

NAS

I believe it was Aristotle who said “nature abhors a vacuum”. I guess nature thought that if my “life would be easier”, that would create such a vacuum. One task was to centralize all my computer files so that I could access them from what ever computer I was using. There was an old, pre 2011, disk that I had used to store all our music so that it could be played thru out the house. “A perfect place to store my stuff”. The disk decided to “retire”, “change address with no forwarding address, etc (stop working).

Note: I had backed up all the data on that disk to another USB connected disk, so “nothing”, as far as I can remember, was lost. Hmmm, what was I talking about?

Therefore it was time to open the wallet and purchase a Network-Attached Storage (NAS) device. This two disk unit connects to the network and is the central library. I purchased a two disk unit so that I could configure it with Redundant Array of Independent Disks (RAID) 1. This means all the info will automatically be copied/mirrored to both disks, thus losing one disk will still give access to the data.

EDUCATION

The average salary in Canada for a python programmer/developer is \$95,000. There are presently over 25,000 vacant computer jobs in Canada. This is a worldwide vacancy problem. In the UK, the Raspberry Pi Foundation and the BBC gave a free computer board to EVERY grade 7 student in the country. They are also offering free training, learning resources, programmes and events from the Raspberry Pi Foundation's Education team.

NEW PROJECT

Our new project combines the two controllers/brains (Arduino and Raspberry PI).

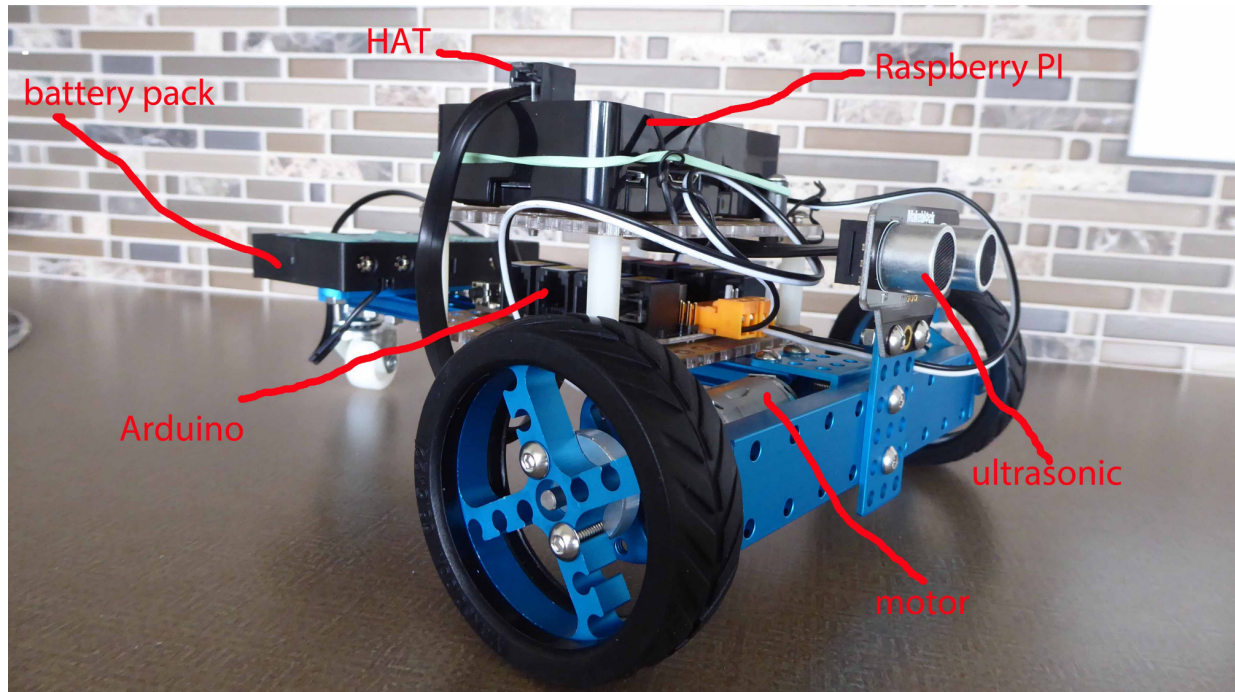
The Arduino is really a micro controller and talks directly to the pins (analog and digital) which connect to the sensors and motors. Therefore it is a real time processor with no delay/lag of an operating system. The code I write on the Arduino is basically a loop that either directs a sensor/motor to do something or asks the sensor/motor for a status. (more on this later) It does this in milliseconds. When I was programming the Arduino for the past robots, since the code would execute so fast, I would have to code in large waits (1-2 seconds) between commands.

The Raspberry PI is a computer board with a real operating system. That means that you can program it in many different languages and have it do many things. To be able to talk to sensors and stuff, it requires additional hardware, such as Hardware Attached on Top (HATs).

You can think of the Arduino as the professional painter, plumber or other trades person. Great at doing a single task. The Raspberry PI is the general contractor who is the scheduler and organizer.

ALLIE

I would like to introduce you to Alliance or ALLIE for short.



Since the Arduino has the sensors and motors connected to it, it requires about 7.2V and 2A of power. Therefore the battery pack is attached to the Arduino. The Raspberry PI (PI) requires 5V and 2A and therefore it is connected to the Arduino for power. Using our construction analogy, the supervisor (PI) gets a cut of the work (power) done by the workers (Arduino).

In order for the programming to work between the two boards, I had to develop a table of port numbers and item type numbers that both would understand. The port number indicates which analog/digital pin on the Arduino that a sensor/motor is connected to. The item type number indicates what sensor/motor is connected to that port. Therefore the PI commands would look like:

call arduino_request (port, type, action, status)

examples:

call_arduino_request (4, 9, 50, status)

- this would tell arduino to set speed to 50 on motor (type 9), which is connected to port 4

call_arduino_request (5,4, ultra, status)

- this would request arduino to read the value of the ultrasonic sensor (type 4) on port 5 and return the result in the variable "ultra".

On the Arduino side, the code is constantly in a loop storing the value of each sensor/motor and awaiting a request from the PI. When it receives the request, it fulfills the request and returns a result. The status would be 1 for okay and 0 for problem. This is because 1 is boolean for TRUE and 0 is for FALSE.

SUMMER PROJECT

The project for this summer is machine learning and computer vision. I have loaded a bunch of ebooks on my tablet and loaded my travel computer with new software. The goal is to learn the basics of artificial intelligence (machine learning) and pattern recognition (computer vision). I will use the webcam on the computer for now, but I have also ordered a camera to be mounted on ALLIE.