

EE/CprE/SE 491 - sdmay19-31:**Multi-Purpose Automated Robotic Mixer (mpARM)**

Week 8 Report

October 30 – November 3

Client: Alexander Stoytchev/Brett Altena

Faculty Advisor: Alexander Stoytchev

Team MembersDrew Caneff — *3D Printer Specialist/CAD Designer/Accountant*Amos Hunter — *Electromechanical Specialist/Meeting Scribe*Brett Altena — *Meeting Facilitator/ Computer Vision Developer*Kristian Wadolowski — *Report manager/Front-end programmer/Computer vision Developer*Jase Grant — *Embedded Systems/ Assignment Manager*

Summary of Progress this Report

- **Started 3D printing** – 3D printing has been distributed to several sources, with several of the larger parts being started earlier as they take longer to print.
- **Continued to order parts** – Nearly all parts have been ordered for the project at this point in time.
- **Professional responsibilities reflection meeting** – The team met and discussed the assignment in depth.
- **Budget and design choices meeting** – The design and parts were again brought up and discussed. Details such as the material to use for the enclosure, the spatula, and the bowl were discussed.
- **Confirmed power flow** – The energy requirement for each part has been calculated, and the conversions from the power source has been designed.
- **Image processing tutorials** - In Reference 1, Christos Kyrkou discusses a project he had done using "Xilinx Spartan6-based Industrial Video Processing board equipped with an on-board video camera which makes it ideal for real-time video processing." This project provided beneficial insights into how computer vision can be implemented on a FPGA board. Here he goes into detail on how the architecture of how his systems works from the image processing input going into a scanline buffer then being processed in Local Binary Pattern Processor and an Edge Detection Processor. The results are compared against a popularly used recognition algorithm called a support vector machine. This project is relevant to our project due to same architecture being used for the computer vision sub-system. In Reference 2, Computer Vision on FPGAs is discussed as a standard in the IEEE library. Here similar research is done on the Xilinx Virtex II FPGA, with focus on the methodology on HPDF representation which helps with the verification of image processing correctness. Overall this research will help the embedded system engineer with the HDL implementation and architecture design.

Reference 1: <https://medium.com/@ckyrkou/computer-vision-algorithms-implemented-on-fpga-14eb5525c989>

Reference 2: <https://ieeexplore.ieee.org/document/1565448>

Pending Issues

- Finalized budget of parts
 - Batter issues (Splashing, feeding, mixing, type, etc...)
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Plans for Upcoming Reporting Period

- Continue 3D printing
- Continue ordering parts
- Create early version of computer vision code

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Drew Caneff	<ul style="list-style-type: none"> ➤ Participated in group meetings ➤ Started finding arm components 	7	78
Amos Hunter	<ul style="list-style-type: none"> ➤ Participated in group meetings ➤ Further refined mounting and enclosure designs ➤ Confirmed power flow 	12	62.5
Brett Altena	<ul style="list-style-type: none"> ➤ Participated in group meetings ➤ Facilitated meetings ➤ Started image processing tutorials 	7	83
Kristian Wadolowski	<ul style="list-style-type: none"> ➤ Participated in group meetings ➤ Compiled and edited weekly reports ➤ Writing and compiling technical reports 	14	44
Jase Grant	<ul style="list-style-type: none"> ➤ Participated in group meetings ➤ FPGA research 	3	28

Gitlab Activity Summary

 Action: joined, Tue Sep 04 2018

Author: dvcaneff
