Minor robot logistics
Decentralized control

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THINK BIGGER

Introduction

- This is a 14 week project from the minor Adaptive Robotics. The goal is to create an industry 4.0 environment by using Turtlebots to transport products. The decision-making in this project is decentralized, meaning each robot makes its own decisions based on information that is exchanged between them.
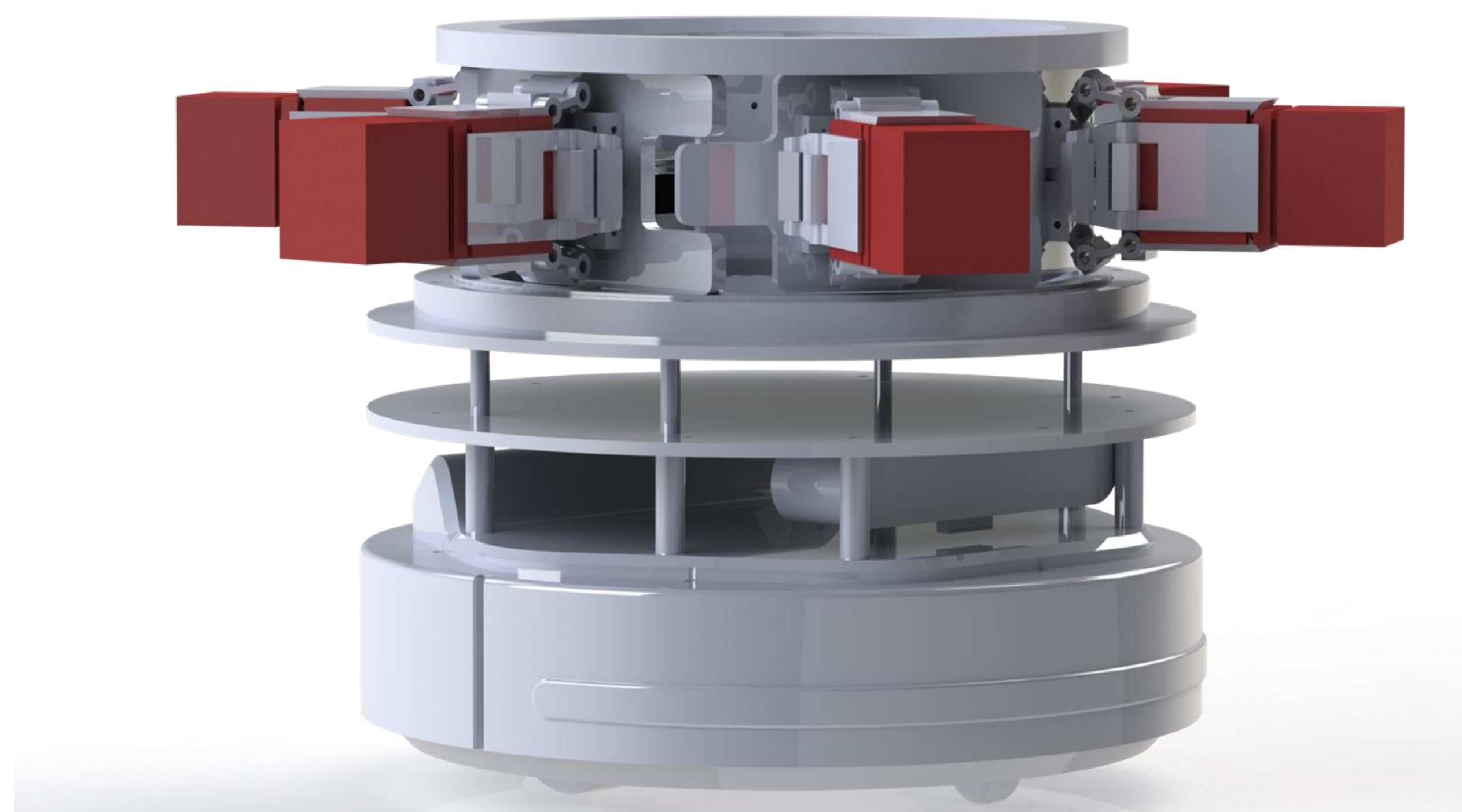

Figure 1 - The mechanical design

Hardware

- The hardware for this project was designed using a morphological map which detailed every requirement of the system.

- To make the transfer of products easier, a carriage is used. By doing this the gripper could be designed to handle 1 shape perfectly, instead of having to be able to adjust to different products.
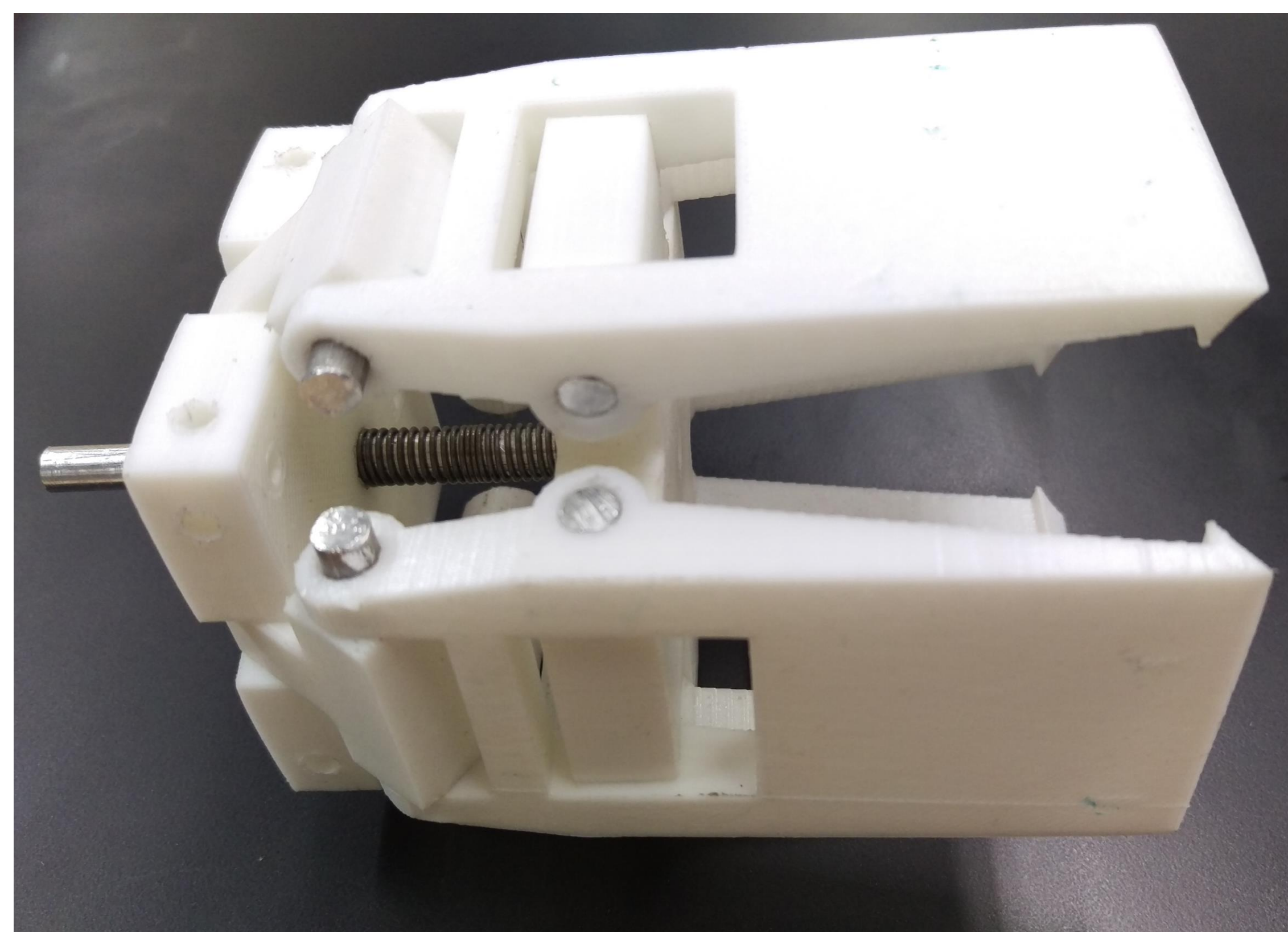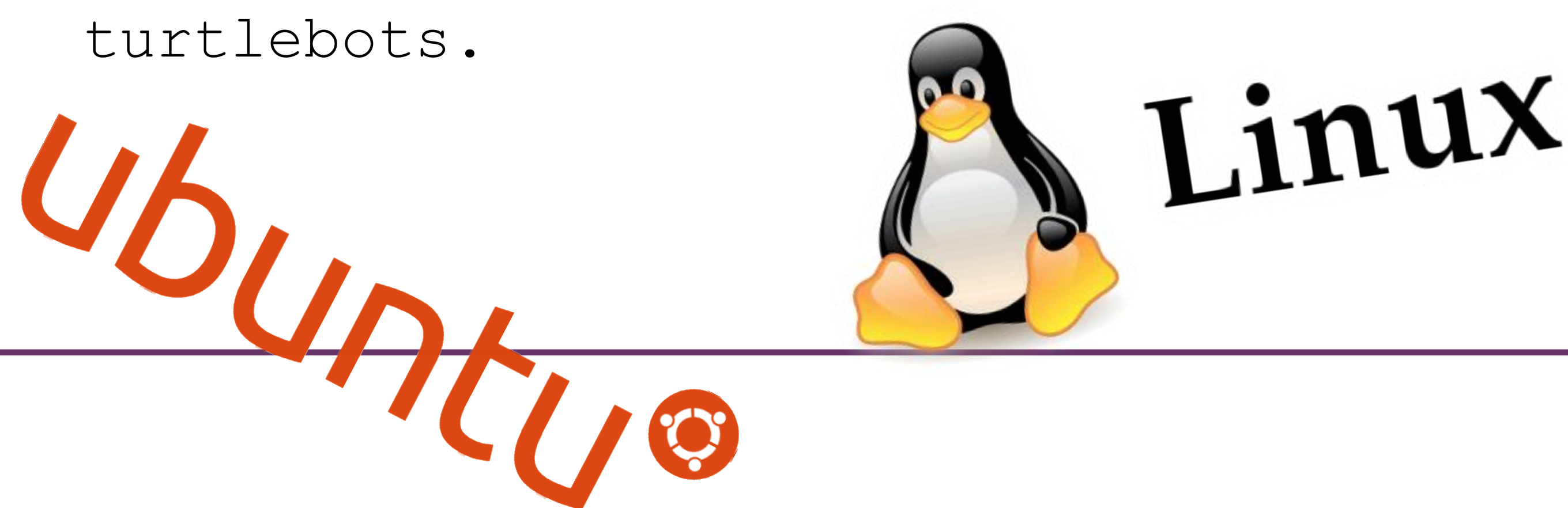

Figure 2 - The gripper

Software ROS

- The software decides on the actions the robot takes. Can accept or decline a command based on predefined metrics, e.g. distance to a target, available space for products, etc.
- The software is build on top of ROS and tested in a simulation with four turtlebots.

ubuntu

Linux

References

1. Blasdel, A., Leeper, A., & Hendrix, A. (z.j.). Robot operating system. Geraadpleegd van http://ros.org/
2. Debiec, J. (z.j.). Running ROS across multiple machines. Geraadpleegd van http://wiki.ros.org/ROS/Tutorials/MultipleMachines
3. Tiderko, A. (z.j.). multimaster fkie. Geraadpleegd van https://github.com/fkie/multimaster fkie
4. Hsu, J., Koenig, N., & Coleman, D. (n.d.). gazebo ros pkgs. Retrieved from http://wiki.ros.org/gazebo ros pkgs
5. Jagielka, J. (z.j.). Multiple robots simulation and navigation. Geraadpleegd van http://answers.ros.org/question/41433/ multiple-robots-simulation-and-navigation/
6. Gerkey, B. (z.j.). Slam gmapping. Geraadpleegd van https://github.com/ros-perception/slam gmapping
7. Natterer, M., & Neumann, S. (z.j.). GNU IMAGE MANIPULATION PROGRAM. Geraadpleegd van https://www.gimp.org/

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