MIDDLE EAST TECHNICAL UNIVERSITY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE 493-DESIGN STUDIO 1

WEEKLY REPORT IV

revolusys

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1. SUMMARY OF THIS WEEK'S PROGRESS

This week, as Revolusys Company, we determine our objectives for project selection. Then the Table 1 is formed as a consequence of our final evaluation. As a result, Gimme Fast project is selected.

For proposal report, introduction is written with providing background information. Upon that, we wrote problem statement. We determine the design objectives and Table 3 is formed.

Performance, functional and physical requirements of Gimme Fast project are specified. In addition, constraints of the project are clearly defined.

2. PROJECT SELECTION

Table 1: Binary Comparison of Objectives

	A	B	C	D	E	F	G	GRAND TOTAL	ADD 1	Weighted Total
A)The amount of mechanic skill required	-	0,5	1	0,5	0	1	0	3	4	0.14
B) Suitability of the project to the skills of group members	0,5	-	0,5	0	1	0	0	2	3	0.11
C) Excitement that project creates on project members	0	0,5	-	1	0,5	0,5	0,5	3	4	0.14
D) Variety of the possible solutions	0,5	1	0	-	0	1	0	2,5	3,5	0.13
E)Testability of the project and the submodules	1	0	0,5	1	-	1	0,5	4	5	0.18
F) Clarity of the project requirements	0	1	0,5	0	0	-	0	1,5	2,5	0.09
G) Possibility of finding implemented solutions	1	1	0,5	1	0,5	1	-	5	6	0.21

Our objectives for the projects are specified by the Company members and the weights of the objectives are found by binary comparing. Table 1 shows the weights of all objectives.

Table 2: Objective Metric

	A(0.14)	B(0.11)	C(0.14)	D(0.13)	E(0.18)	F(0.09)	G(0.21)	TOTAL
Cat Feeding	2 (0.28)	2 (0.22)	3 (0.42)	3 (0.39)	2 (0.36)	2 (0.18)	3 (0.63)	2.48
Gimme Fast	4 (0.56)	4 (0.44)	3 (0.42)	3 (0.39)	4 (0.72)	5 (0.45)	3 (0.63)	**3.61**
Autonomous Valet	1 (0.14)	3 (0.33)	3 (0.42)	4 (0.52)	3 (0.54)	3 (0.27)	3 (0.63)	2.85
Where Am I?	3 (0.42)	3 (0.33)	3 (0.42)	4 (0.52)	2 (0.36)	3 (0.27)	2 (0.42)	2.74

As a result of objective metric, Revolusys Inc selected "Gimme Fast" project for Engineering Design course.

3. WORK ON PROPOSAL REPORT

3.1. Introduction Part of Proposal Report

The company started to write the Proposal Report by first writing introduction part. In order to write introduction part, background information is provided and after that, problem statement is written. It is as follows:

"Although, there are existing communication architectures, they suffer from the aforementioned inefficiencies. A need exists for new communication methods. The design possesses a physically guided vehicle and a VLC system. The goal is to transport a picture from one terminal to the other terminal as fast and accurate as possible while keeping the cost minimal."

3.2. Objective Selection and Weight Determination

Table 3: Binary Comparison of Design Objectives

	Cost	Physical Robustness	Immunity to External Factors	Accuracy	Speed	Grand Total	Add One	Weight
Cost		0	0	0,5	0,5	1	2	0.13
Physical Robustness	1		0	0	1	2	3	0.20
Immunity to External Factors	1	1		0,5	0,5	3	4	0.27
Accuracy	0,5	1	0,5		1	3	4	0.27
Speed	0,5	0	0,5	0		1	2	0.13

Design objectives are defined and by means of binary comparison, the weights of them are calculated. Table 3 shows the weights of all objectives.

3.3. Constraints and Requirements

Performance requirements:

- The system should be able to transmit the data by light at a minimum distance 5 cm while using maximum 8 LEDs and 8 photodiodes/LDRs.
- Data transfer must be completed within 2 minutes.
- The vehicle should complete the data transfer with minimum 5 full tours while carrying maximum 10 kB of data on it.

Functional requirements:

The system should take a photo and by using visible light, send it to a vehicle as data packets. Then the vehicle should carry the data packets and again via visible light, transfer it to the other terminal, where the transmitted photo should be displayed.

Physical requirements:

- The vehicle should be able to move on a physically guided track.

- The distance between two terminals should be up to 1.5 meters.

Constraints

- There must be 5 cm between transmitter and receiver during the light communication.
- Maximum time for the total data transfer is 2 minutes.
- Microcontroller's memory shouldn't exceed 10 kB.
- Data transfer must be handled with 5 full round.
- Up to 8 LEDs and 8 photodiodes/LDRs can be used in the whole system.
- The distance between two terminals should be convertible up to 1.5 meters.

4. CONCLUSION

This week, Revolusys Inc. selected Gimme Fast project. The design objectives are specified with their weights. From now on, the proper design solution will be decided by using objective metrics.

Functional requirements, performance requirements and physical requirements are also defined. Proposal report will be continued to be written by the company members.