

# Contents

List of Figures	3
List of Tables	1
<b>1 INTRODUCTION</b>	<b>2</b>
1.1 Basics of XSS attack . . . . .	2
1.2 Attack vectors . . . . .	3
1.3 Scenarios . . . . .	5
1.3.1 Scenario I . . . . .	6
1.3.2 Scenario II . . . . .	7
1.3.3 Scenario III . . . . .	8
1.4 Distinguishable characteristics for attack and benign script . .	9
1.5 Overview of existing approaches . . . . .	9
1.6 Motivation . . . . .	10
1.7 Objectives . . . . .	10
1.8 Report organization . . . . .	10
<b>2 BACKGROUND</b>	<b>12</b>
2.1 Classifiers . . . . .	12
2.2 Feature selection algorithms . . . . .	15
2.3 Malicious and benign scripts . . . . .	17
2.4 XSS attack and its types . . . . .	17
2.4.1 Persistent or Stored XSS attack . . . . .	18
2.4.2 Non-Persistent or Reflected XSS attack . . . . .	18
2.4.3 DOM-based XSS attack . . . . .	18
<b>3 LITURATURE SURVEY</b>	<b>20</b>
3.1 An overview of the existing detection approaches . . . . .	20
3.2 Issues to be addressed . . . . .	22
3.3 Overview of existing prevention approaches . . . . .	22

<b>4</b>	<b>DATASET PREPARATION</b>	<b>24</b>
4.1	Data gathering . . . . .	24
4.2	Feature extraction . . . . .	25
4.3	C routines for dataset preparation . . . . .	25
4.4	Increase in the population density of the dataset . . . . .	28
4.5	Normalization of the dataset . . . . .	28
<b>5</b>	<b>ATTACK DETECTION FRAMEWORK</b>	<b>30</b>
5.1	Proposed framework . . . . .	31
5.2	Experimental results . . . . .	38
5.2.1	Results . . . . .	38
5.3	Comparison with other methods . . . . .	39
<b>6</b>	<b>ATTACK PREVENTION ARCHITECTURE</b>	<b>41</b>
6.1	Background . . . . .	41
6.2	Proposed framework . . . . .	42
6.3	Issues to be addressed . . . . .	44
<b>7</b>	<b>CONCLUSION AND FUTURE WORK</b>	<b>45</b>
7.1	Future work . . . . .	45
	<b>Bibliography</b>	<b>46</b>

# List of Figures

1.1	Typical scenario of reflected XSS attack generated through mail.	6
1.2	Typical scenario of XSS attack through guestbook. . . . .	7
1.3	Typical scenario showing reflected XSS attack through specially crafted links in attacker's website. . . . .	8
2.1	An overview of XSS attack . . . . .	17
4.1	Example of a benign JavaScript . . . . .	24
4.2	Example of an attack script . . . . .	25
4.3	A portion of the original dataset . . . . .	29
4.4	A portion of the normalized dataset . . . . .	29
5.1	Proposed framework for XSS attack detection . . . . .	32
5.2	Optimal feature selection framework . . . . .	37
5.3	Output of the rank aggregation algorithm with optimal feature subset . . . . .	38
5.4	ROC curve . . . . .	40
6.1	An XSS response system to mitigate XSS attacks . . . . .	43

# List of Tables

3.1	Summary of related works . . . . .	21
4.1	Description of extracted features . . . . .	26
5.1	Symbol table . . . . .	31
5.2	Results obtained from various feature selection algorithms . .	37
5.3	Accuracy of the classes based on the feature subsets . . . . .	40