

# CONTENTS

## ACKNOWLEDGEMENTS

## PREFACE

## CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

## LIST OF ABBREVIATION

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Background . . . . .	1
1.2	Problem Identification . . . . .	2
1.3	Objectives . . . . .	3
1.4	Scope of Work . . . . .	3
1.5	Research Methodology . . . . .	4
<b>2</b>	<b>BASIC CONCEPT</b>	<b>6</b>
2.1	LiDAR(Light Detection and Ranging) . . . . .	6
2.1.1	TF-Luna . . . . .	7
2.1.2	Arduino Mega 2560 . . . . .	8
2.1.3	Motor Servo and Motor Stepper . . . . .	9
2.2	Electromechanical Scanning . . . . .	10
2.3	3D Point Cloud . . . . .	11
2.4	3D Reconstruction . . . . .	12
<b>3</b>	<b>THE PROPOSED SYSTEM AND ALGORITHM</b>	<b>13</b>
3.1	The Proposed System . . . . .	13
3.1.1	Electrical Design . . . . .	13
3.1.2	Mechanical Design . . . . .	16
3.2	Design of Algorithm . . . . .	17
3.2.1	Full Scanning method . . . . .	20
3.2.2	Edge Tracking Algorithm(ETA) . . . . .	20

3.2.2.1	ETA on a Single Object . . . . .	22
3.2.2.2	ETA on Two Objects . . . . .	22
3.2.3	3D Point Cloud Visualization . . . . .	24
3.3	Testing area . . . . .	28
3.4	Performance Parameter . . . . .	28
3.4.1	Accuracy . . . . .	28
3.4.2	Data Processing Speed . . . . .	29
3.4.3	Data Processing Efficiency . . . . .	30
<b>4</b>	<b>RESULT AND ANALYSIS</b>	<b>31</b>
4.1	Algorithm Result Test . . . . .	31
4.2	Analysis of the result . . . . .	34
4.2.1	Accuracy . . . . .	35
4.2.2	Data processing speed . . . . .	35
4.2.3	Data Processing Efficiency . . . . .	36
4.2.4	Testing ETA on Two Object . . . . .	37
<b>5</b>	<b>CONCLUSION</b>	<b>39</b>
5.1	Conclusions . . . . .	39
	<b>REFERENCES</b>	<b>40</b>