



TABLE OF CONTENTS

HALAMAN PENGESAHAN.....	2
PERNYATAAN BEBAS PLAGIASI	3
TABLE OF CONTENTS	4
LIST OF TABLES.....	7
LIST OF FIGURES.....	8
ABSTRACT	10
CHAPTER I. INTRODUCTION	11
1.1 Research Background.....	11
1.2 Research Problem.....	13
1.3 Research Objective.....	13
1.4 Research Scope	14
1.5 Research Advantage	14
1.6 Research Schematic	14
CHAPTER II. LITERATURE REVIEW	16
CHAPTER III. FUNDAMENTAL THEORY.....	29
3.1 Brain Tumor Diagnosis	29
3.2. Magnetic Resonance Imaging.....	30
3.3. Convolutional Neural Network.....	30
3.4. VGG16	32
3.5. SMOTE	34
3.6. Genetic Algorithm Optimization.....	37
3.7. Radius – SMOTE	39
3.8. XG – Boost.....	41
CHAPTER IV. RESEARCH METHODOLOGY.....	43
4.1. Research Description	43
4.2. Data Acquisition.....	44
4.3. Data Pre-Processing	46
4.4. Model Architecture.....	49
4.4.1 Model Architecture of VGG16.....	51



4.4.2	Model Architecture of SMOTE.....	53
4.4.3	Model Architecture of GA-SMOTE.....	54
4.4.4	Model Architecture of Radius-SMOTE	57
4.4.5	Model Architecture of XG-Boost.....	58
4.5	Initialization of the Models	58
4.6	Evaluation Procedure	60
4.6.1	Model Validation.....	60
4.6.2	Validation Strategy	61
4.6.3	Model Comparison.....	61
CHAPTER V. IMPLEMENTATION		63
5.1	Implementation Tools.....	63
5.2	Library Preparation	63
5.3	Dataset Preparation and Splitting.....	64
5.4	Pre-Processing Preparation	66
5.5	Model Training Preparation	67
5.5.1	VGG16 Feature Extraction and Scaling.....	68
5.5.2	Classifier	69
5.5.3	Baseline and SMOTE Model	71
5.5.5	Radius - SMOTE.....	71
5.5.6	GA optimized SMOTE.....	73
5.6	Model Evaluation Implementation.....	79
CHAPTER VI. RESULTS AND DISCUSSION		82
6.1	Evaluation on Un-Balanced Baseline Model.	82
6.2	Evaluation on SMOTE.....	83
6.3	Evaluation on Radius SMOTE.....	84
6.3	Evaluation on GA SMOTE performance	88
6.4	Comparison Analysis	91
6.5	Discussion	93
CHAPTER VII. CONCLUSION & SUGGESTIONS.....		96
7.1	Conclusion	96
7.2	Suggestions	97



REFERENCES..... 98