

Advisor meeting

And tasks

proposal - Separation of tasks

• good diagram

- Show how communication

• maybe too many processor

• be clear about what you are designing for

mqtt - connect robot to router

and pc to router

CPU client
PL broker

see reasons
code

Neilson: Found T-slots online

↳ mechanisms to connect and cut sliders cut
↳ no welding

Camera height should be around 1 to 1.5 meters

demonstration: Setup of some sort

• print out a photo on foamboard and
use that to test the robot

↳ expand this

↳ maybe real live
evague

weekly meeting time: Tuesday 4:30-5:30 pm

To do:

□ finalize proposal

□ prepare presentation

Ruslan
Stretch
open cv
gaspic cloud app
label generator
etc

01/08/2019

Send for review

Tango robot

↳ may be hard
to use

maybe use
kinect sensor

Advisor presentation

01/15/19

To do

□ see west about getting and testing parts this week

□ Sensor package schematic and control system design

Increase Font size of certain pictures

Speed controller: PWM output for speed controller

motor controller

↳ 10 A (considerable size)

↳ Speed mode and acceleration modes

↳ As the sensor package is moved change the max speed

options

Arduino i. RC servo

↳ stepper motors ↗

Crabber → lead screws and rails

↳ linear bearings

↳ lead screw and bushing

↳ look at 3D printer

2 types: pulley or lead screw

↳ coupler between rod and motor

Bearing on the plate needs to be large

Advisor Meeting

01/27/19

Nelson and Lemel

- Tested out the Motor Controller (VEX SP Motor Controller)
- PWM signal from Arduino DUE

presentations (Graeber suggestion)

• done/updates/issues

• planning

• Gantt Chart

Shutter circuit?

Elizabeth:

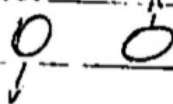
• Sensors are I2C which may be difficult to use

• Image capturing

↳ game control schematic

↳ check how controller looks for a tank

• Control based off of left motor/right motor



end condition of the arms

might have issues

Adrian:

• scissor lift design → fully collapsible

↳ pneumatic sensors

Check the CNC machine → ball screws

Dynamic range / color information → what is more important

Advisor meeting

02/05/19

1/30/19: Robot was scrapped and cleaned out

- 3 relays
- Arduino DUE
- 2 motors with encoders
- spectral signal receiver and controller

1/31/19: motor controllers were tested and calibrated

center = 185/255

parts have been ordered

To do:

↳ pick up amazon parts

Think about voltage
regulator

Sensors: may be
best to use industry
standard

battery Samsung INR 18650

↳ Can draw up to 20A

with 2.5Ah

or LiMA

↳ could get a
charger

↳ or polymer Li-Ion battery

ultrasonic distance sensor

LM7805 - voltage regulator

14

Nelsoni

↳ lead screw might not be long enough
for design



Hexagonal shape for more
stability

waterproof orduino enclosure?

Advisor meeting

2/12/19

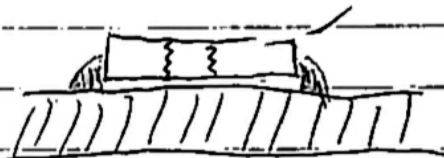
Mechanical Arm parts

- ↳ some are to be ordered
- $\frac{1}{8}$ " sheet needs to be ~~just~~ rigid enough
- ~~be~~ $\frac{1}{4}$ " is needed for the top plate

To do

- ☑ pick up amazon parts 2/6/19
- ☐ find solution to watertight
- ☑ get mechanical arm parts ordered 3/12/19
- ☑ Calibrating Sensors 2/15/19
- ☑ Wilson Communication 3/5/19

Potential solution



Admani

- needs pulley
- bolts, spring tensioner
- Spring bolts to apply tension
- belt connector pieces
- Nema Stepper motor C20 mm

↳ Admani would raise the turntable over the cables

Turntable plate ~~can be~~ ^{needs} groove can be machined using a lathe if the inner circle of the plate is machined out

MQTT

MQ₂ sensor & temperature sensor
needs to be calibrated

Rpi camera works but IR^{lights} will cause glare

Nelson:

- ↳ Rpi com (Rpi receiver and pc comm)
- ↳ Used MQTT to send real time information regarding control.

2/11/19

Adriani mechanical arm design is coming
wrong (he is not able to go to the meeting)

Elizabeth's Testing environment

- ↳ testing ~~environment~~ gauges have been ordered
- ↳ we have not ordered foam board

Grabber's

- Can use duct tape to get gauges to fit in the foam board
- Set up on corner end
- Could use plywood instead

To do:

- ✗ find a storage location for foam board (Senior design lab)
- ✗ find solution to watertight (using an extra plate)
- ✗ Calibrate sensors (2/15/19)
- Figure out ^{spread} ~~spread~~ on IR ^{temp} sensor
- ✗ order parts ~~and~~ for screws and bolts (3/12/19)

Nelson's mqt Setup works

- has sent keyboard controls to the R-pi from the GUI

power supply:

- move the motor load to before the voltage ^{regulator} ~~converter~~
- The LM7805 will not be able to dissipate that energy
- Look at buck converter for R-pi ^{converter} ~~converter~~
- Use 4 batteries in series could be enough

Budget: we are quickly approaching our budget.

Nelson's website looks really good. embedded files in the website

• another weekly report

↳ maybe not (Added effort)

Advisor meeting

2/26/19

- battery connections are soldered with 12 gauge wire and a 20A fuse
- Arduino due PWM frequency modified to 490^{Hz} to work with Victor speed controller

• Controller functions

- create movement function in arduino

maybe separate controllers between 2 people

use reset
when to
realign robot

Afterword

GUI: full screen ability added and graphics
can show crents as well

Graphic Gauge:

- static gauge works
- Nelson $\rightarrow$ I can calculate arm direction with angle information

To do:

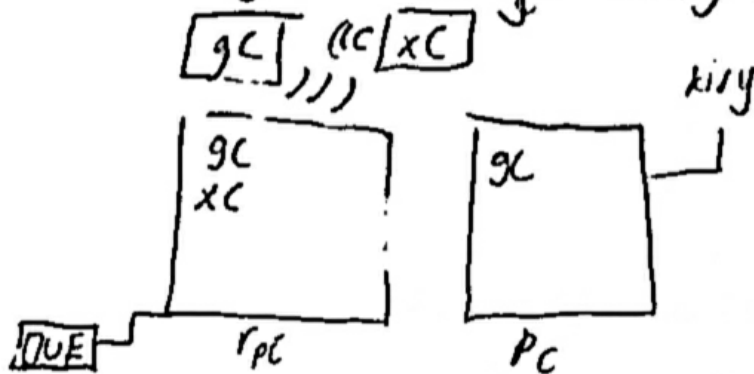
- think of a reset protocol (set initial value)
- think of seal for wires
- Find storage location (Senior design lab / Wests lab)
- figure out specs for FR (2/24/19)

Adrian: • mechanical arm $\rightarrow$ spacers to align
motor with the lassy Susan

- Brass connectors might shear (m3 might be too small)

MQIT:

- Can communicate both ways
- Transmitted controller input (delay issues)
- Formatting data for GUI (string convention)



Advisor meeting

3/5/19

Elizabeth's, 20 amp ^{fuse} in series connection

- waterproofing cable solution
 - ↳ use round wires

↳ ethernet cable needs to be able to get off the robot

↳ may not be used - could be wifi

rotation should be stopped by sensors (soft 360°)

Aluminum plate can be returned to Steinberg

Adrian's mechanical arm has been updated

- pulley has been moved down
- Collar clamps
- top platform changed to a circular platform
- meet people and see if Invention Studio can machine the parts on time

GUI: Screenshot of picture

Screenshot of complete GUI

maybe share the x-axis and have 1. Nav bar

MQTT Comms:

- Serial from duc to rpi is under development
- duc sent information but information both ways is off
- Object oriented code works.

Order 4 ready to be submitted

Software:

- Comms
- Streamer
- Sensor code → Elizabeth
- motor code (movement)
- Arm code

Advisor meeting

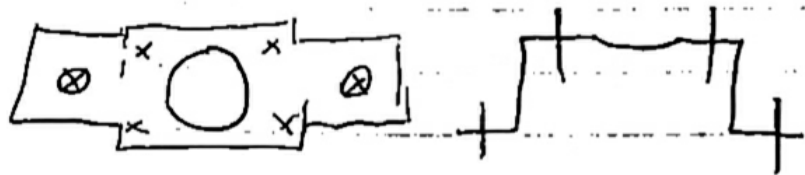
3/12/19

spi ord
motor mount
are printed

Adrian's mechanical arm design is finished, part
order form will ^{go} ~~show~~ out today

plate that goes on top of robot will be $\frac{1}{2}$ " instead
of $\frac{1}{4}$ "

mount
motor design



Nelson: MATT Communication

ClientObs

- topic
broker

guiPublisher

- publish data

guiSubscriber

- connect sub

Simplify the process by using object oriented
class

Website

↳ website will be updated with milestones
and images.

Glaber's focus on mechanical design and not
things such as the website

Control system

↳ going to meet up and talk about
exactly what functionality we want out
of the robot

Elizabeth's electrical schematic is done

↳ check for decoupling capacitors

Advisor meeting - All members present

3/26/14

Adrian: cad design is 85% percent done

↳ mechanical arm design

↳ will do: start machining this week

Camera mount printed:

- ball may need to be sanded
- warm water to make it more malleable

Gui update:

- gauge working /
- bar graph
- scrolling graph
- large graph

Serial Comm:

- work in the small scale
- ~~update~~ synch may be an ^{issue} ~~issue~~

Control:

- Set up function controls
- rely on update loop of the arduino
- use 1 function to control both motors

Advisor meeting

04/09/19

~~Assembly~~ All are here

Assembly Updates: ~~more~~

- threaded holes in the aluminum
- Order new Standoffs
- Coiled wires are stripped
- pulley rod recut

To do:

- Attached pulley system ✓ 4/12
 - Drill hole for waterproof ground ✓ 4/18
 - re-drill holes on the top of the robot ✓ 4/18
 - Sensor holder ✓ adrian 3D modeled & printed
- only a few

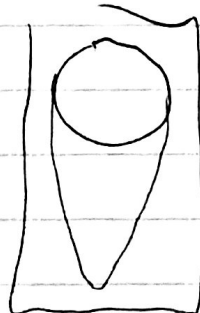
presentation pictures - stage them and make sure
it isn't messy

Countersunk screw head

- ↳ drill them out for the main plate
- ↳ screw threads ~~don't~~ won't match

Check: 3D Stepper motor
Acceleration code

- ↳ too complicated for
our purposes



- movement code:
 - ↳ Reaction time with sensors

- reset code with IR sensor (optional)

- started arm movement code
 - ↳ rotation/movement code

mett successfully
} Streaming

To do:

- incorporate streaming data to GUI ✓ 4/22

- need to update streaming method & camera updated 4/23

Schedule the presentation meeting after the expo → scheduled for 4/24

next week: Show functionality of the robot in West's lab

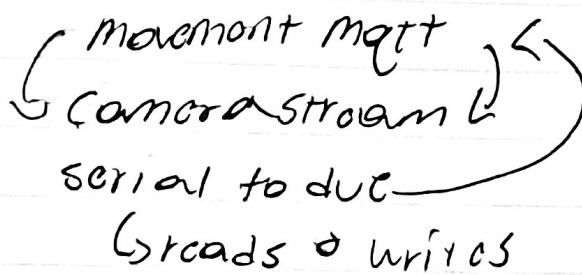
meet. with Nelson to work through comms code

poster → more about the motivation

Stepper motor wiring diagram

Black	Blue
Green	Red

Seperately:



need to write:

reset code ✓

add sensor to arduino code ✓

microswitch interrupt code

microswitch ✓

↳ use of interrupt pins

need to do:

put everything together

~~4 enable~~ 1
 8 motor
 3 digital interrupt
 3 analog

pinout on the
uno

~~Arduino~~ drc needs ~~an~~ an external
analog reference.

↳ desolder R-3 ~~on~~ on the board?

↓
just use the uno.