

EE/CprE/SE 491 WEEKLY REPORT 9

04/03/2024 – 04/09/2024

Group number: 6

Project title: Video Pipeline for Machine Vision

Client: JR Spidell

Advisor: Dr. Philip Jones

Team Members/Role: Deniz Tazegul (Video Stream to FPGA), Liam Janda (VDMA to DDRM), Taylor Johnson (DDRM to Display), Ritwesh Kumar (Video Stream to FPGA)

o Weekly Summary

This week, the team started investigating code compatible with the PYNQ and non-PYNQ SD cards on the Ultra96-v2 board. From advisor and client feedback, the team coordinated a meeting with Senior Design Team 5 to discuss shared project workspaces.

o Past week accomplishments

- Deniz: This week Deniz finished the block diagram of the inputs and outputs to the MIPI controller. Deniz also updated the known inputs and outputs spreadsheet with the MIPI controller data. It was determined that instead of there being an issue with the Non-PYNQ sd card causing the system to crash, there is likely a problem with Deniz's set up as other team members were able to access the prompt on the Non-PYNQ card.
- Liam: This week, Liam met 1 on 1 with Ritwesh to help him further understand how to access the terminal and Jupyter notebook. Liam also began to create a more in-depth VDMA slide deck and began finding issues with the current VDMA code with Taylor. The current code does not give ownership to the user code, which is required when reading the frame within the VDMA. Liam created a backup image of the PYNQ OS card, so we can always revert if something goes wrong.
- Taylor: Taylor worked with Liam to try to determine how to read a frame using the VDMA. Taylor also created a code to try and display an image on the monitor. Currently, the code uses cv2 to display an image in Jupyter Notebook but does not display it to the monitor. Believes that the DisplayPort will need to be configured first.
- Ritwesh: This week Ritwesh met with other team members to work with the Ultra96. In addition, he started writing a test file for testing communication with the Ultra96 was established. Ritwesh familiarized himself with Linux commands to use on the terminal that will help when using the non-PYNQ SD card.

- Group: The team started working more in-depth with the board to get the existing code running on the hardware. This week, per the advice of the team's advisor, the team met with senior design group 5 to discuss the overlap in projects and if any interaction between the teams would be necessary or helpful. It was decided that collaboration would not be beneficial due to the differences in project design and work environment.

o **Pending issues**

- Deniz: Some work needs to be done to get the Non-PYNQ card working for Deniz before more progress can be made.
- Liam: None.
- Taylor: None.
- Ritwesh: None.

o **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Deniz	Block Diagram, Inputs/outputs, began debugging set-up	5	55
Liam	Backup, meet with Ritwesh and Taylor, create VDMA slide deck	11.5	67.5
Taylor	Met with Liam to work on the TPG/VDMA code and worked on loading an image to the monitor from the PYNQ SD card.	5	51
Ritwesh	Starting writing PYNQ-compatible code to write and read to I2C ports on the Ultra96 and learning how to configure the Ultra96 to view the terminal and Jupyter Notebook interface	6.5	65.5

o **Plans for the upcoming week**

- Deniz: Fix set up to allow Non-PYNQ code to run, begin translating code to PYNQ
- Liam: Continue to fix the current VDMA code and finish the VDMA slide deck to share with the group. Back up the non-PYNQ card.
- Taylor: Will continue working on displaying an image to a monitor using the ultra96 board.
- Ritwesh: Run code for the non-PYNQ SD card to communicate with the Ultra96 board using I2C.

Action Item	Task Owner	Expected Date
Learn how to communicate with the camera by running the prior team's code (Be able to send & configure the camera using I2C using the code from before)	Ritwesh	4/14/24
Run the existing code on the hardware and observe how the registers are updating for MIPI controllers	Deniz	4/14/24
Load an image to an SD card and get the image to display on a monitor using the FPGA	Taylor	4/14/2024
Map each section's inputs and outputs to determine appropriate data widths across sections/roles.	All	4/1/24

o **Summary of weekly advisor meeting**

The team met with the new faculty advisor and received questions to bring up to the client during the team's weekly client meeting. The advisor gave the team feedback on ways of approaching the project.