Weekly Presentation

Week 38

Luleå University of Technology

September 15, 2020

Group members

- Y-students
  - Martin Blaszczyk - Project leader and object detection
  - Edward Cedergård -Arm and gripping tool
  - Niklad Dahlqvist - Arm and gripping tool
  - Måns Norell - Movable base
- D-students
  - Edward Källstedt - Object detection
  - Albin Martinsson - Arrowhead and Git

Robotic arm

What we have done and what we are working on:

- Servos
- Representation (DH-parameters)
- Kinematics
- Chosen arm, 4DOF
- 3D modeling

Servos

- Dynamixel
  - Feedback; position, torque, temperature, etc
  - Serial communication
  - Chainable

Figure: Dynamixel AX-12A servo.

Representation

- Denavit–Hartenberg parameters
- Joints
- Degrees of freedom

Link	a	alpha	d	theta
1	0	-90	d1	theta 1
2	a2	0	0	theta 2
3	a3	0	0	theta 3
4	a4	0	0	theta 4

Kinematics

- Forward kinematics
- Inverse kinematics
- Numerical or analytical solution
- Robotics Toolbox in Matlab by Peter Corke

Kinematics

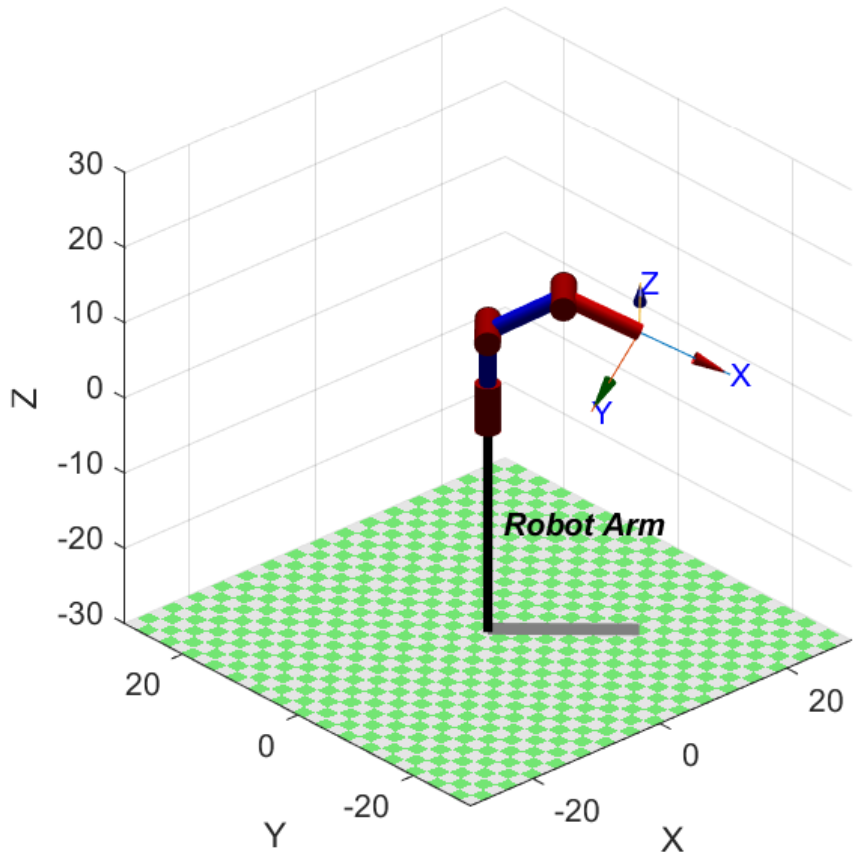

Figure: 3DOF robot moving in a triangle pattern.

Chosen arm

- Four degrees of freedom
- 3DOF for positioning and a "wrist" for controlling the angle of the end effector

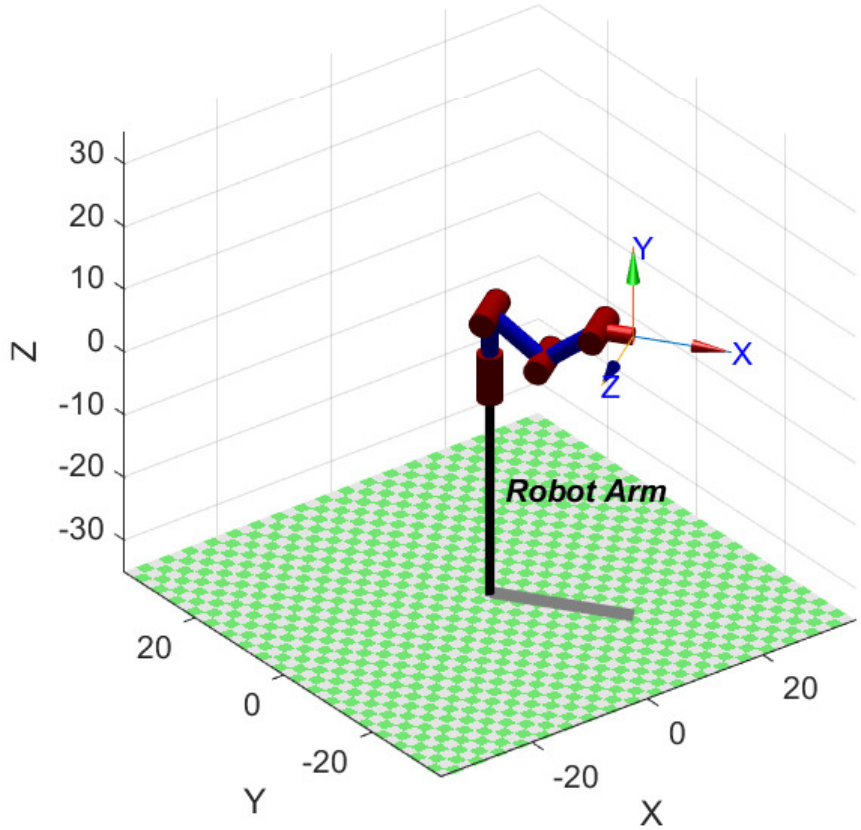

Figure: Representation of the robotic arm.

3D Modeling

- Modeling in fusion 360
- Work in progress
- Time table

Github

Git is a great way to structure and sync a project. With commits it's easy to "backup" the code in case something goes wrong. All members will be able to have an insight into the project nad help eachother. Not all group members have used Git extensively so there's a learning curve in the beginning and how to structure the repo in a good way.

Github - branches

- Master and development branch.
- Separate branch for each part of the project.
- Proofreading of the report by two people before it ends up in master.
- Code review by the other team members before it ends up in master.

Github - issues

- Tasks
- Assingees and mentions
- Labels
- Milestones

Arrowhead

- C++ provider and consumer
- Framework
- Local cloud

Overall timetable

Sep	Oct	Nov	Dec
Concept generation	Evaluation	Evaluation	
Theory	Prototyping	Evaluation	Finishing up
Simulation	Evaluation	Evaluation	
Prototyping	Final Design	Evaluation	

Time plan for September

Subproject	Week 1	Week 2	Week 3	Week 4
Arrowhead	Reading	Setup	API	Prototyping
Movable base	Reading	Modeling	Simulation	Implementation
Arm and grip	Reading	Kinematics	Simulation	Prototyping
Object detection	Reading	Testing	Prototyping	Evaluation

Questions?