

## TABLE OF CONTENTS

APPROVAL PAGE .....	ii
SELF DECLARATION AGAINST PLAGIARISM .....	iii
ABSTRACT .....	iv
ACKNOWLEDGEMENT .....	v
PREFACE .....	vi
TABLE OF CONTENTS .....	i
LIST OF TABLE .....	vi
CHAPTER I INTRODUCTION .....	1
1. 1    Background.....	1
1. 2    Problem Identification .....	3
1. 3    Objective and Contribution.....	3
1. 4    Scope of Work .....	3
1. 5    Hypothesis .....	4
1. 6    Methodology.....	4
1. 7    Research Methodology .....	4
CHAPTER II STUDY OF LITERATURE.....	6
2. 1    Literature Review .....	6
2. 2    Basic Theory .....	11
2.2.1    Software Defined Network.....	11
2.2.2    SDN Architecture .....	12
2.2.3    Machine Learning.....	13
2.2.4    Random Forest .....	15
2.2.5    Hyperparameter Tuning .....	16
2.2.6    Distributed Denial of Service Attack (DDoS).....	19

2.2.7	DDoS Attack on SDN .....	23
2.2.8	InSDN Dataset.....	25
	CHAPTER III RESEARCH METHODOLOGY.....	36
3. 1	Research Design. ....	36
3.1.1	Dataset Selection Phase.....	36
3.1.2	Dataset Preprocessing Phase .....	36
3.1.3	Dataset Splitting Phase.....	37
3.1.4	Determination of Tuning Hyperparameters Phase .....	38
3.1.5	DDoS Attack Detection Accuracy Results.....	40
3. 2	Research Simulation .....	40
3.2.1	Selection of Suitable Datasets for Machine Learning Models .....	40
3.2.2	Selection of Data Preprocessing Methods.....	41
3.2.3	Determination of the Best Hyperparameter Value for Random Forest.....	42
3.2.4	Determination of Measurement Metrics for DDoS Attack Detection.....	42
3. 3	Research Implementation .....	44
3.3.1	InSDN dataset Implementation .....	44
3.3.2	SelectFromModel Implementation for Feature Selection .....	44
3.3.3	Random Search Implementation for Hyperparameter Tuning .....	45
3. 4	System Analysis.....	45
	CHAPTER IV SIMULATION RESULT AND ANALYSIS.....	47
4. 1	System Analysis.....	47
4. 2	System Performance Evaluation.....	47
4.2.1	Performance Evaluation of Hyperparameter Tuning Random Search to Determine the Optimal Value of Hyperparameter .....	47
4.2.2	Performance Evaluation of Hyperparameter Tuning Random Forest in detecting DDoS attacks on SDN Networks.....	50
	CHAPTER V CONCLUSION AND FUTURE WORK.....	57

5. 1	Conclusion .....	57
5. 2	Future Work.....	57
	REFERENCE .....	58