

# Instructor Meeting minutes

## **First meeting minutes - September 4, 2018**

Pitman Center-Ballroom

4:00 PM Start the team table

- Team members: Xiao Liu, Jeremy Perhac, Yizhou Ye

4:20 PM Finish team table

4:20 PM Start drafting contract

5:30 PM Finish drafting contract

## September 6, 2018

2:30 PM Self-introduction

- Client: James Frenzel
- Mentor: Feng Li

2:35 PM Claim some requirements of the project.

- Discreet, non-obtrusive, low-cost, remote.
- Any type of video monitor device is forbidden.

2:50 PM Go through the team contract.

- Correction
  - Missing a requirement of “remote” in the objective.
  - Feng li is mentor, and James Frenzel is Client.
- Roles and Responsibilities
  - Liu is to oversee the project’s budget
  - Jeremy is to be the primary client contact
  - Han is to be in charge of organizing team meetings
- Documentation:
  - Carl is to be in charge of keeping the portfolio.
  - Everyone is to keep their own form of team meeting minutes. From here the team will combine them into one.
- Team Relationships
  - All members are to respect everyone’s ethnicity
  - All members are to reach out to one another for help as needed
  - All members are to only communicate in English during team events

3:00 PM Question and answer session

3:20 PM End of the meeting

## **September 13, 2018 9.13**

2:35pm Meeting start and summary of last meeting

2:37pm Q & A Start

Some important items to note from the questions

- project is to be for a more general group
- tracking of the car is a good idea
- the project is for independent elderly
- budget is \$1000
- disguising devices would work
- microphones are fine
- record home power is useful
- stairs might be an area to investigate
- no defined test area yet
- Ethernet communication preferred
- send data to webpage would potentially
- battery operated devices

3:15pm Wrap up and meeting adjourned

## Sept. 20th, 2018

2:30pm Start and Jeremy summarized what was discussed last meeting

2:33pm Liu discussed:

- Weighing sensor
- Automatic door sensor

Dr. J asked about devices:

- Size
- Power
- Connectivity
- Cost

2:37pm

Carl

- Temperature discussion
  - o Monitor health

Dr. J

- Mentions sleeping bag rating
- How many sensors?
- Smart blanket

Carl

- Another use is to inform of potential fire

Dr. J

- Would be nice
- Might be intrusive

2:42pm

Han

- Discusses power usage
- Monitor power

Dr. J

- Mom has a gas stove
- Monitor bathroom
  - o Light and hairdryer
- Kitchen light
- Smart light switch
  - o Google this, might exist
- Focus on a single outlet

Han

- Simple trigger

- Door left open
- Open vs. Closed

Dr. J

- Connectivity?

Han

- Light beam for car

Dr. J

- Ultrasound sensor instead?

2:50pm

Jeremy

- We could weigh for the car moving over the sensor
- Stair solutions
  - o Light vs. Weight

Dr. J

- Railing
- Set up

Jeremy

- How long should the batteries last?

Dr. J

- Quarterly would be good
- Battery pack, USB

3:00pm: Clarification and questions

Dr. J

- Date and put team name on documents please
- ZigBee might be useful
- Flat wire

Jeremy

- Webpage would be optimal

Dr. J

- Webpage creation simple, connecting to it not so much
- TCP messages, wire shark

Jeremy

- So far, any sensor ideas reach out to Dr. J?

Dr. J

- Weight is interesting

- Temperature might be difficult
- Microphone is skeptical
- Echo maybe

Jeremy

- Monitor fridge

Dr. J

- Should work
- New microcontroller

Li

- Budget draft next week
- \$70 for final poster board
  - Group email: [Engr-IOSenior@uidaho.edu](mailto:Engr-IOSenior@uidaho.edu)

3:20pm Meeting adjourned

## Sept. 27th, 2018

Meeting minutes 09/27/18

By Jeremy Perhac

Team: IO Senior

Attendees: Dr. Li, Dr. Frenzel, Han, Jeremy, Carl, Liu

2:35pm: Start

Han

- Review of last week's meeting

2:38pm: Fridge ideas

Han

- Door is open vs not

Dr. Li

- Fridge has a light

Han

- Freezer doesn't

Dr. J

- Conductive tape?
- Sealing issue

Han

- Yes, conductive tape

Dr. J

- Wires might cause issues

2:42pm: Ultrasonic

Jeremy

- May prove to be useful for different scenarios

Dr. J

- Range?

Jeremy

- Not sure yet
- Ultrasonic sensors are cheap
- Arduino Nano for potential controllers

2:48pm: Motion sensor

Liu

- Useful
- Affordable



Dr. J

- Range?

Liu

- Not sure

Jeremy

- Recently found, so we are still researching these

Han

- Range shouldn't be much of an issue

2:50pm: Power use

Han

- Some form of transformer for hair dryer

Dr. J

- How cumbersome to transfer between monitored objects?
- Think discrete, like the outlet itself

Han

- Outlet relay?

Dr. J

- Look for current flow

2:55pm: Other notes

Jeremy

- Found a testing place

Han

- Is there some "technique" for a wireless communication

Dr. J

- Been looking into this himself
- Some of these "techniques" are on the 443 handouts
- Arduino libraries have some issues
- No good debug
- Check Arduino for ZigBee compatibility

Jeremy

- Arduino more than likely has ZigBee compatibility

Han

- Talks about a picture he drew for potential device locations

Dr. J

- What about a pet?

Jeremy

- Load cells
- Budget in process, almost done

Dr. J

- Look into what comms Arduino supports

Dr. Li

- PRD due today

Dr. J

- Text message could be useful

Jeremy

- How critical on text?

Dr. J

- Query if mom is home
- Emergencies on text

3:20pm: Meeting adjourned

## October. 4th, 2018

Meeting minutes 10/04/18

By Jeremy Perhac

Team: IOSenior

Attendees: Dr. Li, Dr. Frenzel, Han, Jeremy, Carl, Liu

1:30pm Start and batter

Jeremy

-Battery has 5000mAh

-First test was on roughly a 1/3 charge

-Lasted 160min

-Nucleo board

1:35pm Scheduling

Han

-Learn boards while testing

Jeremy

-Complete two items at once

Dr. j

-Motion, how do?

-DVP?

Jeremy

-Summarize finding on motion sensor

Dr. J

-Found some typo's in plan

-o Key days misunderstanding

-Snapshot days

-Communication start

Jeremy

-This semester sensors, next communications

1:52pm Snapshot

Han

- We have started working on it

- Jeremy and Carl on ultrasonic

-Han and Liu on current transformer

Dr. Li

- 9 slides minimum for snapshot

Dr. J

- Purchase current transformer?

Han

-Researching it

Dr. J

- Digikey for purchases

-New Ark

Jeremy

- Buy stuff?

-o Nanos specifically

Dr. J

- Budget proposal for purchases

Dr. Li

- Proposals: What you're doing, why you need it and how much it is

- Email who all needs to be addressed

Han

- Silicon labs

Dr. J

- Look for internet connectivity when looking into controllers

- Internet connection coding webinar on 442 handouts

Jeremy

- HMI is in person only

2:13pm Meeting "adjourned," Dr. Li leaves

Dr. J

- Looks at silicon labs and nucleo with everyone

- Diligent, multi wireless communication device

2:20pm Meeting fully adjourned

## October. 11th, 2018

Meeting minutes Oct 11, 2018

By: Jeremy Perhac

Team: IOSenior

Attendee's: Dr. Frenzel, Dr. Li, Jeremy, Han, Carl, Liu

2:34pm Start

Han

-DVP questions?

o Not sure what to do

Dr. Li

-No idea, it's new

-Don't worry about it, will email about what to do after the meeting.

Dr. J

-Might be about how to test the design

o Simulation

o Hit it with a hammer

o Special tools necessary

-How well does it work?

Han

- Pitch competition

Dr. Li

- Optional

- You have several minutes to present your idea/project to entice them into "Sponsoring" in. AKA, free money to help with idea/project

- If you have interest, you should try it

Dr. J

- A group in the past started a company for lineman hardhat sensors off of this

2:40pm Sensor change and issues

Jeremy

- Another battery test, this time full battery

- Ultrasonic has some issues potentially use IR

- Some sort of check, CRC?

Dr. J

- Extrapolate this issue?

Jeremy

- Sensor triggers itself every now and then

Dr. J

- Potential reverb or the Arduino library
- Consider storing data that the Ultrasonic is outputting
- What do with IR sensor?

Jeremy

- IR sensor more than likely receive
- o I.e. Temp change when something comes across it

Dr. J

- Might not work, feel free to prove wrong

2:45pm Endowment Request

Han

- Rough draft of Endowment

Dr. J

- Be specified on the items
- o Company
- o Brand
- Explain why you need the number of items

2:50pm Other items

Dr. Li

- Logbook is due
- Logbook discussion

Jeremy

- When ever you are working on the project, you should be writing in your logbook

Dr. J

- Looking forward to more answers on the Ultrasonic issues and IR potential
- Leaves

Dr. Li

- No project is perfect, just present what you have but explain your worry/issues
- It's all about progress, not the product

3:00pm Meeting adjourned

## October. 18th, 2018

Meeting minutes Oct 18, 2018

By: Jeremy Perhac

Team: IOSenior

Attendee's: Dr. Frenzel, Dr. Li, Jeremy, Han, Carl, Liu

2:35pm Start Purchase proposal draft

Han

- Presents the "final" draft

Dr. J

- Supplier
- o Amazon, Digikey, sparkfun
- Couple words missing
- Conductive tape?
- Confusing sentence towards end

Han

- Delete the last couple of words

Dr. J

- Put where these prices are from
- IR is a possible alternative to Ultrasonic re-word
- Make those minor changes
- o Gives physical changes to Han

Dr. Li

- Add on to the Project Objective
- Pitch?

Jeremy

- No

Dr. Li

- Looked for a similar system?
- o No camera

Dr. J

- There are things, but still a little intrusive

2:45pm Sensor issues

Jeremy

- Ultrasonic has a vague wording on a 60ms measurement cycle on datasheet

- Tried:
- o Waiting every 60ms to read
- o Wait 60ms between send and receive
- o Averaging over 60ms
- Went with averaging 5 readings with 60ms in between each read
- Works for car, not so much on pass by
- o Steady state works, transient not so much

Dr. J

- Could you send me this datasheet

Jeremy

- Can do
- o Pretty short
- Past battery tests are invalid due to "roll over"
- o Issue with values

Dr. J

- Remember bits

Jeremy

- Current test results
- o Started 9:00pm 10/17/18
- o End 12:17pm 10/18/18
- o Expected: min = 917, 10's = 91, 100's = 9
- o Results: min = 147, 10's = 91, 100's = 99
- Goes over why the results showed
- New test going currently
- Millis() function

Dr. J

- 24hr estimate should be fine
- o IE: Let it run, and check every day

2:55pm Wikimaster

Han

- Wikimaster question's
- Can two people work on it

Dr. Li

- Yes, why?

Carl

- Feels like it might be too much for just him

Dr. Li

- It is not too hard, but you can do two masters



2:57pm DVP draft

Han

- Provides copy to Dr. Li and Dr. J
- o They read over it

Dr. J

- Tests all seem pass fail
- o May need to be a little more rigorous on this
- The current ones seem important
- To Dr. Li: Is this enough detail?

Dr. Li

- Should be based off the PRD
- The more detail the better
- Full system test could already be on here

3:03pm Other comments and concerns

Dr. Li

- Portfolio should be physical
- o Provides an example Portfolio
- Can go in here:
- o Reference papers
- o Datasheet
- Logbook
- o Minutes should just be copied from the minute taker
- o Date confusion in Liu's and Carl's Logbook
- o Provides an example Logbook

3:06pm Dr. J leaves

Jeremy

- Can logbooks have different colors in them

Dr. Li

- Yes, can be useful
- If a project continues, giving a logbook is a good reference

3:15pm Meeting adjourned

## October. 25th, 2018

Meeting minutes Oct 25, 2018

By: Jeremy Perhac

Team: IOSenior

Attendee's: Dr. Frenzel, Dr. Li, Jeremy, Han, Carl, Liu

2:30pm Start

Han

- Presents the DVP

Dr. J

- Finds some spelling mistakes
- Ultrasonic tests complete?

Jeremy

- Kind of
- o Battery tests took place
- o The initial tests should cover for the most part
- o Will do a test for object placement soon

Dr. J

- Hesitant about the Current sensor?
- Draw a picture

Han

- Draws one

Dr. J

- Is this measurement a voltage?
- o Analog to Digital (A to D)?
- Explains A to D

2:45pm Battery Test Results

Jeremy

- Two battery tests
- o First lasted 32 hours
- o Second lasted 30 hours
- Bigger battery or put device to sleep mode to increase life

2:46pm Fridge Trigger design

Han

- Conductive tape could cause some small sparks

Dr. J

- FSR and FSRR

Han

- Force Sensitive Resistance

Dr. J

- FSRR is with a 10k ohm resistance
- Spark shouldn't be an issue
- Ordered yet

Han

- Wasn't in the original purchase
- There are two items there

Dr. J

- How does the FSR connect to the board?

Jeremy

- Honestly don't know, first I've seen of this item
- o Have heard about a little from Han

Dr. J

- Be careful due to the open circuit to short circuit case
- o Will need a circuit for this
- A pull up resistor could work to keep a logic high

Han

- Why can we not use a diode to connect this?
- o Draws a simple circuit

Dr. J

- Input is not a source of voltage

Han

- Battery

Dr. J

- Purpose of diode?
- o No current with the INPUT pins

3:04pm Wiki page

Carl

- Wiki page questions
- o Missing stuff
- o How to Add links?

Dr. Li

- \* The first turn in is just a draft
- o Doesn't need to be 100% done
- o Just keep updating it
- Talk the mechanical person about adding a hyper link

3:07pm Li works with Carl and Liu on something while Dr. J works with Han on the circuit structure of the pins of a controller.

3:09pm Everyone focuses on Dr. J's mini lecture of pin structure

3:15pm Other items

Action items for next week:

Carl and Jeremy: Ultra Sonic sensor object placement test  
Liu and Han: Current transformer

Jeremy: find a room for preliminary design review

Dr. J will not be here 11/14-11/16, that week 11/13 1:30pm or 2:30pm Meeting place to be determined for preliminary design review

Dr. Li

- Project Value Proposition due 11/2, next Thursday

Dr. J

- This project has a good value
- Helps elderly but, still gives freedom
- Leaves to get prepped for advising

Dr. Li

- Find a conference room that can hold 20 people

Jeremy

- What time frame do we have for the preliminary design review?

Dr. Li

- Any time within two weeks before Nov. 16th
- For agenda
- o More action items
- Don't need to just be technological, but can be on presentation
- o Sent out a day prior

3:30pm Meeting Adjourned

## November 1st, 2018

2:33pm Start, schedule change and fridge trigger

Han

- \* Had an issue with being too busy

- \* Liu will now be on Liu

Liu

- \* Research the FSR

- \* Resistance is lower on lower pressure

- \* Want to put it on the fridge

- \* First condition for fridge is alarm for door open

Dr J

- \* Not necessary on alarm, just open vs. closed

- o Arduino connection

Jeremy

- \* Some fridges have a built in alarm for open door

Liu

- \* It will be connected to the Arduino

Dr. J

- \* You are going to need to make a circuit for the connection of the device

- o A button is a good example

- \* For starters, turn on an LED when door is open

2:40pm Ultra sonic, purchase update and Design review

Jeremy

- \* Tests have been very successful for object there vs. not

- \* These tests cleared up issues for pass by

- \* The idea was that the sensor is looking down

- \* Purchase has been made

- o Parts on their way

- o Had issues with customer number

Dr. J

- \* Talk to mike on customer number for Digikey orders

Jeremy

- \* Preliminary design review is Nov 13, 2018 in GJ 218 at 2:30pm

2:47pm Current Transformer Research

Han

- \* Distributes a 2 page packet on current findings

Everyone reads though it

Han

- \* Analog input on Arduino only positive?

Dr. J

- \* What is this Current rate: 100A:50mA

Han

- \* Used to calculate transmission

Dr. J

- \* Answer to analog Arduino

- o Remember you are referring to voltage between two points:
  - \* One is referred to ground
  - \* The second changes
- o Use an oscilloscope for testing
- o 1V peak to peak?
- o Maybe use an amplifier
- o You may need to shift the signal
- o Document Dr. J sent out talks about rectifying the signal to only positive
  - \* Burden resistor
- o Load?

Han

- \* Yes, Load

Dr. J

- \* Do they recommend Caps and Res?

Han

- \* Yes

- o 35 ohms for res

Dr. J

- \* The site you found this info from, were they measuring AC?

Han

- \* Yes

3:00pm Wiki page

Carl

\* Shows the wiki page to Dr. Li and Dr. J

Dr. J

\* Fonts on the table seem a little small

3:05pm Other items

Dr. J

\* Networking?

Jeremy

\* Been looking into RF

o Lorawan

\* Expensive

o Xbee

\* Much cheaper

Dr. Li

\* Team lead should push for Action Items

\* Person who makes the Agenda is typically the Team Lead

Next week Action Items

Liu

\* ADC

Carl

\* Fine tune Ultra sonic or some other item with Jeremy

Jeremy

\* Research into the network/comms

Han



\* More research into CT/work on

## November 8th, 2018

2:40pm Start, Schedule, and Design Review info

Han

- \* Parts came in
- \* Try to get curr sensor item
- \* Team will be meeting at 1:30pm for last minute changes if needed
- \* Review slides should be done by Sunday

2:43pm Fridge Trigger

Liu

- \* Purchase FSR

Dr. J and Dr. Li

- \* If you have “wobble room” with what you have, just use what was given to you with the first purchase

Jeremy

- \* Only used 60 out of 200

Liu

- \* For testing the FSR, use multimeter first to find voltage changes.

o This way to find a threshold

Dr. J

- \* Until you get the FSR, use potentiometer to simulate what results could be

2:50 Move back to room and discuss slide layout and Dr. Li excuses himself for a PDR

Dr. J

- \* Test slides would be good
- o Explain Gant chart and this will come naturally

- \* Explain brainstorm process

- o How you pinned what sensors

- \* Gant chart is important

3:00pm Communication findings

Jeremy

- \* More RF devices found, cheaper but less effective

- o It can only transmit/receive and not switch

- \* NRF24201

- o Can have antenna attachment, costs more

- o Cheaper than Xbee

- \* 10 for \$12 on Amazon

- \* “433MHz ASK RF kit”

- o Same channel

- \* Communicate one at a time

Dr. J

- \* Synchronize?

- o Real time clock

- \* If cheap enough, maybe have all devices listen and wait their turn to speak

- \* Depending of frequency, signal may pass through walls quite well

3:10pm Sleep mode.

Carl

- \* Sleep mode uses 6.5mA, Power save 1.62mA, Power down .36mA

- \* Completed a test

- \* Tried to put to sleep and wake up

- o Sleep worked

- o Waking didn't

- \* Watch dog timer lasts max 8 sec

- \* Most common method to sleep is to use an interrupt

Dr. J

- \* Any other method besides Watchdog?

Carl

- \* Watchdog is most common method

Jeremy

- \* The Animal gps tracking Project does a sleep mode, ask them what they did

3:20pm Other items

Jeremy

- \* All parts came in, never got an email, solution?

Dr. J

- \* Not really, due to lack of secretary

- o Tracking number should be helpful to know when it has been delivered for at least one day

3:25pm Meeting Adjourned

Action Items:

Jeremy – Continue research on communication and work on design review slides

Han – Work with current transformer

Carl – Continue research on sleep mode

Liu – Simulate FSR using potentiometer

## Meeting Minutes Nov 29, 2018

Team: IOSenior

By: Jeremy Perhac

Attendees: Dr. Li, Dr. Frenzel, Jeremy, Han, Liu, Carl

2:30 pm Start

Dr. Li

- \* Goes over some of the “reviews” the team got on our PDR

- o Read off slide/sheet too much

- o Didn't answer some questions that well

Dr. J

- \* Slides are for reference

Jeremy

- \* Cheat sheet fine?

Dr. Li

- \* Generally yes, but do not read straight off

Dr. J

- \* Engage the audience

2:39 pm Snapshot

Made some changes to the snap shot draft

Dr. J

- \* Sometimes wake up causes issues with power

- \* Test CT on signal generator

3:13 pm End and Action Items

Due to dead week and Finals, members are assigned light action items

Jeremy will continue research on communication and helping members

Carl will continue research on sleep mode

Liu will help around until an FSR is available

Han will complete some tests on the current sensor and is to send the CT datasheet and circuit schematic

## November 29th, 2018

Attendees: Dr. Li, Dr. Frenzel, Jeremy, Han, Liu, Carl

2:30 pm Start

Dr. Li

- \* Goes over some of the “reviews” the team got on our PDR

- o Read off slide/sheet too much

- o Didn't answer some questions that well

Dr. J

- \* Slides are for reference

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Dr. J

- \* Engage the audience

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3:13 pm End and Action Items

Due to dead week and Finals, members are assigned light action items

Jeremy will continue research on communication and helping members

Carl will continue research on sleep mode

Liu will help around until an FSR is available

Han will complete some tests on the current sensor and is to send the CT datasheet and circuit schematic



## January 17th, 2019

2:30pm Start and Jeremy Shows the schedule

Dr. J

- \* For the board to board, don't worry about the communication over house distance, keep it small

- \* For the two communications, some dates on them to show progression would be good.

2:40pm Everyone worked on the Expo Pre-registration form

Jeremy

- \* Bi-weekly meetings?

Dr. J and Dr. Li

- \* Weekly still, mainly do to the number of students

3:00pm General Discussion

Dr. J

- \* Look for a program to deal with the stack

- \* TCP or UDP

- \* S complicated depending on support for the Arduino

- \* Talk to Mike about finding temporary connection to FSR

Action Items

Liu: Coordinate next week's meeting and generate some results with the FSR

Carl: Do some research on the ethernet and more on the sleeping mode.

Jeremy: Do some research and maybe purchase an ethernet shield for Arduino

Han: Keep working on the current sensor and research potential wireless, try to avoid wifi.

3:20pm Meeting adjourned

## January 24th, 2019

2:35pm Start

Liu

- \* Presents a basic demo of the FSR
- \* Dr. J and Dr. Li play with the demo
- \* Also has a value of the pressure and resistance
- \* This will work quite well
- \* Next step now is sending the data and “packaging”

2:40pm Sleeping mode

Carl

- \* 15mA active, sleep mode uses approx. 6.5mA
- \* Dr. Hess informed of MSP430 board might be better for saving power

Dr. J

- \* what was the arduino doing while awake?

Carl

- \* just sitting there being on

Dr. J

- \* How did you make it go to sleep?

Carl

- \* Change a pin

Dr. J

- \* Is there any documentation on approximate power consumption for Ardiuno Nano?

Carl

\* Not sure, might investigate

\* Presents a packet called “Accessing Arduino Over Internet”

\* No citation currently, will do soon for future access

Dr. J

\* Have access to ethernet capabilities?

Jeremy

\* Part should arrive soon

\* Will order FSR soon

Dr. J

\* Is additional software needed for connecting to the web or is this provided?

o e.g. ECE 443 TCP stack from Microchip

No one answered, so this will be investigated

3:00pm Some Board to Board communication

Han

\* 5 approaches but reduced to two components

\* Zigbee or general Radio RF

Dr. J

\* Which ever is easier to get working would be best, power can be later

\* Development kit maybe useful for these

3:05pm Other items

Action Items

Han: RF research

Jeremy: Order parts and if possible play with ethernet

Carl: Ethernet research

Liu: Research packaging

## January 31th, 2019

2:33 pm Meeting Start

Liu

- \* Team helped with testing the FSR on the Fridge in the Senior design lab

- o Shows a video of this test

- \* Modified the code so that the LED turns on when the Door is open

- o Note that the light used to be on when door is shut

- o Demonstrates this new program

- \* Shrunk the overall circuit to a smaller board

Dr. J

- \* Practice with a printed circuit board and just turning on a light

- o Communication can be added later

Dr. Li

- \* At least Design a PCB

Liu

- \* Having two PCBs to talk to each other could work

Carl

- \* We can now start adding board to board communications

- \* Adding a speaker to the door to alarm that the door is open

Dr. J

- \* Mainly interested in use of the door

- o Alarm is not as necessary, but good practice

2:40 pm Ethernet and purchases

Jeremy

- \* Presents the Ethernet Shield and that parts arrive tomorrow

- o Temboo <https://temboo.com/>

Dr. J

- \* Might be too easy

Jeremy

- \* If it is we might be able to implement data logging

2:50 pm RF findings

Han

- \* Presents a report to everyone

- o Will share this with the email group

Dr. J

- \* Han, have you used SPI?

- o Shouldn't be too hard

2:55 pm Engineering Release Review Slides Rough Draft

Dr. J

- \* Back to the CT, More experimentation is needed

- o Use a breadboard, resistor, power supply and wires to test a one wire reading of the CT

Dr. Li

- \* Communication protocols would be a nice touch

- \* Same with schematics

Engineering Release Review will be Thursday February 14, in GJ 218 2:30 – 3:30pm

Dr. J

\* For the video issues

o Embed

o Store locally

Action Items:

Liu: PCB research

Han: Play with RF

Jeremy and Carl: Play with the shield and Temboo

Meeting Adjourned 3:15pm

Link from last week's meeting about the Ethernet and Arduino:

<https://www.instructables.com/id/Accessing-Arduino-over-internet/?fbclid=IwAR0IAN5G3iZZR1DwiZnW0qDIqymcpskcIPGAI8dQ9tRjhVCdmVheDbOoj34>

February 7th, 2019

2:35pm Start

Liu

- \* watched some tutorial on KiCad
- \* will be drawing the components on there at some point
- \* this software maybe challenging for me
- \* It may not be necessary?

Dr. J

- \* What else will you do?

Jeremy

- \* Liu is to be on the RF with Han too?
- \* We are to be making a prototype

Dr. Li

- \* PCB is included because this can be good challenge

Dr. J

- \* Up to the team really when it comes to presenting the design at expo

Dr. Li

- \* More time needs to be spent on the project
- \* 8 Hours should be a good amount
- o 9 would be good too

Liu

- \* Videos were long
- o they are for reference



Dr. J

- \* Fritzing could be another PCB design

2:45pm Ethernet

Carl

- \* There are different cables
  - o Cat 5: 100 Mbps up to 100 meters at 100 MHz
  - o Cat 6: 10 Gbps up to 55 meters at 250 MHz

Dr. J

- \* Don't need to worry too much about the cable
- \* Mainly focus on the software
- \* The electronics really determine the bit rates

Jeremy

- \* Will hopefully get a test done using Telenet to control the arduino
  - o Goal of the test is to get some experience with the Ethernet library

Dr. J

- \* Documentation of the Library?
  - o A: Yes

2:55 Update on RF

Han

- \* Goes over some of the slides that that were added
- \* Plans on adding some more details later
- \* MISO: Master In Slave out
- \* MOSI: Master Out Slave In

Dr. J

- \* An SPI competitor to I2C

- o This is more point to point

- \* Can we move the Engineering Design Review back a week?

Design Review moved to February 21, GJ 218 2:30pm-3:30pm

3:05pm Action Items

Dr. J

- \* Turning on an LED wirelessly would make us feel

Liu: Work with Han on the RF Board to board, then if time prevails PCB (8hrs)

Carl and Jeremy: Control the arduino via Telenet and learn more on the Ethernet library. As well as review/look up how the Ethernet communications work.

Han: RF experiment with Liu

3:15 pm Meeting Adjourned

## February 14th, 2019

2:30pm Ethernet

Jeremy

- \* DHCP Chat sever was a success
- \* Got a web sever running
- \* Security, Password?

Dr. J

- \* Just get data pushed up to the Webpage
- o It's a prototype

Jeremy

- \* In our test we were able to see some data changes
- \* Time stamps

Dr. J

- \* Sure

2:45pm PCB and RF

Liu

- \* Was assigned some PCB research
- \* Demonstrates the RF finding
- o Dr. Li and Dr. J both play with it
- \* There are some connection issues in the Senior design lab
- o Major time delay ~10

Han

- \* Next step is multi sender, one receiver

- \* Very rough experiment

- \* The chip does not work with MEGA 2560 board

- o Will investigate this later

Liu

- \* Shows a video

2:55pm Other items

Dr. Li

- \* These past meetings have had only FSR, other sensors?

Jeremy

- \* Ultrasonic has been finished

- \* CT needs some work

- o Maybe this week as a break from RF

Dr. J

- \* When you do, make it simple

Jeremy

- \* Would it be fine if log books are turned in next week?

Dr. Li

- \* Yes

- \* Number of Sensor

Jeremy

- \* 3 felt like a good sweet spot

Dr. J

- \* If time prevails, figure our another sensor

- \* Pressure sensor for stairs

- o One at top and one at bottom

- \* Light Sensor?

- \* CT may solve a lot of problems

Action items:

Jeremy & Carl: Continue development of ethernet and figure out ethernet access in ECE Conference Room

Liu & Han: Increase number of boards communicating

Han: If time permits work on CT

3:05pm Meeting Adjourned

**February 28th, 2019**

2:35pm Start and nRF update

Han

- \* with liu attempted multi sender, one receiver
- \* it worked but the serial monitor was getting confused

liu

- \* the second the first was sent it got overwritten

Dr. J

- \* will be still investigating?

Han

- \* Yes
- \* Will try making them take turns

2:37pm Ethernet

Jeremy

- \* How to access Arduino from anywhere
- 1) Plug Arduino into router and have power to both devices
  - 2) Login to your router
  - 3) Reserve your Arduino's MAC and IP addresses
  - 4) Port forward your Arduino on its declared port (ours is 80)
  - 5) Write down your router's public IP address
  - 6) In your web browser type in the IP address then colon port, should be like the following: xxx.xxx.xxx.xxx:yyyy

2:40pm Arduino Issue

Han

\* Want to buy an Uno?

Han

\* Uno has different MCU's than MEGA

Dr. J

\* Was confused about this

\* Library Issue?

Han

\* Nope

Dr. J

\* You know this works?

Jeremy

\* Already tested and worked

\* The issues we had at the Review was with Nano's crashing

Dr. J

\* Just do a one page write up

\* Order from Digikey

2:46pm Snapshot

Worked on the snapshot slides for next week's presentation

3:00pm Other items

Jeremy

\* if the Ethernet is good, I can start on Packaging or the Current Transformer

Dr. J

\* Sure

Action Items:

Han and Liu: work on RF

Han and Carl: work on CT

Jeremy: Fine tune snapshot, work on packaging, ethernet fine tune, and help around

Dr. J

\* For expo, maybe make a mini network on table

3:10pm Meeting Adjourns



## March 7<sup>th</sup>, 2019

2:30pm Ethernet demo

Jeremy

- Demo an off campus access of the Arduino
- You could see that someone had entered a room

2:40pm Proposal

Dr. J

- Looks good email it to me as soon as possible

2:45pm Multi Sender, One Receiver

Han

- On Sunday we got the system up and running
- On snapshot, when we tried to add the Ultrasonic, it didn't work

Dr. J

- You got two working, but not three?

Liu

- No, two were working with FSR and a theoretical second sensor
- Once the ultrasonic was implemented it didn't work.

Han, Liu and Dr. J discuss and draw on the white board the Multi Send, One Receive.

- Set the programmed value to high and can observe the two values
- Try using a button first to adjust the value on the Programmed node
- The ultrasonic interprets the value as a one or a zero
- Look at what is being sent to the transceiver on an oscilloscope. From here you can figure out where the issue is:

o Sender

o Receiver

o Uno

o Nano

3:00pm Current Transformer

Han

- The power supply in the lab may be too weak for the CT to detect.

Han and Dr. J Draw on the white board the circuit that was used for the test.

- Made a simple circuit with supply and a resistor

- Res = 30  $\Omega$

- Vsupply = 5VDC

- So it seems that the CT detects a change in Current

- All datasheets should be on the wikipage

3:15pm Other Items

Dr. J

- Power the Devices?

Jeremy

- Either outlet or battery

Dr. J

- Have a lot of battery's, will bring some for testing

3:18pm Meeting Adjourned

**March 21<sup>th</sup>, 2019**

2:35pm Start PCB

Jeremy

- Looking to be about four designs
  - o One for each major component
  - o Some combination of Transceiver and another component

Dr. J

- When it comes to the PCB

- o Really only one

§ It's mainly getting experience

- Try not to be too expensive

Dr. Li

- So you are basically done with the project?

Han

- Not fully, we have everything working and just need to add in the Ethernet

Dr. Li

- you may not need to do complicated

- Talk to Mike about this more

Dr. J

- If Mike can help do them all

2:45pm Multi-transceiver and Current Transformer Liu walks everyone through the following video: <https://youtu.be/OABA0B7fH6E>

Dr. J

- What did you do to fix the CT?

Han

- We had to leave the clamp open and lay the CT on the wire

- Talked with Yaciene earlier, he was speechless

- changed the burden to a higher to  $3k\Omega$

Dr. J

- What was the current of the Hair dryer

Liu

- 15A

Dr. J

- Tries to find the Amperage on the hairdryer

- I still think that you may be using the CT incorrectly

- The CT seems to have an orientation issue

Liu

- Demonstrates what this issue is

o Depending on the rotation of the wire, different reactions

Dr. J

- Try making your own cords to use for measurements

- Ideally, all of this could be within a devices plug, power strip or outlet

- Last step is connecting to the web

Action items:

Jeremy: Talk with Mike about PCB and find two good options based to best chance of success and time constraint

Han: Improvement on CT

Carl: Work with Han

Liu: PCB with Jeremy

Everyone: Get the web connection running this weekend

Dr. Li

- On the Sunday night of the week of expo, send me and Dr. J slides for the poster for review and print

3:10pm Meeting Adjourned

## March 28<sup>th</sup>, 2019

2:35pm Start PCB

Jeremy

- Presents the first PCB board
- Noted some of the issues
- Han has done a PCB for the CT and NRF
- Carl has done a PCB for the NRF to Ethernet
- Liu has done a PCB for the FSR and NRF
- So we are winding down and it is about time to start getting prepared for expo and making the final touches for the system

Han

- Time stamps?

Jeremy

- This has proved to be challenging
- Dose a Pic 32 have this capability?

Dr. J

- pic 32 uses a RTC, real time clock, so yes
- Web connects to NIST to get the time
- Dr. Wall, his web based control used embedding the time on a webpage to NIST

o Doesn't work right now

- The time stamp depends on who takes it: Web or the Arduino

Dr. Li

- What is everyone using for PCB?

Jeremy

- KiCad

Action Items:

Everyone: Finish PCBs, make sure system works

Han and Jeremy: Get Han's laptop to be an access point for expo

3:00pm Meeting Adjourned

## April 4th, 2019

2:33 pm Start and Laptop demo

Han

- demos his laptop is working a router for the expo

Jeremy

- The adjustment to the design was just replacing a broken part

- the second gen PCB should be done printing today

- o deepening on the one that comes in, the rest may be able to me made

- The laptop router is a private network

Dr. J

- What happens when the wifi to the laptop is off?

We try, the webpage works fine. This means that the webpage is hosted on the laptop.

Dr. J

- What if you talk with JJ about getting a wireless router for expo?

- o If time prevails

- This should allow wireless access to the Arduino

Dr. Li

- Try to make the webpage fancier

- o Pictures

- o Animations

Dr J

- Maybe two static images with an indicator of the status

Action items:



Jeremy: Look into spiffing up the web page

Han: Look into wireless router

Everyone: PCB's start thinking about expo items. Get rough draft of the template for the expo by next meeting.

## **April 11th, 2019**

2:30pm start and PCB

Jeremy

- Ultrasonic is complete
- Han's CT has an issue with the coverage
  - o there is a trace within the coverage
  - o Ultrasonic has this too, but was avoided during soldering

2:40pm webpage

Jeremy

- pictures are possible
- takes up a lot more memory for the Arduino
  - o having some technical difficulties, but hope to have a small demo next week

2:45pm Poster Layout

Liu

- Shows the layout

Dr. Li

- Is the next steps needed?

Jeremy

- It is to really to say what is still to be done

Dr. J

- Looks nice
- Start playing with the real thing now

Dr. Li

- there is an official template on the capstone
- for the wikipage, add some more text
- logbooks due Friday March 12, 5 pm

Action Items:

Jeremy: Work on webpage

Liu: Work on the poster

Carl: Work on Wiki with Jeremy

Han: Try Soldering his current PCB

Everyone: PCB work when possible

3:00pm Meeting Adjourned

## **April 18th, 2019**

2:35pm Start and Webpage update

Jeremy

- I have pictures finally working
- Am currently working on combining code
- Found issues with the Ultrasonic PCB and am fixing that too

2:40pm PCB update

Han

- All board have come in, but a lot of them are destroyed

Jeremy

- For expo we have two options for demo

o Video

o Breadboard the necessary devices

Dr. J

- Breadboard the necessary devices

2:50pm Poster Update

We pull up the first draft of the poster and review any issues.

Dr. J

- Some good additions/adjustments
  - o Future work: Battery Life, Packaging or durability, verify distance/typical home
  - o Include datasheet distance report
  - o Fix any typos/fragments
  - o I don't need a picture, just mention

o Field trials

3:00pm Wikipage

Jeremy

- NRF needs to be added

Dr. J

- Parts numbers could be useful

o Include a used for Prototype and Part #

o Rephrase the “What are the pain points?” to “What are their motivations?”

o Mainly clarify that is about the users reasons of use

o In the Weighing sensor: Rephrase the Disadvantage, it is supposed to explain the unreliability.

Action Items:

Jeremy: Finish combining code and fixing Ulta PCB

Carl: Update wiki, find Jeremy for any questions

Liu and Han: Second draft of poster to Jeremy by tomorrow afternoon

Everyone: Prep for expo or find Jeremy for any other work

Prep includes:

- Make video

- Breadboard devices

- Check system stability

- Presentation

- Portfolio and logbook finalization

3:20pm Meeting Adjourned

