

Formal Meeting	Week 6
Location	Frank Forward Mining Conference Room
Date and Time of Meeting	September 30th, 2019, 3:00 – 4:00 PM
Minutes Prepared by	Martin Battilana
Leader	Devang Lamba
Secretary	Martin Battilana
<b>1.0 Attendees</b>	
<p>Dr. Chad W. Sinclair  Martin Battilana  Jacob Koo  Hin Yao Chow  Oliver Tian  Devang Lamba  Kevin Zhu</p>	
<b>2.0 Meeting Agenda</b>	
<ol style="list-style-type: none"> <li>1) Provide a status update regarding the completion of action items and questions posed in last weeks formal meeting</li> <li>2) Present our Midterm Presentation</li> <li>3) Discuss potential questions based on our Midterm Presentation</li> <li>4) Discuss improvements for our Midterm Report from our Midterm Report Rough Draft</li> <li>5) Discuss Machine Learning and how it can be applied to our image processing</li> <li>6) Discuss only using an image sensor taking pictures in the x-y plane to detect defects in x, y, and z directions</li> <li>7) Discuss edge detection methods</li> <li>8) Discuss environmental and economic aspects of our current design</li> <li>9) Discuss our “worst case scenario” and how we could detect it</li> <li>10) Discuss goals for next week</li> </ol>	
<b>3.0 Notes from Meeting</b>	
<ol style="list-style-type: none"> <li>1) Machine Learning may not be viable based on scope of project and time</li> <li>2) Lots of notes from Midterm Presentation:</li> <li>3) Do not read off the screen or a script</li> <li>4) Keep language simple and easy to understand</li> <li>5) We will be presenting to people who have no idea what a 3D printer is</li> <li>6) Chad was unable to follow certain slides</li> <li>7) Definition of FDM is good</li> <li>8) Move video to first slide</li> <li>9) Explain that the video is a time laps video and where it came from</li> <li>10) Audience is not an expert, however they are still a technical audience</li> <li>11) 3D printer can be seen as a “Glue Gun”</li> <li>12) Feed material is ABS, PLA, etc. which are thermoplastics</li> <li>13) Need to have low enough viscosity that the print material will actually flow (complex polymer behaviour)</li> <li>14) Improve Critical Defect slide, provide a visual guide, not all defects are critical</li> <li>15) Rather than defining defects ourselves, show it through a study</li> <li>16) If your nozzle misprints by 1mm and you continue printing, you can end up with a “Spaghetti Monster” regardless of size</li> </ol>	

- 17) We only need to know when a defect happens, find the simplest way possible to detect any defect
- 18) We want to be able to apply our solution to different geometries
- 19) Audience needs to be led to the same conclusion that we only need to detect defects in the x-y plane
- 20) Automatic defect detection and correction is common in higher end FDM printer
- 21) Objective and constraints need to be defined before a solution is defined
- 22) CCD and CMOS camera slide is not relevant to the presentation and the time should be allocated explaining other topics such as explaining vision, laser line and thermal sensors

#### **4.0 Action Items for Next Week**

- 1) Need to identify strengths and weaknesses of each sensor/detection method
- 2) Do a case study on who our customer is and ask them what they want and ask what a critical defect would be for them
- 3) Properly define hard and soft constraints
- 4) Need to redefine need statement to include cost and environmental factors
- 5) Find the simplest way possible to detect any defect
- 6) Show that there is a need for defect detection in lower end FDM printers
- 7) No new information should be in summary slides
- 8) Need to look at deliverables for Final Report
- 9) Need to have Socio-economical analysis in the presentation mention in the Midterm Presentation
- 10) Make sure the ground work is done, do not presume anything, and be able to convince people that our approach is the correct one

#### **5.0 Questions**

- 1) In the video for the Midterm Presentation, why didn't the person press stop when the print went out of control? What is a critical element that would help us understand the video?
- 2) How do we check to see if the market wants what we've designed?
- 3) Have we surveyed what the customer wants?
- 4) Where does the 5% shape error come from and why?
- 5) What is an unwanted model defined as?
- 6) What is the maximum size of a defect that would lead to a critical defect?
- 7) What is the smallest dimension of a part which can cause a critical defect?
- 8) Does this 5% shape error translate to all builds and what could you do to see if it applies?
- 9) Do we want to differentiate between different defects?
- 10) Is the goal to detect defects with a minimum number of components?
- 11) Are there solutions that already exist out there?
- 12) Do we need the slide comparing CCD and CMOS cameras in our Midterm Presentation?
- 13) Do we need to justify how a vision sensor operates in our Midterm Presentation?
- 14) What are the next steps that we are going to take based on what we've done so far?

Several Small Private Meetings/Video Calls	Week 6
Location	Frank Forward Computer Lab/Online
Date and Time of Meeting	Throughout the week
Minutes Prepared by	Martin Battilana
Leader	Martin Battilana/Hin Yao Chow/Devang Lamba
Secretary	Martin Battilana
<b>1.0 Attendees</b>	
<p>Martin Battilana  Jacob Koo  Hin Yao Chow  Oliver Tian  Devang Lamba  Kevin Zhu</p>	
<b>2.0 Meeting Agenda</b>	
<ol style="list-style-type: none"> <li>1) Discuss each member's research from the previous week</li> <li>2) Assign tasks for the Midterm Report and Midterm Presentation</li> <li>3) Discuss content of Midterm Report and Midterm Presentations</li> <li>4) Practice Midterm Presentation for Formal Meeting</li> <li>5) Redo several slides from Midterm Presentation based on feedback from Formal Meeting</li> <li>6) Practice new version of Midterm Presentation</li> <li>7) Re-assign new tasks for Midterm Report</li> <li>8) Discuss benefits and drawbacks of vision sensors and laser line sensors</li> <li>9) Discuss Shape Error Detection and how to implement it in our solution</li> <li>10) Discuss project objectives/constraints/free variables and improve upon their definition</li> <li>11) Clarity each section of the Midterm Report and what content should go where</li> </ol>	
<b>3.0 Notes from Meeting</b>	
<ol style="list-style-type: none"> <li>1) Practicing and preparing the Midterm Presentation took more time than expected, resulting in us falling behind on the Midterm Report</li> <li>2) Vision based sensors outperformed laser line sensors and thermal sensors in terms of low cost and high resolution</li> <li>3) Methods of quantifying a defect need to be explained in the report</li> <li>4) Expect lots of time needed to prepare for Final Presentation and to start preparing well in advance</li> </ol>	
<b>4.0 Action Items for Next Week</b>	
<ol style="list-style-type: none"> <li>1) Methods of quantifying a defect need to be explained in the Midterm Report</li> <li>2) Show the decision-making process in the Midterm Report</li> <li>3) Refine our objectives/constraints/free variables for the Midterm Report</li> <li>4) Make sure all numbers, equations and decisions are properly justified</li> </ol>	