# DEVELOPING A MOBILE ROBOT USING GPS AND VISION SUBSYSTEM FOR WAYPOINT NAVIGATION AND OBSTACLE AVOIDANCE IN AN OUTDOOR ENVIRONMENT

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## STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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## ABSTRACT

DEVELOPING A MOBILE ROBOT USING GPS AND VISION SUBSYSTEM FOR WAYPOINTS NAVIGATION AND OBSTACLE AVOIDANCE IN AN OUTDOOR ENVIRONMENT

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Navigation for a mobile robot is the fundamental of robotics. The proposed method uses a differential drive system to navigate the robot from starting waypoints to finish waypoints using GPS to obtain latitude and longitude and a magnetometer for heading direction in an outdoor environment. Additionally, a monocular camera and ping sensor has been added to distinguish objects and the distance to the robot at the waypoints. Two methods are used for object detection, which are contour and SURF, while Qtextserialport is used to communicate between the mobile robot and a mini computer. Two power sources are being used, which are a powerbank and a Li-Po battery. Ultimately, the results can be monitored using a laptop via wifi module.

*Keywords: vision for road detection, outdoor gps navigation, mobile robot, mini computer, differential drive system, Qtextserialport.*

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# DEDICATION

I dedicate this thesis works for my family, my friends, and for my future self.

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# TABLE OF CONTENTS

STATEMENT BY THE AUTHOR....2
ABSTRACT....3
DEDICATION....5
ACKNOWLEDGEMENTS....6
TABLE OF CONTENTS....7
LIST OF TABLES....10
LIST OF FIGURES....11
CHAPTER 1 INTRODUCTION....13
1.1 Background....13
1.2 Thesis Purpose....13
1.3 Thesis Scope....14
1.4 Thesis Limitation....14
1.5 Thesis Structure....15
CHAPTER 2 LITERATURE REVIEW....16
2.1 Introduction....16
2.2 Digital Image Processing....16
2.3 OpenCV....17
2.3.1 Grayscale....17
2.3.2 Canny Edge Detector....18
2.3.3 HSV....19
2.3.4 Contour....20
2.3.5 SURF....20
2.3.6 Morphological Operation....21
2.3.7 Histogram....22
2.4 Independent Spring Suspension....22
2.5 Differential Drive System....23
2.6 GPS....24
2.7 Serial Communication....24
2.8 Remote Desktop....25
2.9 Similar Works....25
CHAPTER 3 RESEARCH METHODOLOGY....28
3.1 System Design Overview....28
3.2 Mechanical Design....29

3.3 Electrical Design ..... 30
3.3.1 Camera ..... 30
3.3.2 Ultrasonic Ranging Module ..... 31
3.3.3 GPS Shield ..... 32
3.3.4 Magnetometer ..... 39
3.3.5 Mini PC ..... 40
3.3.6 Microcontroller ..... 44
3.3.7 Motor Driver ..... 47
3.3.8 DC Motor ..... 48
3.3.9 Power Supply ..... 49
3.4 Software Design ..... 50
3.4.1 Software Design Overview ..... 50
3.4.2 Qt and OpenCV ..... 51
3.4.3 Arduino IDE ..... 51
3.5 Contour Object Detection ..... 52
3.6 SURF Object Detection ..... 53
3.7 Magnetometer Program ..... 53
3.8 GPS Program ..... 55
3.9 HSV for Road Detection ..... 59
3.10 Remote Desktop ..... 60
3.11 Single Obstacle Avoidance ..... 60
CHAPTER 4 RESULTS AND DISCUSSIONS ..... 62
4.1 Subsytem Test ..... 62
4.1.1 Ultrasonic Ranging Module Test ..... 62
4.1.2 GPS Latitude and Longitude Test ..... 63
4.1.3 Magnetometer Test ..... 70
4.1.4 Contour Object Detection Test ..... 73
4.1.5 SURF Object Detection Test ..... 77
4.1.6 Serial Communication Test ..... 79
4.1.7 HSV Color Test ..... 80
4.1.8 Remote Desktop Configuration Test ..... 82
4.1.9 Histogram Test ..... 83
4.1.10 Road Detection Test ..... 84
4.2 Integration Test ..... 87

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4.2.1 Fully Assembled Mobile Robot Test ..... 87
4.3 Overview of the Mobile Robot ..... 90
CHAPTER 5 CONCLUSION ..... 91
5.1 Conclusion ..... 91
5.2 Recommendation ..... 91
GLOSSARY ..... 92
REFERENCE ..... 93
APPENDICES ..... 94
APPENDIX A – Technical Drawing ..... 94
APPENDIX B - Electrical Wiring and Diagram ..... 96
B.1 ODROID-U3 Schematic ..... 96
B.2 Arduino Mega 2560 Schematic ..... 97
B.3 GPS Shield Schematic ..... 98
B.4 Motor Driver Schematic ..... 99
B.5 HMC5883L Schematic ..... 100
B.6 HCSR04 Schematic ..... 101
APPENDIX C – Data Sheet ..... 102
C.1 ODROID U3 ..... 102
C.2 Arduino Mega 2560 ..... 103
C.3 GPS Shield by IteadStudio v1.1 ..... 110
C.4 L298N Motor Driver ..... 114
C.5 Pololu DC Motor 34:1 ..... 121
C.6 HMC5883L ..... 122
C.7 HC-SR04 ..... 127
APPENDIX D – Coding ..... 130
D.1 Ultrasonic Distance Test ..... 130
D.2 Magnetometer Heading Program ..... 131
D.3 GPS Latitude and Longitude ..... 135
D.4 Full Arduino IDE Program ..... 139
D.5 Multithreaded Program ..... 152
APPENDIX E – Bill of Materials (BOM) ..... 160
CURRICULUM VITAE ..... 161

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