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X-Cali

Busines Statement

Version 1.0

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Design Studio Section:

3

Presented by:

Oytun AKPULAT

Göksenin Hande BAYAZIT

Emre DOĞAN

Taha DOĞAN

Burak SEZGİN

Introduction

In this report, brief information about our company X-Cali, about our co-founders and the approaches of our co-founders to the designated projects are included. Also, detailled information about our co-founders in their CVs are present in the Appendix.

Mission and Vision of the Company

Mission

To produce reliable, affordable and high quality products and to provide satisfaction to all stakeholders.

Vision

To become the leading technology company in Turkey and one of the most productive companies in the world by creating value in the global market and to ensure long-term sustainable growth.

Human Resources

Justification of the composition of the team

Description of Capstone Design Projects

Project 1: Vehicles leaving and re-joining a convoy of similar vehicles, marching in single file

In this project, at least two robots of a convoy have to be designed and constructed. One of the robots should be the leading one, which will never leave the convoy as the path-setter. The other one should be one of the followers of the leading robot and it should leave or re-join the convoy upon command. The robots in the convoy are also expected to indicate if they are leaving the convoy or if they are the last robot in the convoy.

As the implementation of this project does not require a complex mechanical system but a powerful knowledge of signal processing, software and control, it is quite consistent with the background of the members of our team.

Project 2: Robots collaborating to balance on a see-saw and keep the distance between them

Robots collabrating to balance on see-saw project aims that two robots should stay in balance on a 50cm plank that is located on a cylindrical object with 10-12cm diameter.

This project has an unique property that is the functionality of the robot depends on the other robot at the other and of the plank. That is, this project is a problem that consists an advanced control design. The advantage of this project is there is no need for image processing. However, this means that a very sensitive accelerometer must be used, which might be very expensive. Another mind bending issue is that the restrictions of the designs. One can use large arms or one can use gyros inside the robot. Thus, such kind of flexibility may cause a time waste for some companies.

Project 3: Robots taking part in a basketball shoot-out

In this project, two opponent robots will take part in a basketball shoot-out. Each team will design and construct one of the robots.

In the game field, there will be three parallel lines that consist of two baselines and a center line. These lines will be spaced equally by 1 meter. Center line will seperate the game field into two similar half-fields and each half-field will be constructed by one of the design teams. There will be no markings in these half fields except the baselines.

At the beginning of the game, 6 balls will be arbitrarily placed behind the baseline for each robot. The balls should be compatible to ping-pong balls in terms of size. Each robot is supposed to pick up a ball, carry it to the center of the game field and drop or shoot into the common basket which is placed on the center line. Robots will repeat this action until the basket is full. The team with more balls in the basket will win the game.

Throughout the game, robots can not deal with more than a ball at a time. Crossing the opponent’s half field or touching the basket is not allowed, any violations of these rules will be penalized.

Project 4: Robots collaboratively carrying a long object through an open-top maze

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Project 5: Vehicles chasing each other on an obstacle course, by going over walls and under bridges

In this project two vehicles compete with each other. However, there are some obstacles such as walls, bridges and sticks. They should overcome those obstacles somehow. At that point, project gets harder to achieve the aim since to jump from the wall and locate the angle of the bridge and enter accordingly is not easy to obtain.

The most difficult software utilization part of the project is image processing part since both speed of the car and quality of the image processing works inversely proportional. In other words, if vehicle moves faster, image processing quality gets low which is not a desired. It is because vehicle has to move faster to compete with the other one. The most difficult mechanical application part of the project is going over the wall. To implement that jump, vehicle has to be solid so that vehicle must not be damaged during landing. And also a mechanism to provide jumping is necessary and hard to apply. After all these taken into account, project seems to be a fancy one but also the hardest one.

Conclusion

Appendix 1

Time table for the tasks including the assignment of responsibilities until the submission of the proposal report

Appendix 2

CVs of the team members are attached in the following order:

* Oytun Akpulat
* Göksenin Hande Bayazıt
* Emre Doğan
* Taha Doğan
* Burak Sezgin

























