

## MTRL 466- Sensing Failure Weekly Meeting Minutes

**Date:** Wednesday, October 9th, 2019. (4:00pm - 5:00pm)

**Room:** FORW 519A

**Week 6:** Midterm Presentation

**Leader:** Isabela Taketa

**Secretary:** Sofia McGurk

### Attendance:

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

### Agenda:

- Go through key points of presentation with Chad
- Clarify the difference between the problem definition (*Identify customers/users, needs, constraints*) and specification definition (*Specify design requirements*)
- Schedule a time for presentation on Thursday with Chad

Cat: Are we good if 2 people present- No issues with that...

J: Does everyone stand up front?

Chad: Non-presenters can come up at end or sit at the front of the room. Use a laser pointer to change/ control your own slides.

J: was gonna do into, introduce people, and then do an intro of the product. Assume audience is academic but must give a little context/ background.

Chad: Present at a general technical level. People understand the basic sciences behind it but must introduce the specific terminology and information.

Chad: 1hr into prez is worst time, need to have a captivating presentation. First slide needs to grab attention. Movies, or visually striking but relatable/ can be understood. Could also use humor- can be taken the wrong way. Shock value also works.

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S: Could maybe start with spaghetti monster.

A: Describe funny 3D print.

Chad: This is how you 3D print something... then this is NOT how you 3D print something.

Chad: Circuit powerpoint leads observers to think of ELEC things. Helvetica font (?) black with white background (tofu of fonts).

Chad: Need to start by defining defects (broad problem: 3D printing and defects), then go into research: what are defects, why do they happen, how to fix? THEN go into the problem definition. Need to lead people to where you want them to go. Need to build up to problem definition not jump into it rn.

J: FDM general, then defects then problem definition.

Chad: If first slide has defects, then it creates a natural segway. Why do we need automatic print detection?

J: because prints last hours so user may not be there.

Cat: Should I give all defects and then say scope is only so many of them

Chad: 34% needs to be cited- Last name of the first author, year, journal volume.

Be prepared for questions on this.

Cat: Do you know how common large vs small defects are?

Chad: Hard because people won't be tracking. Can say Spaghetti monster will cause lots of waste.

Chad: Distill info on slides & avoid using standard titles.

Chad: Need to back up why we chose the defects that we did.

J: Because of constraints is why we chose the defects.

Cat: List 5 main types of defect and give an example of 1 defect.

J: Should we go through the reason why we didn't choose the sensors?

Chad: for order do defects then problem definition (get rid of problem definition picture) then sensors.

Chad: Ensure that pictures reinforce what you are saying. Image can reinforce an idea.

Chad: Start need statement off by saying: there is a need for.... Can't pre judge solution, objective presumes the solution direction.

J: Need to detect defects.

Cat: Objective is non-contact method for defect detection.

J: What is need?

C: reduce material waste

Chad: Reduce the number of failed prints in FDM prints - evidence is pictures and 34% of material.

Chad: We need to show a proof of concept- can we detect defect and stop a print if it were to happen? Is it viable by the final report.

Chad: Logistics are next semester. But proof of concept- not a working thing rn...

Chad: Need both the objective and need statement.

Chad: Function of objective is minimizing or maximizing something in this case: Waste.

A: Maximizing success of final products- not rejection.

Chad: What to optimize?

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Chad: constraints- Give global constraints then narrow to\* one printer one material: non contact, only have one printer to test on\*, material\*, cost, precision (big defects), Sensor, geometric, height.

Cat: 400 microns for defect size.

Chad: Deviation in height is our key- geometric defects, deformation in the z-plane.

Chad: Customers need to be mentioned earlier along with why is this product necessary. Are we in competition with anyone? Can anyone already do this? Think about this as a selling point- high end models have had technologies developed. Our group targeting low cost FDM. Filling in the gap.

Cat: Acoustic too expensive

Chad: sensors- we have evaluated a large number of solutions but due to cost, resolution, inability to pick up geometric defects we have chosen the following... Speckle would be great cause would give full 3D picture of each layer but we think it is too high detail for us, plus more expensive, data analysis too complicated.

Cat/ C: Optical was too expensive and would be limited to looking from one side (2D pictures), lighting issues, trouble distinguishing background from object.

Cat/ A/ J: Have been used for error detection in terms of- Height, surface errors.

Chad: Explain why we are gonna do the specs we have chosen. How to justify them?

Chad: Laser would it be better to chose 90 degree or otherwise.

Chad: Safety factor of LZR.

Chad: Things that we need to think through can be put into the next steps.

Chad: When and where are we making the measurements? how small resolution? Height from print bed? Will camera move? Field of view? Where to put laser and camera.

J: Do theoretical calculations with our laser.

Chad: For line laser wiggle away from average will indicate the deviation in height. Once z goes out of 400 micron range- something bad happened.

J: technically if a layer was missing x and y would be fine but z would be out of range due to over or under deposition.

Chad: At end- what you know and what you are going to look for (do second half of term), including socio- economic assessment as something we are going to do.

Chad: Problem definition is what is objective and constraints, specification definition is in terms of sensors or more specific things. Both are covered.

### Action Items:

	Item	Assigned To
1.	Finish MT presentation	All
2.	Present MT	All
3.	Finish MT report	All

**Next Meeting Time: Wednesday sometime from 3-5 pm**