MTRL 467 Week 2 Meeting Minutes

Date: January 17th 2020 @ 11 am

Room: FF 313

Leader: Catherine

Secretary: Sofia

Attendance:

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

Agenda:

1. Term 2 Action Plan in Presentation form

a. Objectives & constraints, listing of the defects
   i. Reducing energy consumption not reducing material waste
   ii. Creating a prototype versus concept
   iii. Go through specific goals:
      1. Aim to have a camera and laser mounted on machine- can we do this? 3D print the arms and attach.
      2. Edge detection- have software choose area to analyze. Average of the edge of the laser line. Might not be an issue with a higher quality laser.

Daan: Hardware figured out, remember the calibration step between hardware and the edge detection software. Maybe focus on the orientation. Print a test part to set the geometry of the laser and the detector. We can align the part however and the process should still work.

3. Interface software with the printer (majority of focus)

4. Lowest hanging fruit: scan 1 line on a 100% infilled printed object and stop the printer.
5. Determine how the geometry changes when the laser and camera are on the same side.

Daan: What is the linkage between what you are intending to print and what the laser will represent. What should the laser look like?
Cat: Mount on the x-stepper, so that image is always the same distance from part.
Daan: Use the slic3r to determine what you are expecting, where the edges should be on the part. Which x should the Y look like. Once you figure out how to pull the data out of the slice should be easy.
C: Pull points from G code
Daan: G code tells it to start and move in a point at a speed- too complicated. Get the slic3r to generate what we need (not sure it is possible but expects it is). Going to need to know what the geometry is supposed to look like from STL or slic3r.
J: Then compare to what is printing
Daan: What if a new feature introduced, then print would stop and we don't want that...

6. List of equipment we anticipate needing (How much money we expect to spend?)
    a. Line laser better one
    b. Camera
    c. Arduino

iv. Defects
- Defects can be detected on the condition that they are at least as large as a layer thickness (of the printed filament) ~150-350 microns or the defect propagates
- Additionally prototype will work on 100% infilled- flat top objects to begin with

b. Assumptions that we will be making/ have made
c. Achievements last semester (milestones) each group (Timeline)
    i. Software: Blurring of the lines on the image, separating the image into red, green and blue, thresholding the image, Edge detection python code, manually measure the distance between edges to determine defect or not (tested on shield with print defect).
    ii. Hardware: set up laser and camera geometry (camera directly over the part and laser on one side at a fixed angle), took images of various objects with varying thickness, 3D printed two overhang parts- 1 failed and 1 totally fine.
    iii. LCA: with a focus on energy consumption of the machine

J: All calculated manually- goal this semester is to automate

2. Go over the outline of the Proposal Report
Daan: Technical review needs some general background but focus on the particular technical content. Last term was general- this term we have specific defects and equipment. Focus on laser line not on the defects. This is an extension or continuation- marking is different. Really focus on meaningful things. Project ahead to what the MT and Final reports might be like.
J: We don't really have a proposal more of a full fledged report.
Daan: We will have different deliverables, methods, and research far more specific. Economic and social impact will be the same.
Cat: Could using software be tech review?
Daan: Putting in stuff about slic3r, STL- what is the feasibility of extracting info from different areas. State what defects we are going to look for very brief just to orient. Discussion about what the issues with the laser, intensity, color, light. Color of the print is a factor.
Cat: Darker room is best.
Daan: Start with a reflection on what we learnt last semester and then go into the new technical details that are relevant now.
Daan: How do we envision this working? Automatic- what does this mean?
Cat: Software integrated into the printer software, have different settings for tolerances and stuff.
Daan: With your device- will happen automatically. How does it fit in and turn on/ start. At what point and how does defect detection setup activate? Where does the data come from? We don't have to have answers but take a step back and think about how it does it. High level tasks that need to happen. Is there a separate processing unit? And how does it sync to arduino and computer. Need a command to stop and hold printing to scan the object with the laser. Movement of print head to scan is probably done in slic3r.
Daan: High level steps the device needs to operate and the kind of information that we need?
Cat: is it ok if we only take one picture.
Daa: Yes, be careful and clear as to what you want to accomplish this term. How it fits into the overall plan and what we might be able to accomplish.
Daan: Send minutes day before, post on the Wiki. Meetings Fridays at 11… let him know if we don't need a meeting. Week of March 16th he won't be able to meet.

For Team Use:
3. Chair Schedule

Week Start	Week End	Chair	Deliverable
06-Jan	12-Jan	N/A	
13-Jan	19-Jan	Cat	
20-Jan	26-Jan	Cat	Project Proposal Report (January 24th)

27-Jan	02-Feb	Isabela	
03-Feb	09-Feb	Isabela	MT Presentation (February 7th)
10-Feb	16-Feb	Clement	MT Report (February 10th)
17-Feb	23-Feb	Reading Week	No Class or Meetings
24-Feb	01-Mar	Clement	-
02-Mar	08-Mar	Jen	-
09-Mar	15-Mar	Jen	-
16-Mar	22-Mar	Aleisha	No Meeting (Daan Away)
23-Mar	29-Mar	Aleisha	-
30-Mar	05-Apr	Aleisha	Final Presentation (April 3rd)
06-Apr	12-Apr	N/A	Final Report (April 6th) & Design and Innovation Day (April 7th)

4. Meetings:
- Just us: Monday 12-2 or Tuesday 10-11
- Weekly Meeting with Daan:11-11:30 on Friday's

5. Presenters:
MT- Isabela and Sofia
Final- Jen, Clement, Cat & Aleisha

Action Items:

	Item	Assigned To
1.	Proposal Report	All
2.	Research how to extract geometry from STL, Slic3r, G-code	All

Next Meeting Time: January 24th at 11 am