.3 ANALYZING BEST CLASSIFICATION MODEL	45
7	CONCLUSION AND FUTURE WORK	48
	7.1 CONCLUSION	48
	7.2 FUTURE WORK	48
	REFERENCES	49

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1.1	Percentage of People Cyberbullied Across Social Media Platforms	2
1.2	Examples of Non Bullying Tweet	6
1.3	Examples of Bullying Tweets	7
3.1	Corona NLP Twitter Dataset	22
3.2	Country-wise Tweets Count	23
3.3	Architecture Diagram of Cyberbullying Detection in Tweets	24
5.1	A Tweet Posted by Elon Musk	37
5.2	XPath Extraction From Tweets For Scraping	37
5.3	Code Snippet For Scraping Tweets	37
5.4	Collection of Real-Time Tweets after Webscraping	38
6.1	Accuracy Metric Between Text Classification Models	43
6.2	Precision Metric Between Text Classification Models	43
6.3	Recall Metric Between Text Classification Models	44
6.4	F1 Score Metric Between Text Classification Models	45
6.5	BERT Model Summary	46
6.6	Classification of Real-Time Tweets by BERT Model	46

6.7	CSV File of the Generated Report	47
6.8	Report Generated in Frontend	47

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
3.1	TF-IDF Calculation	26
3.2	Confusion Matrix	30
6.1	Performance Metrics Result for Bullying Class	41
6.2	Performance Metrics Result for Non Bullying Class	45

LIST OF ABBREVIATIONS

API	Application Programming Interface
BERT	Bidirectional Encoder Representations from Transformers
Bi-GRU	Bidirectional Gated Recurrent Units
Bi-LSTM	Bidirectional Long Short Term Memory Networks
CNN	Convolution Neural Network
GRU	Gated Recurrent Units
IDF	Inverse Document Frequency
LR	Logistic Regression
LSTM	Long Short Term Memory Networks
NB	Naive Bayes
NLP	Natural Language Processing
NN	Neural Network
RNN	Recurrent Neural Networks
SA	Sentiment Analysis
SPC	Spanish Cyberbullying Prevention System
SVM	Support Vector Machine
TF	Term Frequency
TF-IDF	Term Frequency - Inverse Document Frequency