

TABLE OF CONTENTS

APPROVAL PAGE	i
SELF DECLARATION AGAINS PLAGIARISM	ii
ABSTRACT	iii
DEDICATION	iv
ACKNOWLEDGMENTS	v
TABLE OF CONTENTS	vii
LIST OF TABELS	x
LIST OF FIGURES	xi
CHAPTER 1 INTRODUCTION	1
1.1 Background	1
1.2 Formulation of the problem.....	2
1.3 Goals and Contribution	2
1.3.1 Goals	2
1.3.2 Contribution	2
1.4 Scope of problem	2
1.5 State of The Arts	3
1.6 Hypothesis	6
1.7 Research methodology	7
1.7.1 Literature Study	7
1.7.2 Identification of problems	8
1.7.3 Requirement analysis	8
1.7.4 System planning	9
1.7.5 System Implementation	9
1.7.6 Test	9
1.7.7 Data analysis	9
1.8 Research Method.....	9

CHAPTER 2 REVIEW OF LITERATURE AND STUDIES.....	11
2.1 Image Prossessing.....	11
2.2 Control System.....	12
2.2.1 Open Loop Control System	13
2.2.2 Sistem Kendali Loop Tertutup	14
2.3 Full Fuzzy Logic	15
2.3.1 Mamdani Fuzzy Control Control System	16
2.4 Computer Vision	17
2.5 Data Communication System.....	17
2.6 Microcontroller.....	19
2.7 Arduino MEGA 2560.....	19
2.8 Bahasa C.....	20
2.9 Arduino IDE.....	21
2.10 Pixy CMUcam 5.....	21
2.11 PixyMon Software.....	23
2.12 Driver Motor Shield L293D	23
2.13 NRF24L01.....	25
CHAPTER 3 SYSTEM DESIGN AND MODEL.....	27
3.1 System Model.....	27
3.1.1 Design of object detection system	28
3.1.2 Design of AGV Robot Prototype	29
3.1.3 Object detection system software design	30
3.2 Algorithm Model.....	31
3.2.1 Fuzzification	32
3.2.2 Fuzzy Rule Base	39
3.2.3 Defuzzification	40
3.3 Data Communication Model	40
3.4 System Implementation.....	41

3.5	Simulation Scenarios	44
CHAPTER 4 TESTING AND DATA ANALYSIS		46
4.1	Camera Sensor Test.....	46
4.2	Communication System Test	48
4.3	Maneuver Test.....	49
4.3.1	Testing Based on Manual Calculation	49
4.3.2	Testing Using Live Experiments	53
4.4	Overall System Test	53
4.5	Testing Data Analysis	58
4.5.1	Analysis of Camera Sensor Test Results	58
4.5.2	Analysis of Communication System Test Results	59
4.5.3	Analysis of Maneuver Test Results	59
4.5.4	Overall System Test Results Analysis	60
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS		61
5.1	Conclusion.....	61
5.2	Suggestions.....	61
REFERENCES.....		63