MTRL 466- Sensing Failure Weekly Meeting Minutes

Date: Friday, October 4th, 2019. (12:00pm - 12:45pm)

Room: FORW 519A

Week 5: Finalize 1 Solution for Midterm

Leader: Aleisha Reese Cerny

Secretary: Clement Asiedu-Antwi

Attendance:

Individual	In Attendance
Catherine Greenwood	Y
Jenna Moledina	N
Clement Asiedu-Antwi	Y
Isabela Taketa	Y
Aleisha Cerny	Y
Sofia McGurk	N

Agenda:

Recap:

- Midterm presentation is a week from now. A lot of work to be done.
- Chad: If you are going to miss a meeting, let Chad know as well as your group mates. Three people presenting is about 2 minutes per person with the given time frame, so about 2 slides per person (~ 1 minute each). Not enough time to present technical details more important is the story behind it.
- Cat: What counts as technical detail?
- Chad: Going into great minutia about what FDM is because the whole time can be spent for FDM. Could be higher level. 7 ideas max and need to keep people engaged and interested. Ideas all have to link together and from the title slide it should get people going.
- A: Is it like an intro presentation? Like the proposal?
- Chad: Yes, but you have the ability to go a bit deeper and the proposal could be summarized into one slide. Next steps should be shown. Think about the 6-7 ideas you

want to convey and this should tell a story. Beginning, middle and end. Look at the marking rubric for the presentation. By the midterm you should have identified how you're going forward with the socio-economic aspects of the project.

- I: Socio-economic is only for the final presentation.
- Chad: How many things are being evaluated on?
- I: 6 things, which will be put in 6 slides.
- Chad: Big part of this will be answering questions and justifying as people will want to pick holes in the story so you should be confident and have a clear understanding of what you're going to present.

- Ideally Wednesday but latest by Thursday we can do a trial run before the actual presentation.
- Chad: Problem definition is really important even beyond the marks attributed to it. Helps the audience to follow.
- Cat: Users, is it going to be you or anyone who uses FDM?
- Chad: You need to think about it more and decide if you want it to be for hobbyists or specific group of people and be able to justify it so what do you think?
- Cat: I think anyone who uses FDM because it will be as an add-on.
- Chad: Will you sell it separately to the customer or will you sell it to the manufacturer to add to their packaging. No wrong answer unless it cannot be justified.

1. Choose a solution
    a. Speckle Laser vs. Laser

Chad: Present on speckle laser and laser.
Cat: Speckle laser seems better because you can get the whole shape and if the object is changing shape it works better.
Chad: For the midterm you need to show if you understand how the techniques work. When selecting the equipment need to think about what kind of laser in terms of wavelength, energy and type as safety can be an issue with lasers. Need to decide on what kind of camera is needed, filter or no filter. Camera should be low-cost but that also puts a cap on the type of camera to get. Are there cheap low-cost filters, all these should be looked at. What is the mounting system for the camera, self standing or connected to the printer. Would be good to have diagrams. Line laser is measuring height deviations, you get a picture with an x-y resolution and this affects the kind of camera. Height resolution?? What kind of resolution can be measured with the technique?

Chad: Showing the way the procedure works in detail helps a lot. On a rough surface the line will be wiggled as opposed to straight line on a smooth surface. Projection microscope?? Measurements of angular deviations, resolution is dependent on how far your camera is and the number of pixels available to the camera. Can the technique give you a height resolution of ~ very small microns? Draw and do trig calculations. Go for the defect that will have the biggest bang for buck. A defect that can be leveraged.

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Chad: Target could be to stop before you get to the spaghetti monster. Think about how much money or material could be wasted with the sp. Monster (upper bound and order of magnitude) and use this to justify the target. Starting point is to detect when something has gone wrong (height deviations)? Good print is not that flat so how do you differentiate.

Cat: Could justify through experience from print outs.
Chad: Yes, or could do a calibration and give the option for user input for strictness. Do not necessarily need to measure the whole surface. Think about data, if you scan the print after every layer and how do you deal with and fast enough that you don't need a supercomputer.
Cat: Can;t you not save the data?
Chad: You would like to but this needs to be processed and with high resolution pictures it is a point to consider. Don't need to answer now but should be thought about. Think lowest hanging fruit, simplest problem to solve with the task at hand.

Cat: Speckle works on a destructive interference of the dots but sounds like a lot more data to deal with.
Chad: Very interesting technique if you want to do a 3D scan of the surface but do you need all that to meet the requirements. Does not look like an optimal solution in my opinion.
I: Read about the speckle but it looks more complex.
Chad: Two solutions and one is more complicated so choose that one that is simpler to start with if it works well. But justify the reason of your choice better than saying you just don't like the complex method.

Cat: Could you low hanging fruit be spaghetti monster or not printing at all?
Chad: You can detect that because your line will not be at where it's supposed to be. Plotting a graph of laser position as a function of time or layer bed height it should be increasing linearly. If not then you know something has happened.

2. Midterm Outline (Talked about above)
    a. Project Definition
        i. Waiting for feedback on proposal
    b. Tech review
    c. Project Objectives and quantitative goals
        i. Need help to determine what we want to measure (ie. goal: system must be able to detect defects of x size, system must be able to detect defect and alert user within y seconds)
    d. Design options and recommendations
        i. Talk about the 3 options in this section?
    e. Economic, Socio-Economic, Life-Cycle Assessment of Design
        i. Wanted to do LCA, but I think an economic analysis makes the most sense given our budget restrictions?
3. What should we include in our presentation based off our report (Talked about above)

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Action Items:

	Item	Assigned To
1.	Let Chad know about next week wednesday presentation and dry run. We could do thursday as well.	ALL
2.	Write MT report	ALL
3.	Prep MT presentation	ALL

Next Meeting Time: Wednesday October 9th between 3-5 pm.