This document is to detail the resources and projects for teaching modules for computer vision. It will be revised as needed to coincide with the curriculum to be developed

Project Modules:

Below is a list of modules that can be used to introduce and teach the basics of computer vision. The modules will be compiled in such a way that assumes zero proficiency in all introduced topics

Module 1: Intro to [Raspberry Pi](https://www.raspberrypi.org/learning/introduction-to-processing/) and [Arduino](https://www.arduino.cc/en/Guide/HomePage)

Module 2: [Python Basics](https://developers.google.com/edu/python/)

Module 3: [Open CV](https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_tutorials.html)

Module 4: [Facial Recognition](http://www.open-electronics.org/raspberry-pi-and-the-camera-pi-module-face-recognition-tutorial/)

Module 5: [Thermal Recognition](http://www.aicbt.com/disguise-detection/)

Module 6: [Color Tracker](https://oscarliang.com/raspberry-pi-color-tracking-opencv-pid/)

Module 7: [Basic Motion Detection](http://www.pyimagesearch.com/2015/05/25/basic-motion-detection-and-tracking-with-python-and-opencv/)

Module 7b: [Motion Detection Extension](http://www.pyimagesearch.com/2015/06/01/home-surveillance-and-motion-detection-with-the-raspberry-pi-python-and-opencv/)

Module 8: [Motion Tracking Camera](http://www.digitalpeer.com/blog/raspberrypi-motion)

Module 9: [Computer Guided Robot](http://www.instructables.com/id/The-RROP-RaspRobot-OpenCV-Project/?ALLSTEPS)

Module 10: Color Tracking Robot (Will develop from other modules/projects)

Parts Purchasing List:

|  |  |
| --- | --- |
| **Item Name** | **Price (Amazon Prime)** |
| [Raspberry Pi 3 Ultimate Starter Kit](http://www.amazon.com/dp/B01C6Q4GLE/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=IB0ASY73BNF0Z) | $89.99 |
| [Raspberry Pi Camera Module](http://www.amazon.com/dp/B00E1GGE40/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I2AQDRGK9SNDAJ) | $15.98 |
| [Arduino Uno](http://www.amazon.com/dp/B008GRTSV6/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I2JZH5YYOXK10M) | $22.25 |
| [IR Sensor](http://www.amazon.com/dp/B01CORD2HY/ref=wl_it_dp_o_pC_S_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I3DD1VXJN0XVHH) | $15.30 |
| [RioRand 2 Pcs TowerPro SG90 9G micro servo motor](http://amzn.to/1VosHlE) | $7.19 |
| [ZITRADES Aircraft FPV dedicated nylon Pan/Tilt](http://amzn.to/1VosLle) | $3.91 |
| [Robotic chassis](http://www.amazon.com/Motor-Chassis-Encoder-Battery-Arduino/dp/B00THW278A?ie=UTF8&keywords=robotic%20chasis&qid=1465328834&ref_=sr_1_sc_2&s=toys-and-games&sr=1-2-spell) | $14.97 |
| [H Bridge (L298N model)](http://www.amazon.com/dp/B011NE3TRW/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I239DZ801K9OMC) | $9.40 |
| Jumpers ([M-M](http://www.amazon.com/dp/B005TZJ0AM/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I12V013LX7XAIJ&psc=1), [M-F](http://www.amazon.com/dp/B00AC4NQYG/ref=wl_it_dp_o_pC_nS_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I15LR5V7SBG4G8), and [F-F](http://www.amazon.com/dp/B00D7SCT6A/ref=wl_it_dp_o_pC_S_ttl?_encoding=UTF8&colid=3P2R0KM8B5Y73&coliid=I2LW9D5JLPPIA1)) | $6.87, $5.01, $5.47 |
| [Power Bank 1A / 15k mAh](http://www.amazon.com/KMASHI-15000mAh-External-Portable-Powerful/dp/B00JP8MZGK?ie=UTF8&keywords=15000mah&qid=1465333182&ref_=sr_1_1&s=wireless&sr=1-1) | $16.99 |
| [HDMI to VGA Adapter](http://www.amazon.com/gp/product/B00ZMV7RL2/ref=crt_ewc_title_dp_1?ie=UTF8&psc=1&smid=A1RI0YHZ8J2HZU) | $8.99 |
| [Plastic Ties](http://www.amazon.com/Plastic-Cable-Ties-100-Pack-Black/dp/B002C0SKBW?ie=UTF8&keywords=plastic%20ties&qid=1465334964&ref_=sr_1_2&sr=8-2) | $1.30 |

Total parts cost is $223.62 without tax. This includes all necessary parts for completion of aforementioned modules.

Parts List for Modules:

Module 1: Raspberry Pi 3

Raspberry Pi Camera Module

Arduino Uno

Module 2: Python 2.7 Install

Module 3: Open CV Install

Module 4: Raspberry Pi 3

Raspberry Pi Camera Module

Module 5: Raspberry Pi 3

Raspberry Pi Camera Module

IR Sensor

Arduino

Powered USB hub

LEDs

Module 6: Raspberry Pi 3

Raspberry Pi Camera Module

Arduino

Module 7: Web Camera

Module 7b: Raspberry Pi 3

Raspberry Pi Camera Module

Module 8: Raspberry Pi 3

Raspberry Pi Camera Module

RioRand 2 Pcs TowerPro SG90 9G micro servo motor

ZITRADES Aircraft FPV dedicated nylon Pan/Tilt

Module 9: Raspberry Pi 3

Raspberry Pi Camera Module  
Robotic chassis  
H Bridge (L298N model)  
Power Bank 1A / 15k mAh   
RioRand 2 Pcs TowerPro SG90 9G micro servo motor

ZITRADES Aircraft FPV dedicated nylon Pan/Tilt

Jumpers (M-M, M-F and F-F)   
4 AA 1.5V batteries mAh 6k   
Plastic Ties  
Sinks and thermal paste

Module 10: See Module 9