

Dr Roboto reporting:

I have always been fascinated with copters (rotocraft). The idea that an object without a “wing” can “fly”. Ours has four rotors and therefore is a quadcopter.

Quadcopters have been around for about 100 years. In 1923 Etienne Oehmiche's copter had four rotors and eight propellers, all driven by a single engine. It used a steel-tube frame, with two-bladed rotors at the ends of the four arms. The angle of these blades could be varied by warping. Five of the propellers, spinning in the horizontal plane, stabilized the machine laterally. Another propeller was mounted at the nose for steering. The remaining pair of propellers functioned as its forward propulsion.

Quadcopters use two pairs of identical fixed pitched propellers; two clockwise and two counter-clockwise, diametrically opposite to each other. These use independent variation of the speed of each rotor to achieve control. By changing the speed of each rotor it is possible to specifically generate a desired total thrust. The following are the terms to learn:

PITCH – This moves the quadcopter on the side axis, so it would tilt it up and down from front to back. By doing this it causes the vehicle to move forwards or backwards depending on which way it is tilted.

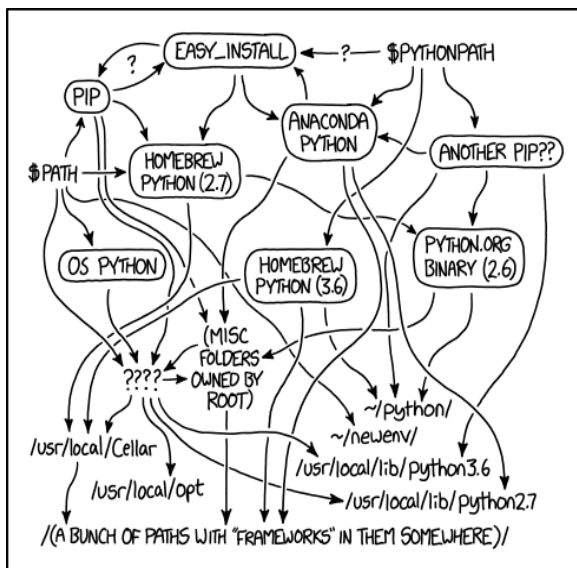
ROLL – This moves the quadcopter on the long (longitudinal) axis, so it would tilt side to side. This causes the vehicle to move to one side or the other depending on the tilt – banking left or right.

YAW – This moves the quadcopter around in a clockwise/anticlockwise rotation as it stays level to the ground. This changes the direction of the vehicle accordingly.

THROTTLE – it does control altitude of the quadcopter – getting you airborne – and of course speed.

Some of this I remember from taking flying lessons 32+ years ago. But back then there was a fully trained pilot in the seat beside me and I had a whole sky to fly in. Now I am flying solo and there are unforgiving walls on all sides.

In addition I have to learn a new programming language. A programming friend sent me this chart:



MY PYTHON ENVIRONMENT HAS BECOME SO DEGRADED THAT MY LAPTOP HAS BEEN DECLARED A SUPERFUND SITE.

So Python is the programming language and there is also an integrated development environment (IDE) toolkit. The IDE on the PC is called PyCharm and is called Anaconda on the Android tablet.

When I was programming the robots, I wrote the code, transmitted the whole code to the robot, with an USB cable, and then the robot ran the code. When programming the quadcopter, I wrote the code and then connect to the quadcopter using wi-fi, and send individual commands (packets) to the quadcopter using User Datagram Protocol (UDP).

UDP transmitted packets is like having a conversation with your spouse where you are sort of listening. You may say a bunch of stuff and then get an “okay” response. You can not match the send message with the receive message as they do not have unique packet identification codes. Therefore you build in small delays between the transmissions. I find that a bathroom break works well.

Two weeks of programming has resulted in this video:

https://1drv.ms/v/s!AiELAs3hBGHIknXDoM4STvtF_Wiv