OULU UNIVERSITY OF APPLIED SCIENCES

VarastoRobo – Drone

Mika Ihamäki, Jari Kylmäoja TVT17SPL
Oulu University of Applied Sciences
Information Technology, Option of Device and Product Design

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.

Objectives

Our goal in the project was to program a drone, DJI Spark (Figure 1.), to detect human intruders entering the robot operation premises. Having detected an intruder, the drone would then periodically capture pictures of the intruder for later viewing. Using the mobile app, the most recently captured image could be uploaded to the connected smartphone. The drone would also land upon receiving a global emergency stop message sent by the system master device.

FIGURE 1. Drone + remote controller and Android phone

Methods

Base state of the code running in the Android phones scans the area it sees with a rectangle drawn in the middle of its video stream screen that moves in the x-plane.

As the scanning rectangle reaches an object that the application detects as a human type object it goes on to tracking that person. (Figure 3)

Additionally, the Android application can receive emergency stop messages from a router forwarded through a Raspberry PI.

As the remote controller of the drone (Figure 2.) creates its own WLAN network, and is thus separated from the other robots, a Python script, running on a Raspberry Pi, was written to forward the emergency stop message sent by the master device, to the mobile application connected to the drone.

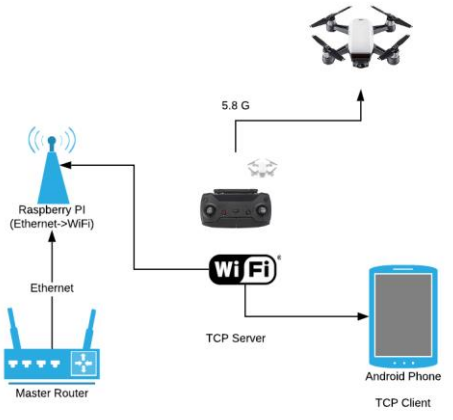

FIGURE 2. Drone System Architecture

Results

Taking a handle on Android development using Java in a complex system such as a drone without prior Android nor Java experience was challenging and required more work to get familiar with the technologies.

Lessons learned were that having knowledge of Object-Oriented Programming from our C++ course as a premise did in fact help in understanding a different OOP language such as Java.

Conclusions

The initial specifications were successfully completed in accordance to the planned schedule. During the project, the team members gained experience in developing applications for Android devices.

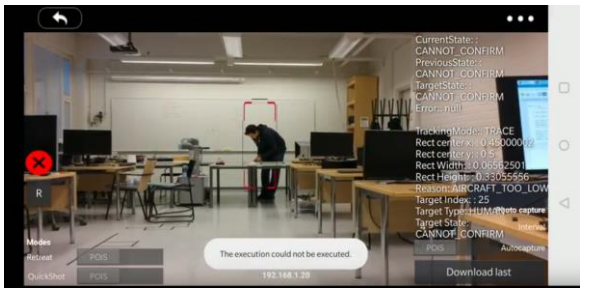

FIGURE 3.
Android Application tracking a person

References

1. DJI SDK
API https://developer.dji.com/api-reference/android-api/Components/SDKManager/DJISDKManager.html

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