Alex Shah

Project 6 - Wifi video

2024-03-17

EN.605.715.81.SP24

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Requirements

This project requires an assembled and flight capable drone from previous projects. The goal is to attach a video camera to the drone using a raspberry pi and a power source and transmit images from the drone in flight to another device such as a laptop.

Design

This project uses a Raspberry Pi 4, a USB power bank, and a USB webcam. The software chosen to handle video capture and transmission is the apt package "motion" available on most linux distributions. The power bank, Pi, and webcam are attached to the drone, in this case with rubber bands which allowed easy repositioning of the new devices in order to achieve a good center of gravity. I chose to mount them on the underside of the drone to prevent the drone from wobbling in flight. The powerbank uses a short usb cable to power the Pi, the webcam plugs in to the Pi, and the assembly is complete.
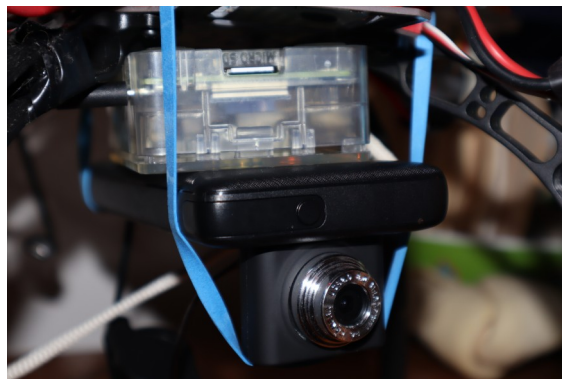
(Figure 1) A Pi, power bank, and camera mounted under the drone

Implementation

Prior to assembling the components on the drone, the Pi needs to be set up. I imaged a micro sd card with the latest version of the Pi operating system using the official sd card maker, then I set up a local account, connected to wifi, and added the openssh package while on the device. From here I was able to continue the set up process remotely by connecting over ssh to the Pi such as with

$ ssh alexpi@192.168.1.123

In order to install the motion package, I used the apt package manager

$ sudo apt install motion

Then the configuration can be modified with

$ sudo nano /etc/motion/motion.conf

Here we can modify some values which allow the camera to be remotely monitored as a daemon. This is done by configuring the settings:

```daemon on

stream_localhost off

webcontrol_localhost off```

Which allows for video capture to stream to the local network by navigating to the pi IP address in a browser with port 8081 e.g. *```192.168.1.123:8081```*

If motion has not been run you can touch the file or just use nano

$ sudo nano /etc/default/motion

where we append the line

```start_motion_daemon=yes```

Restart the motion service with

$ sudo service motion restart

and run *$ sudo motion*

to begin the daemon and capture. The Pi address:8081 should now show a feed from whatever usb cam is present. This can be listed with *$ lsusb* to make sure the camera is being detected properly.

Demo

The drone flies and the video capture is sent wirelessly to my laptop nearby.

https://drive.google.com/file/d/1DF7zpgpNQ6IPUsI1bTXOorRSmMOvxNdQ/view?usp=sharing

References

https://www.instructables.com/How-to-Make-Raspberry-Pi-Webcam-Server-and-Stream-/

https://www.raspberrypi.com/software/