Robot CV Research Ideas

**Preliminaries**

**These are just some ideas. Please feel free to try whatever**

* In order to connect to the raspberry pi, one needs to ssh into it. This can be done by the following:
  + Ssh pi@[ip\_address]
  + The password is r0b0tr0b0t
    - To find the IP address of the pi, plug it into a TV or monitor through the HDMI port.
    - Also, connect a mouse and keyboard to the pi through the usb ports
    - Once this is done, open up a terminal and type
      * ifconfig
    - This command will display the IP address of the pi
  + Once this is done, run the kp.py code to take control of the machine
    - python kp.py
    - use wasd keys for navigation
  + To gain access to the camera go to http://[ip\_address]/html:
    - Use this url when you are in Collier-Scripps: <http://10.38.22.182/html/>

**Video Feed to Camera Implementation**

* The thing that needs to be worked on now is taking the video feed and fragmenting it into pictures
  + There is a camera API that is already on the raspberry pi so please look into the docs
* From there we will take the given picture, pass it into the prediction function of the model, and then the prediction function will output a value
  + 2 is for an obstacle, 0 and 1 is for an open space
* Then take the predicted value, and create a new function that will take control of the machine. Please look at the kp.py file for some inspirations.

**Model Implementation**

* We need to find a way to make the model more accurate. In order to do this I have found several datasets that we may want to train on first and apply transfer learning to our small dataset.
* Here are some examples of datasets:
  + Synthia dataset: <http://synthia-dataset.net/>
  + Oxford dataset: <http://robotcar-dataset.robots.ox.ac.uk/>
* The more varied models we have the better.
* When training the models you can use this command to see which GPU is available:

nvidia-smi

**Tutorials**

* Here is a tutorial on CNN
  + <https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-Guide-To-Understanding-Convolutional-Neural-Networks/>
  + <https://adeshpande3.github.io/adeshpande3.github.io/A-Beginner's-Guide-To-Understanding-Convolutional-Neural-Networks-Part-2/>