D7039E report

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Abstract

Introduction

Background and motivation

Self explanatory.

Contributions

How does this report contribute. Are there any novel solutions?

Structure

Overview of the report structure

Conceptual design

Mechanical structure

The final design of the robot. Include CAD renderings etc.

Electrical components

Electrical components such as motors, MCUs etc. Why were they chosen

Modeling

Robotic arm

Forward kinematics

Inverse kinematics

Motion algorithms

Robot arm

Path planning

Experimental evaluation

Prototype components

Movable base evauation

Arm evaluation

Gripping evaluation

Sensor evaluation

Conclusions

Conclusions of the robot and the course (?)

Appendix A

Team members

Martin Blaszczyk

Martin is a 5th year Y-student with interest in Control och Mechatronics. In this course he'll take the role of the Project Leader where the main objectives are to keep focus on the goal, hold meetings and an overall oversight of the project. As for the technical part the main interest will be in machine vision together with Edward K. to use cameras or other sensors to localize external objects for the robot to grip, avoid or approach.

Edward Cedgård

Master in engineering electronic systems and control engineering. Edward main task is to design the grip mechanism with Niklas. Topics like the design of the claw, necessary components, model of the controlsystem and then implementation.

Niklas Dahlquist

Niklas is studying his fifth year at the Engineering physics and electrical engineering student programe.

His main focus will be to work with Edward Cedgård to evaluate the gripping mechanism and if necessary design new components and model the corresponding control system to be able to lift up and hold the target object.

Edward Källstedt

Currently studying his fourth year in the Master Programme in Computer Science and Engineering. A fan of making things secure, fast, scalable, and well-documented. Primarily interested in low level software development. Will ini-

tially work on the machine vision implementation together with Martin. In addition to machine vision specifically this work will also consist of robot localization and collision avoidance. As the project progresses he will take on more general software problems that might arise. The first week will be spent researching different computer vision technologies.

Albin Martinsson

Albin is a 5th year computer science student specializing in industrial computer system. In this project he will be focusing on the arrowhead integration and be in charge of the Github repository. This will entail connecting all the services to each other and making sure they are authenticated and secure. Being in charge of the git repository will entail merging pull requests and sorting out conflicts, making sure that the version control part of this project runs smoothly.

Måns Norell

As Måns is a control student, he will be working on the movement and navigation system for the robot. In the beginning this will manifest in moving the robot to user specified coordinates.

Appendix B

Working together

Project structure

To keep the project going and have an organized structure the project is divided in different parts, or subprojects. Each group member is either alone or in group responsible for each part of the project which coincides with their interests.

- Arrowhead
- Machine vision and localization of external objects
- Gripping tool
- Movable base

Meetings

Every week the group will be meeting on Mondays and Tuesdays to catch up and support each other. This scheme may change in the future if needed. The Monday meetings will have the following agenda where the goal is to catch up with the whole project group and discuss the project

- Status of work done the previous week by each member
- Preparation for the seminar
  - Discussion of the previous seminar meeting
  - How the weeks work has been coinciding with the seminar feedback
  - Questions to ask the teachers
  - Questions to ask the other group
  - Who does what during the Tuesday seminar
- Other

The Tuesday meeting will be after the seminar to collect and reflect over the feedback from the teachers and the other group. Also a status on the work planned to be done the coming week will be discussed so that each member has an overview of what the other members are doing. The meetings will have the following agenda

- What feedback did the teachers give
- What feedback did he other group give
- Feedback to each other withing the group
- Work to be done the following week
- Other

As mentioned, this meeting structure may be subject to changes if needed and of course if any member of the group wants to work from home a video call will be organized.