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: 4/10/2018
Project End: 26/5/2019
Project Budget: $450

Company Name : Duayenler Ltd. Şti.

Members	Title	ID	Phone
Sarper Sertel	Electronics Engineer	2094449	0542 515 6039
Enes Taştan	Hardware Design Engineer	2068989	0543 683 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

1 notes

1.1 problem statement, societal impact of the project,

1.2 company organization (human resources, etc.),

1.3 specific requirements and objectives of the project

1.4 approach to the solution of the problem

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

1.6 deliverables and expected outcomes of the project,

1.7 tentative cost-budget analysis,

1.8 time plan (Gantt chart),

2 Executive Summary

3 Introduction

4 Team Organization

DUAYENLER Ltd. Şti. was founded in September 2018 by five electrical engineering students from Middle East Technical University. The team is composed of variously skilled visionary members. The leader of the team is Halil Temurtaş. Being the team leader, Halil manages the organization of the members as well as drawing an outline for the future calendar. Besides, he will be working on the development of the subsystems compu

Our team

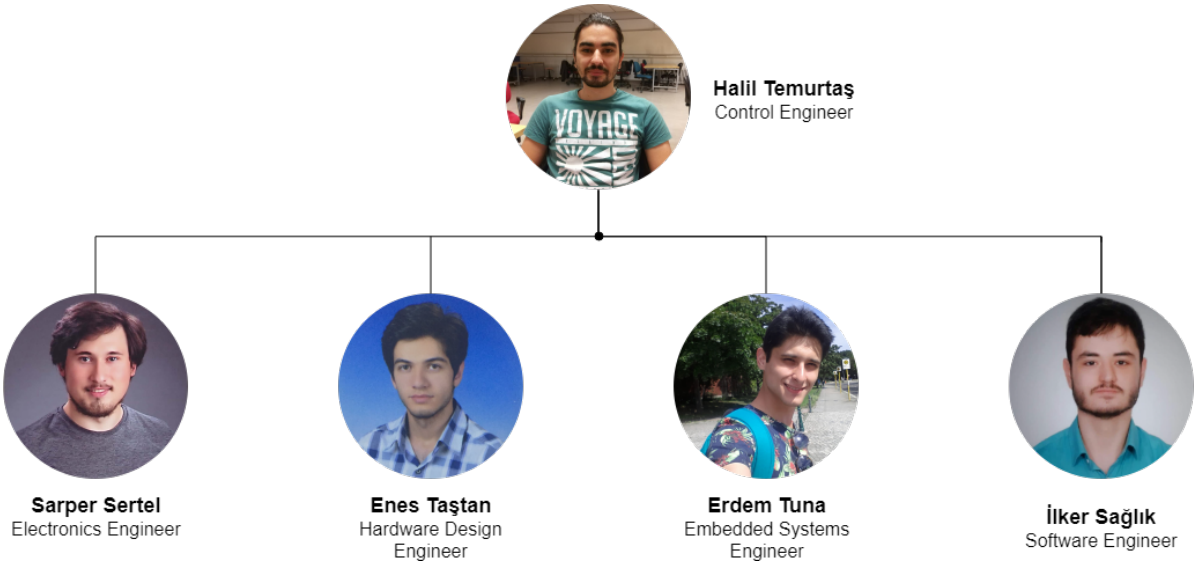

Figure 1: Company Tree

5 Requirement Analysis

Reqs, soln puanlama

	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

	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	10	6	4	0	2	6	5,28
	1,6	2	0,96	0,4	0	0,32	0,36	
Air Hockey	8	8	4	8	2	6	8	5,84
	1,6	1,6	0,64	0,8	0,24	0,96	0,48	
Chasing Cars	10	8	8	6	6	8	10	7,48
	2	1,6	1,28	0,6	0,72	1,28	0,6	
Mapping	4	4	8	2	8	0	6	4,04
	0,8	0,8	1,28	0,2	0,96	0	0,36	

Figure 3: Project Evaluation Chart

	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: Pairwise Comparison Charts for Objectives

	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: Pairwise Comparison Charts for Sub-Objectives

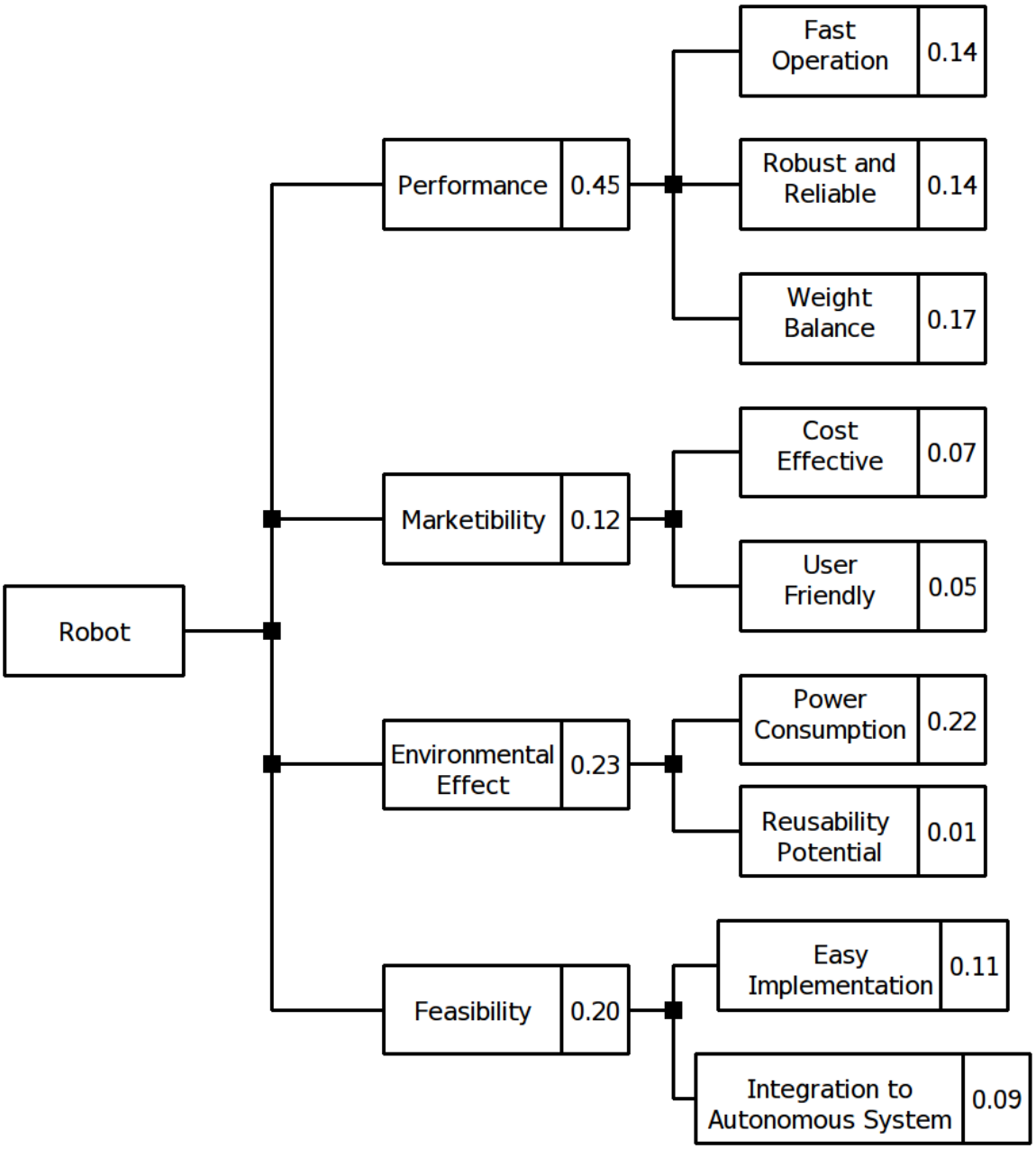

Figure 6: Weighted Objective Tree

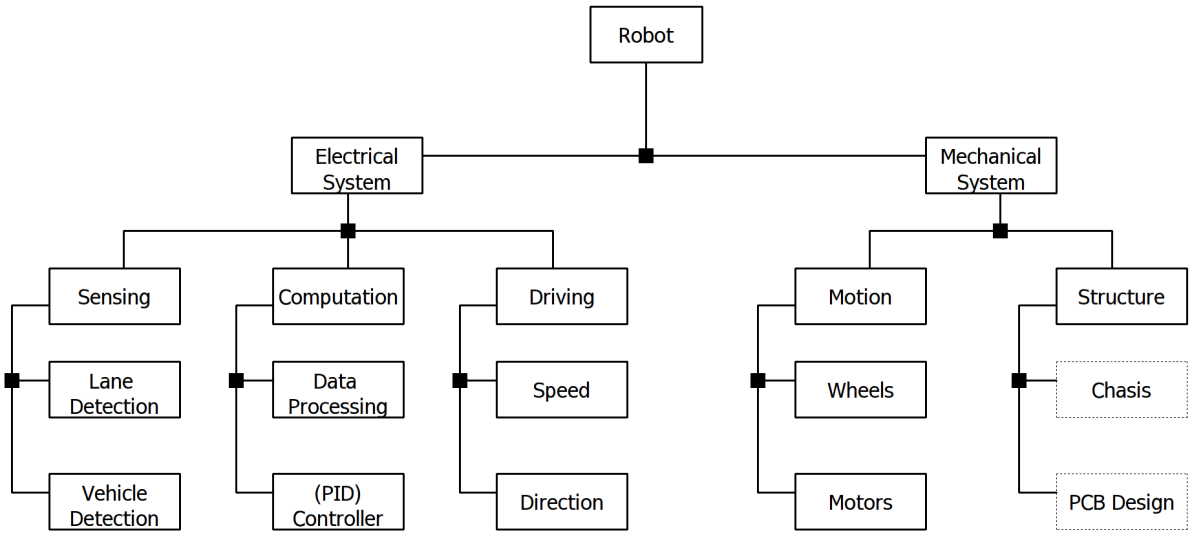

Figure 7: Weighted Objective Tree

6 Standards Section

7 Solution Procedure

8 Expected Deliverables

9 Conclusion

A Gannt Chart

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

Is the

	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**																												