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BENHA UNIVERSITY
FACULTY OF ENGINEERING-SHOUBRA

AN ULTRASONIC ROBOT LOCALIZATION SYSTEM
FOR INDOOR APPLICATIONS

BY

ENG.GEHAN SAMI ABBASS

B.Sc. in Electronic Engineering

A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE IN
ELECTRICAL ENGINEERING
ELECTRONIC & COMMUNICATION DEPARTMENT

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Approved by the Examining Committee:

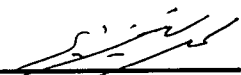
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ABSTRACT

This thesis develops a positioning system for mobile robot based on the difference in the time-of-flights (DTOF) from a single transmitter to various receivers fixed in 2D and 3D space. The DTOF equations are very sensitive to their variables errors so we introduce a solution to this sensitivity problem based on finding the optimal positions of the receivers using genetic algorithm. These positions also overcome the singularity problem in the DTOF equations. This system can be implemented using poor accuracy ultrasonic ranging hardware.

TABLE OF CONTENTS

Page

ACKNOWLEDGEMENT.....	I
ABSTRACT.....	II
TABLE OF CONTENTS.....	III
LIST OF FIGURES.....	VI
LIST OF TABLES.....	IX
LIST OF SYMBOLS.....	X
LIST OF ABBREVIATIONS	XII

CHAPTER 1 INTRODUCTION

1.1 Motivation.....	1
1.2 goals.....	1
1.3 Literature Review.....	2
1.4 Thesis Outline.....	7

CHAPTER 2 ULTRASONIC SENSORS BACKGROUND

2.1 Ultrasonic Background.....	8
2.2 Physical Working Principle.	10
2.3 Ultrasonic Ranging Configurations.....	11
2.4 Types of Ultrasonic Sensors.....	13
Electrostatic Ultrasonic Sensors.....	
Piezoelectric Ultrasonic Sensors.....	
2.5 Performance Factors.....	14
2.5.1 Variations in Indoor Conditions.....	15
2.5.2 Indirect Path.....	16
2.5.3 Acoustic Attenuation over Distance.....	16
2.6 Accuracy Consideration.....	19
2.7 Location Recognition Technology and Techniques	20
2.7.1 Techniques.....	20
Trilateration.....	
Triangulation.....	
2.8 Localization System Properties.....	24

CHAPTER 3 DIFFERENCE IN TIME OF FLIGHT

3.1 Fundamental Concepts.....	26
3.2 System Formulation for 2D and 3D Case using DTOF	26
3.2.1 Two Dimensional Configuration	27
3.2.2 Three Dimensional Configuration.....	28

CHAPTER 4 OPTIMAL SENSORS POSITIONING

4.1 Introduction.....	30
4.2 Sensitivity Analysis for 2D Formulation	31
4.2.1 Timing Error Analysis	31
4.2.2 Speed Error Analysis	37
4.3 Introduction to Genetic Algorithm.....	39
4.3.1 Selecting the Variables and the Cost Function.....	42
4.3.2 The Population.....	42
4.3.3 Select Mate.....	43
4.3.4 Pairing	43
4.3.5 Mating.....	45
4.3.6 Mutations.....	47
4.4 Sensors Optimal Position in 2D.....	48
4.5 Sensitivity Analysis for 2D Formulation.....	48
4.5.1 Timing Error Analysis	49
4.5.2 Speed Error Analysis	51
4.6 Sensitivity Analysis on 3D Formulation with Optimal Position to Sensors.....	52
4.7 Singularity Analysis for 2D Formulation.....	54
4.7.1 Sensors at Random Positions.....	55
4.7.2 Sensors at Optimal Positions.....	56

CHAPTER 5 SYSTE IMPEMRNTATION HARDWARE & SOFTWARE

5.1 Development of Single Transmitter/Receiver Ranging.....	58
5.2 Multiplexing Beacons for 2D and 3D Implementation.....	59
5.3 Test System Configuration.....	60
5.4 Introduction to Labview.....	64
5.5 Interfacing Card.....	65

5.6 Flow Chart..... 67

CHAPTER 6 RESULTS

6.1 2D Results.....69

6.2 3D Results.....73

6.3 Errors for Time of Flights Results from Hardware Delays and Received Signal Shape..... 75

CHAPTER 7 CONCLUSION AND FUTURE WORK

7.1 Conclusion.....78

7.2 Future Work.....78

LIST OF FIGURES

	Page
Fig. 1.1 Hyperbolic radio localization principle.....	3
Fig. 1.2 GPS spherical positioning principle.....	4
Fig. 1.3 The Bat ultrasonic location system.....	6
Fig. 1.4 The cricket Compass measures the angle with respect to beacon. 6	6
Fig. 2.1 Acoustic spectrum.....	9
Fig. 2.2 Illustration of Reflected Ultrasonic Signal.....	11
Fig. 2.3 Illustration of Transmitter/Receiver Pair.....	11
Fig. 2.4 Padding solution.....	12
Fig. 2.5 Illustration of Transceiver configuration.....	12
Fig. 2.6 Electrostatic Ultrasonic transducer.....	13
Fig. 2.7 Piezoelectric Ultrasonic transducer.....	14
Fig. 2.8 Speed of sound in air as a function of temperature.....	15
Fig. 2.9 Error in position estimation due to Indirect path.....	16
Fig. 2.10 Air absorption coefficient "α" as a function of temperature, relative humidity (RH), and sound frequency.....	18
Fig. 2.11 Transducer misalignment.....	19
Fig. 2.12 Determining 2D position using trilateration requires distance measurement between object X and 3 non collinear points.....	22
Fig. 2.13 The basic triangulation problem: a rotating sensor head measures the three angles λ_1, λ_2 , and λ_3 between the vehicle's longitudinal axes and the three sources S1, S2, and S3.....	23
Fig. 3.1 Two dimensional configuration.....	27
Fig. 4.1 Error analysis flowchart.....	32
Fig. 4.2 Random receiver distribution.....	33
Fig. 4.3 Result from sensitivity analysis for random position of receivers.....	33

Fig. 4.4	Changing transmitter position for random receivers' distribution.	34
Fig. 4.5	Result of sensitivity analysis for new transmitter position.....	35
Fig. 4.6	Other random distributions for receivers.....	35
Fig. 4.7	Result of sensitivity analysis for new random receivers' distribution	36
Fig. 4.8	Concentrating receiver at middle of the room.....	36
Fig. 4.9	Result of sensitivity analysis for concentrated receivers.....	37
Fig. 4.10	Speed error analysis for random receivers' distribution.....	38
Fig. 4.11	Binary genetic algorithm.....	40
Fig. 4.12	Flowchart of binary and continuous genetic algorithm.....	41
Fig. 4.13	Mean cost over generations.....	48
Fig. 4.14	2D optimal receivers' distribution.....	49
Fig. 4.15	Result of sensitivity analysis for 2D optimal receivers distribution	49
Fig. 4.16	Result of sensitivity analysis for 2D optimal receivers' distribution and different transmitter position.....	50
Fig. 4.17	Result of sensitivity analysis for integer of optimal receivers' positions.....	51
Fig. 4.18	Speed error analysis for optimal receivers' distribution.....	52
Fig. 4.19	3D near optimal receivers' positions.....	53
Fig. 4.20	Result of sensitivity analysis for 3D optimal receivers' distribution	53
Fig. 4.21	Singularity analysis for 2D concentrated receivers.....	55
Fig. 4.22	Singularity analysis for 2D optimal receivers' distribution.....	56
Fig. 5.1	Polaroid ranging module.....	57
Fig. 5.2	Block diagram of single transmitter-receiver ranging system.....	58
Fig. 5.3	Multiplexed system block diagram.....	59
Fig. 5.4	Initial distribution for receivers.....	60

Fig. 5.5 40 KHz transmitted burst during 1ms (Sweep rate is 1ms/div & amplification gain is 5v/div).....	61
Fig. 5.6 Multiplexed received signal (Sweep rate is 1ms/div & amplification gain is 50 mv/div).....	61
Fig. 5.7 Recovered amplified received signal (Sweep rate is 1ms/div & amplification gain is 5v/div).....	62
Fig. 5.8 Stop signal (Sweep rate is 1ms/div & amplification gain is 5v/div).....	62
Fig. 5.9 Final hardware used.....	63
Fig. 5.10 A photograph of experimental set up.....	63
Fig. 5.11 PCI 6601 Interface card.....	65
Fig. 5.12 68-conductor flat ribbon cable.....	66
Fig. 5.13 Two edge signal separation measurement.....	67
Fig. 5.14 Software flowchart.....	68
Fig. 6.1 Two dimensional results.....	70
Fig. 6.2 2D errors.....	71
Fig. 6.3 Three dimensional results.....	74
Fig. 6.4 3D errors.....	74
Fig. 6.5 Signal produced by equidistant-misaligned receivers.....	75
Fig. 6.6 Signal produced by receivers at different distance.....	76
Fig. 6.7 Error by Threshold measurement due to different T error terms because of misalignment and distance.....	77