Middle East Technical University

Department of
Electrical and Electronics Engineering

EE493 ENGINEERING DESIGN I

Car Chasing Robot
Proposal Report

Supervisor: Assoc. Prof. Emre Özkan
ADDDRESSS

Project Start: 16.16.6227
Project End: 16.16.6227
Project Budget: $450

Company Name : Duayenler Ltd. Şti.

Members			
Sarper Sertel	Electronics Engineer	2094449	0542 515 6039
Enes Taştan	Hardware Design Engineer	2068989	0543 63 4336
Erdem Tuna	Embedded Systems Engineer	2617419	0535 256 3320
Halil Temurtaş	Control Engineer	2094522	0531 632 2194
İlker Sağlık	Software Engineer	2094423	0541 722 9573

November 9, 2018

Contents

0.1 problem statement, societal impact of the project,

0.2 company organization (human resources, etc.),

0.3 specific requirements and objectives of the project

0.4 approach to the solution of the problem

0.5 outline of the requirements for any standards that the product would need to comply with,

0.6 deliverables and expected outcomes of the project,

0.7 tentative cost-budget analysis,

0.8 time plan (Gantt chart),

1 Executive Summary

2 Introduction

3 Team Organization

Our team

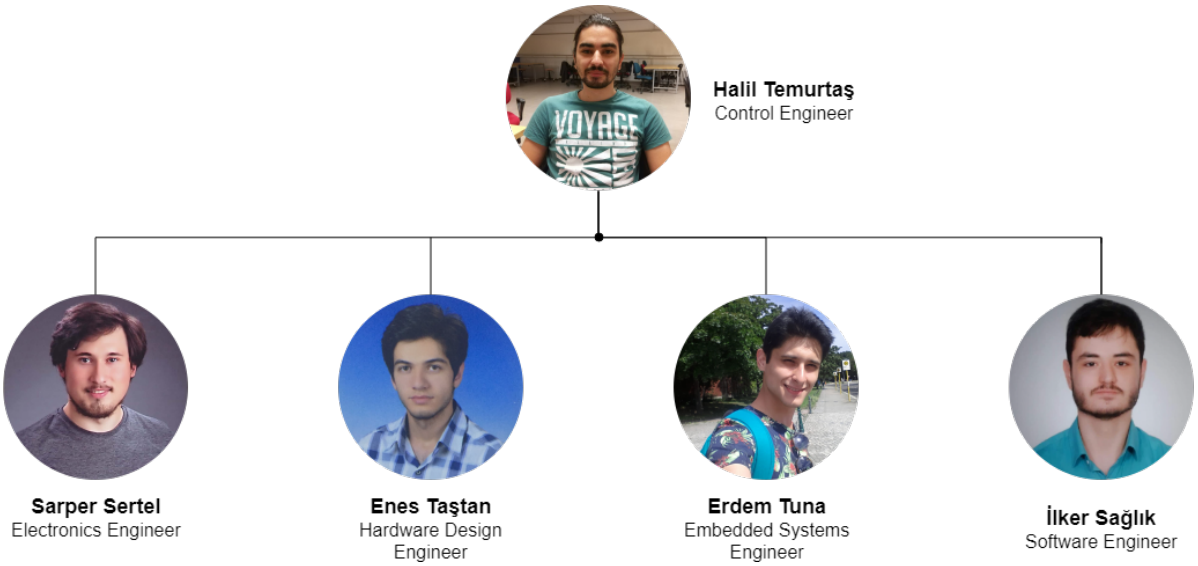

Figure 1: Weekly Schedule

4 Requirement Analysis

Our team

	Having Fun	Competition	Original Solution	Budget	Mechanical Challenges	Complexity	Marketability	Total	Weighted Objectives
Having Fun	0	0,5	0,75	0,8	0,9	0,6	0,8	4,35	0,2
Competition	0,5	0	0,7	0,7	0,5	0,75	0,8	3,95	0,2
Original Solution	0,25	0,3	0	0,6	0,7	0,55	0,8	3,2	0,16
Budget	0,2	0,3	0,4	0	0,2	0,3	0,8	2,2	0,1
Mechanical Challenges	0,1	0,3	0,3	0,8	0	0,3	0,8	2,6	0,12
Complexity	0,4	0,25	0,45	0,7	0,7	0	0,8	3,3	0,16
Marketability	0,2	0,2	0,2	0,2	0,2	0,2	0	1,2	0,06
								20,8	1

Figure 2: Pairwise Comparison Charts

Figure 3: Weighted Objective Tree

	Performance	Marketability	Environmental Effects	Feasibility	Total	Weighted Objectives
Performance	0	1	0,8	0,8	2,6	0,45
Marketability	0	0	0,4	0,35	0,75	0,12
Environmental Effects	0,2	0,6	0	0,5	1,3	0,23
Feasibility	0,2	0,35	0,5	0	1,05	0,2
					5,7	1

Figure 4: Project Objective Tree

	Fast Operation	Robust	Weight Balance	Total	Weighted Objectives	Weighted Objectives
Fast Operation	0	0,55	0,4	0,95	0,32	0,144
Robust	0,45	0	0,5	0,95	0,32	0,144
Weight Balance	0,6	0,5	0	1,1	0,36	0,162
				3	1	0,45

Figure 5: Weekly Schedule

	Cost Efficiency	User Friendly	Total	Weighted Objectives	Weighted Objectives
Cost Efficiency	0	0,6	0,6	0,6	0,072
User Friendly	0,4	0	0,4	0,4	0,048
			1	1	0,12

Figure 6: Weekly Schedule

	Power Consumption	Reversibility Potential	Total	Weighted Objectives	Weighted Objectives
Power Consumption	0	0,95	0,95	0,95	0,2185
Reversibility Potential	0,05	0	0,05	0,05	0,0115
			1	1	0,23

Figure 7: Weekly Schedule

	Having Fun (0.2)	Competition (0.2)	Original Solution (0.16)	Budget (0.1)	Mechanical Challenges (0.12)	Complexity (0.16)	Marketability (0.06)	Total
Balloon	8 1,6	10 2	6 0,96	4 0,4	0 0	2 0,32	6 0,36	5,28
Air Hockey	8 1,6	8 1,6	4 0,64	8 0,8	2 0,24	6 0,96	8 0,48	5,84
Chasing Cars	10 2	8 1,6	8 1,28	6 0,6	6 0,72	8 1,28	10 0,6	7,48
Mapping	4 0,8	4 0,8	8 1,28	2 0,2	8 0,96	0 0	6 0,36	4,04

Figure 8: Weekly Schedule

5 Standards Section

6 Solution Procedure

7 Expected Deliverables

Is the problem sufficiently important to justify money, company time, and your effort?

Is the project well defined and realistic?

Have you outlined a

8 Conclusion

A Gannt Chart

	T0+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	**Concept Development Phase (3 Weeks)**																												
2	**Assessment of System Requirement Phase (3 Week)**																												
3	**Conceptual Design and Preliminary Design Phase (4 Weeks)**																												
4	**Critical Design Phase (18 Weeks)**																												
5	**Test & Evaluation Phase (19 Weeks)**																												
6	**Implementation & Finalization Phase**																												
7	**Project Ending (T0+28 Weeks)**																												
1	**Concept Development Phase**																												
1.1	**Activities**																												
1.1.1	Literature Research and Determination and Similar Platform Specifications																												
1.1.2	Feasibility Works																												
2	**Assessment of System Requirement Phase**																												
2.1	**Activities**																												
2.1.1	Determination of Team Logo and Vision & Mission																												
2.1.2	Problem Define State for All Projects																												
2.1.3	Solve Defined Problem State for All Projects																												
2.1.4	General Component Research																												
2.2	**Outcomes**																												
2.2.1	Business Statement Report																												
3	**Conceptual Design and Preliminary Design Phase**																												
3.1	**Activities**																												
3.1.1	Preliminary Electrical System Design																												
3.1.1.1	Preliminary Sensing Unit Design																												
3.1.1.2	Preliminary Computational Unit Design																												
3.1.1.3	Preliminary Driving Unit Design																												
3.1.2	Preliminary Mechanical System Design																												
3.1.2.1	Preliminary Motion Unit Design																												
3.1.2.2	Preliminary Structure Design																												
3.2	**Outcomes**																												
3.2.1	Preliminary Report																												

	T0+	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
4	**Critical Design Phase**																												
4.1	**First Semester**																												
4.1.1	Electrical System Design																												
4.1.1.1	Sensing Unit Design																												
4.1.1.2	Computational Unit Design																												
4.1.1.3	Driving Unit Design																												
4.1.2	Mechanical System Design																												
4.1.2.1	Motion Unit Design																												
4.1.2.2	Structure Design																												
4.1.3	To be detailed																												
4.2	**First Semester Outcomes**																												
4.2.1	Standards Report																												
4.2.2	Module Test Demo																												
4.2.3	Conceptual Design Report																												
4.2.4	Presentations																												
4.3	**Second Semester**																												
4.3.1	To be detailed																												
4.4	**Second Semester Outcomes**																												
4.4.1	Critical Design Review Report																												
5	**Test & Evalution Phase**																												
5.1	**First Semester Activities**																												
5.1.1	To be detailed																												
5.2	**First Semester Outcomes**																												
5.2.1	To be detailed																												
5.3	**Second Semester Activities**																												
5.3.1	To be detailed																												
5.4	**Second Semester Outcomes**																												
5.4.1	Critical Design Review Report																												
6	**Finalization Phase**																												
6.1	**Activities**																												
6.1.1	To be detailed																												
6.2	**Outcomes**																												
6.2.1	Finalized Product																												
6.2.2	Final Report																												
6.2.3	Final Demo																												
7	**Project Ending**																												