REMOTE MEASUREMENT AND MONITORING

WESLEY MYERS

PROJECT GOALS

Requirement Driver

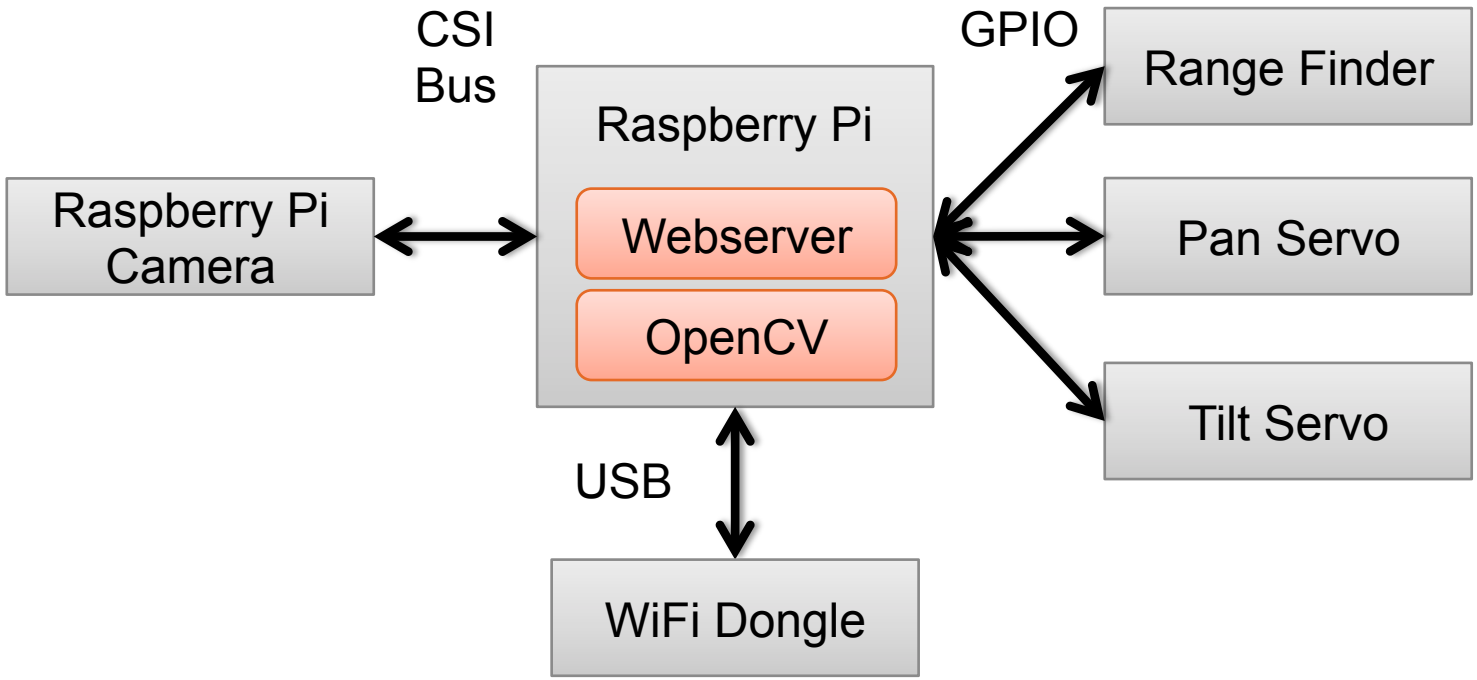
New Spin

- Remote Measurement
- Remote Viewing
- Web Interface Control
- Autonomy for Monitoring

REQUIREMENTS

- Measure distance (+/- 1 cm) to targets out to 50 meters
- View Targets with Camera
- Remote/automated pan-tilt system
- Wireless Control
- Control through Web Interface

SYSTEM LAYOUT

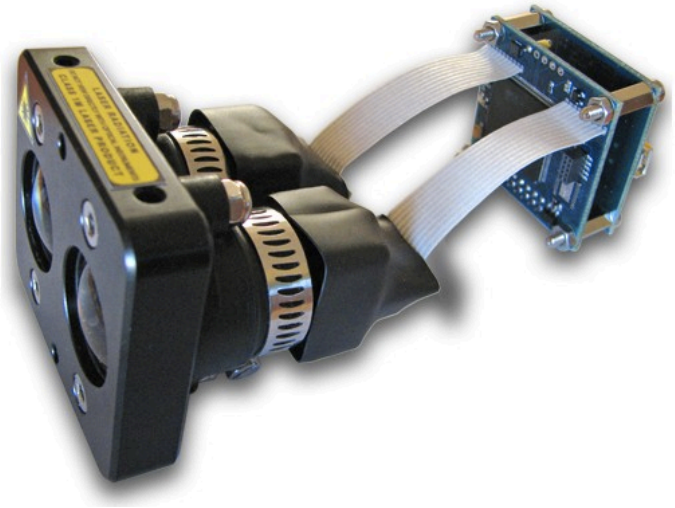


EQUIPMENT

Item	Qty	Cost
Raspberry Pi	1	$40.00
Camera	1	$35.00
Camera (IR)	1	$35.00
Laser Range Finder	1	$500.00
Wifi Dongle	1	$12.00
Servos	2	$10.00
Other Materials		unknown

LASER RANGE FINDER

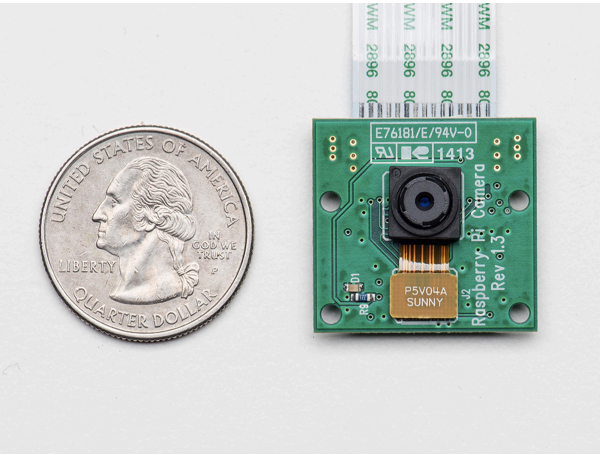
- **Industrial Grade Laser Range Finders**
- **Interface-able with Raspberry Pi**
- **850 nm Wavelength**



http://www.lightware.co.za/shop/en/lrf-modules/31-sf01a.html

CAMERA / OPENCV

- 2592 x 1499 pixels
- NoIR Camera Board
- Automatic Feature Detection

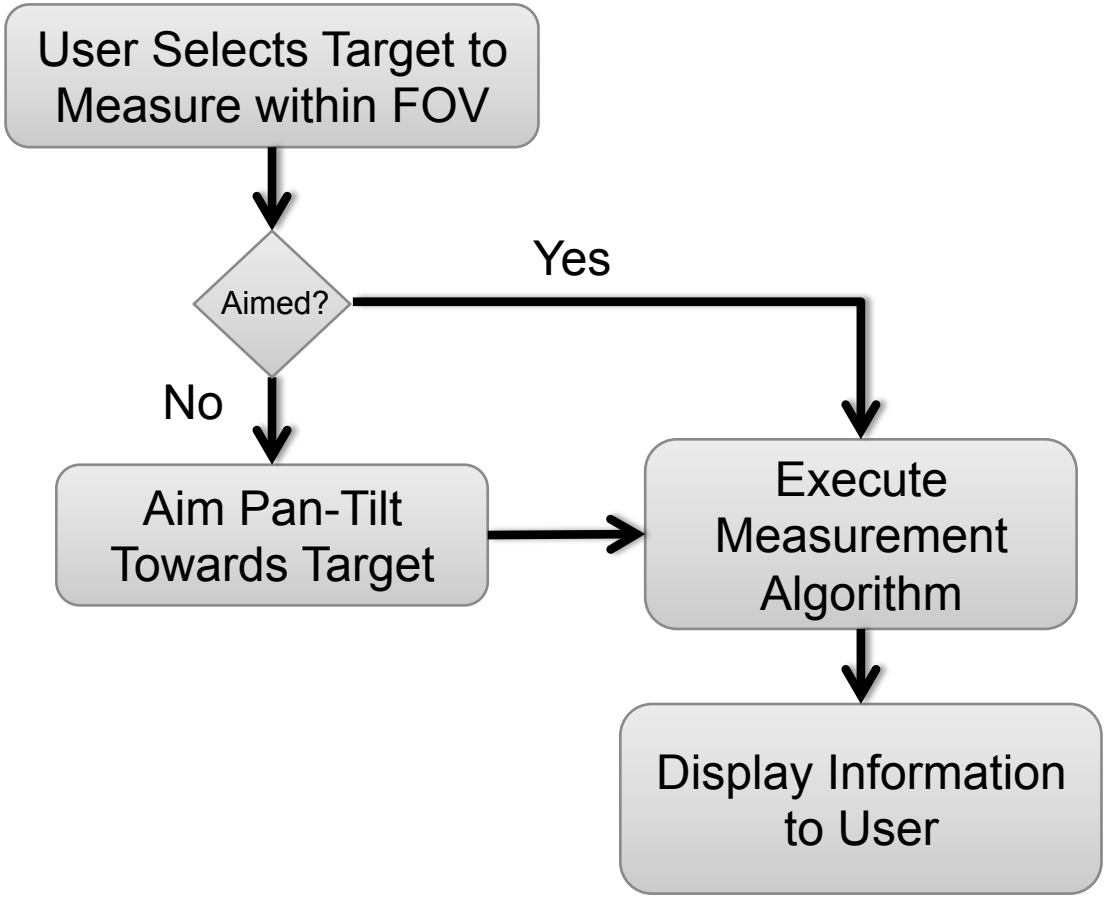


OpenCV

CHALLENGES

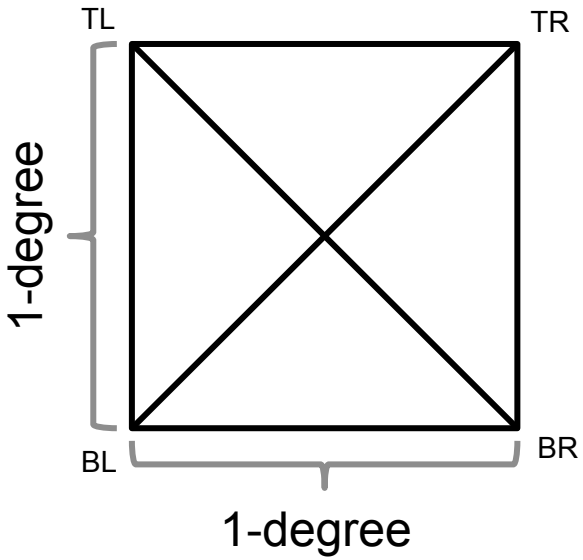
- **Use of Servos**
- **Detection of small targets**

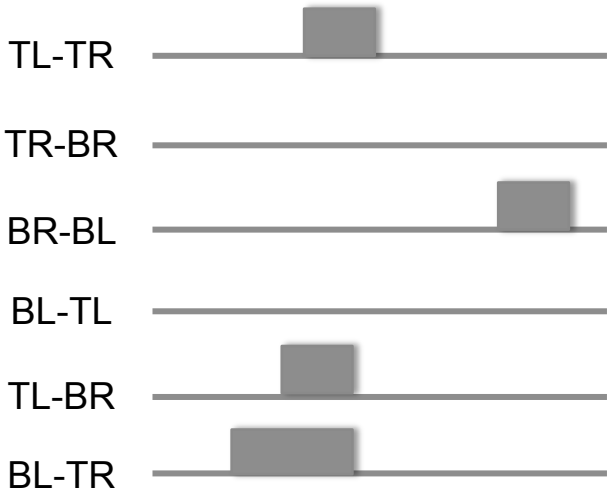
FSM OVERVIEW

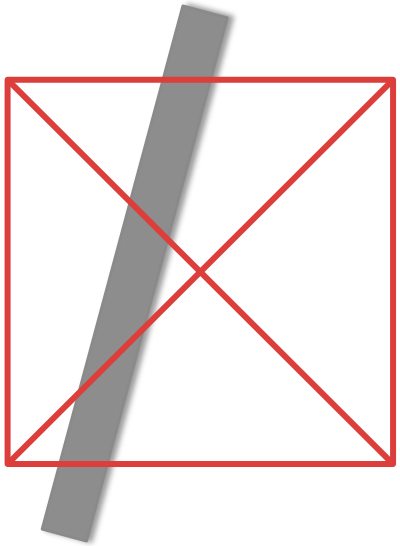


ALGORITHM

- **Pan-Tilt over available area**
- **Combination of inputs**







VERIFICATION TESTING

Questions

- Can we see the laser?

Notes

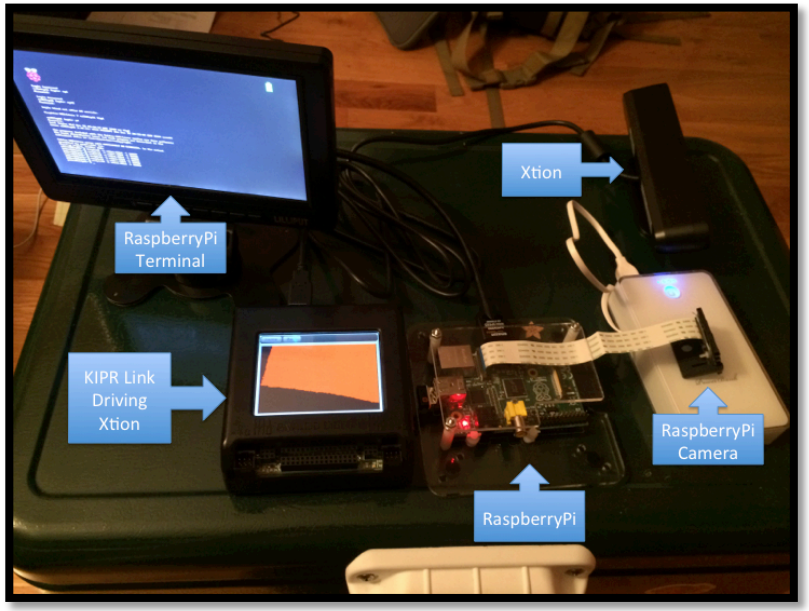
- Kinect outputs 830 nm wavelength

Results

- Not visible in daylight
- Sporadic
- Inconclusive

Future Testing

- Test with IR Camera



SCHEDULE

Date	Milestone
September 29th	Ordering and Receiving Equipment
October 6th	Pan Tilt Mechanism / CDR Due / TDY Tuesday – Friday
October 13th	Camera and Laser Integration
October 20th	Continue Integration / TDY Sunday - Wednesday
October 27th	OpenCV Development
November 3rd	UI and Webserver Design
November 10th	Algorithm Development
November 17th	Algorithm Development
November 24th	Testing and Analysis
December 1st	Testing and Analysis
December 8th	Project Documentation Due
December 13th	Final Presentation

REACH GOALS

- **Addition of Security Camera Features**
  - Automatic Motion Detection
  - Email/Text Alert
  - Saving imagery to Dropbox

QUESTIONS?