VarastoRobo – Overview

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Introduction

The aim of this project was to make an autonomous storage management system, in which multiple devices work in co-operation to transport ordered packages to a drop-off point. In addition a drone was to function as surveillance system for the premises.

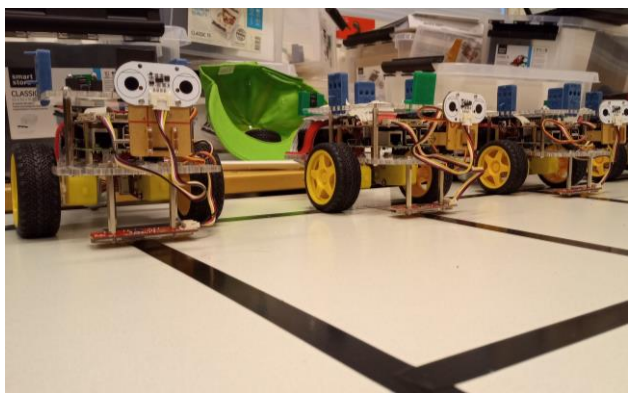

FIGURE 1. GoPiGo Couriers

Objectives

It was mandated that the project needed to use UR5-robot arm, a drone and GoPiGo3-cars.

All robots needed a way to communicate with each other to be able to work in co-operation.

The objective was for the user to have a way to place an order GoPiGo3 to first go to pick-up point where it would receive it from UR5, identify the package and then bring it to the customer. All the while a drone would survey the premises in case of intruders.

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Methods

Project work was divided in five groups. Master-system to manage all devices communications and commands. QtClient to act as the end-user interface and map the courier's routes. Drone to survey the premises for intruders. GoPiGo3 to act as the courier. UR5 robotic arm to give the package to the courier.

GoPiGo3 functions were further divided into four categories. Python server to communicate with Master. Image recognition to identify which product was being carried. Obstacle detection to minimize risk of collisions. Orientation and position tracking to navigate the warehouse route grid.(Figure 2.)

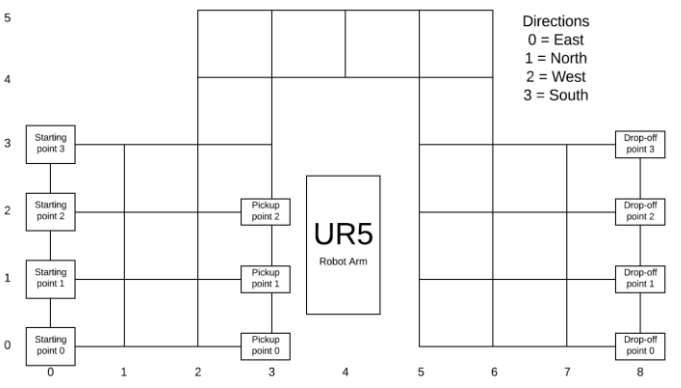

FIGURE 2. Courier Route Grid

GoPiGo3 functions were then made to work together as separate scripts.

Results

Though there were some communication issues at times, the group worked well together managing to reach all objectives to working order and even fine-tune most functions past initial specifications.

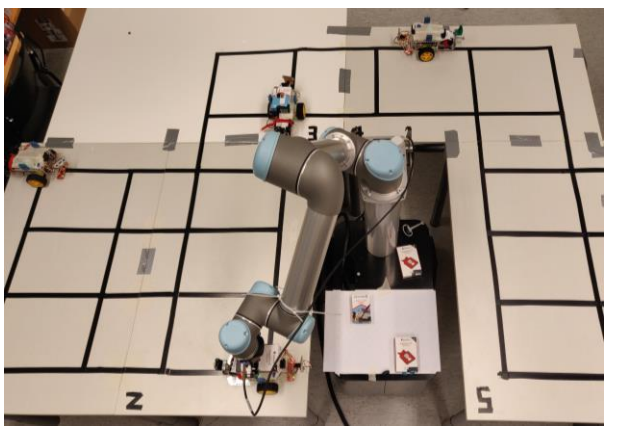

FIGURE 3. All Robots At Work

Conclusions

For a first project consisting the whole class there were only a few issues which were solved quickly. The whole group gained good experience on how to work in co-operation as a larger group

References

1. VarastoRobo GitHub: https://github.com/Jarno-Poikonen/VarastoRobo
2. Dexter Industries GoPiGo3 Documentation: https://gopigo3.readthedocs.io/en/master/