

EE/CprE/SE 491 WEEKLY REPORT 10

04/10/2024 – 04/16/2024

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

The team met with the advisor to discuss the project status and start working on a presentation about the software and hardware tools that will be utilized in more detail. Progress was made with the Ultra-96 to run the previous Senior Design team's code on the non-PYNQ SD card.

o Past week accomplishments

- Deniz: Worked on the Non-PYNQ card to get MIPI code running. The monitor and initialization code seems to be working fine. Worked with Ritwesh to teach basic terminal commands and initialize working on IMX219 sensor, was unable to get i2cdetect command working, but others were able to figure that out later. Started looking at display port initialization code from Taylor. Started looking at PYNQ support for MIPI_rx to transfer code.
- Liam: Continued to work on the VDMA presentation and worked with Taylor and Ritwesh to get the shell program running with no errors.
- Taylor: Met with the client for a one-on-one to understand the expectations for loading an image from the SD card using the PYNQ terminal. Taylor was able to read the EDID from the monitor and set the display, which loaded the PYNQ FPGA "homepage" to the screen. Taylor also met with Liam and Ritwesh to work on running the non-PYNQ code. Taylor also met with Ritwesh to work on finishing reading the registers for the IMX219 image sensor.
- Ritwesh: Met with Liam and Taylor to establish I2C communication with the OV5647 image sensor utilized by the previous team. Met with Deniz to investigate Linux commands in more detail. Met with Taylor to establish I2C communication with the IMX219 image sensor the team will utilize. The I2C communication was done on the non-PYNQ SD card.
- Group: I2C communication has been established with OV5647 and IMX219 image sensors and ran the previous Senior Design team's code on the non-PYNQ SD card.

o **Pending issues**

- Deniz: None
- 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	Non-Pynq work on MIPI code, IMX code, Started helping with display port, started transferring MIPI code	7	62
Liam	VDMA presentation, Non-PYNQ work	5	72.5
Taylor	Read EDID and set the display, wrote a shell script to load an image on the SD card, configured MIPI for the non-PYNQ video pipeline, and helped with reading the register for the IMX219 sensor.	7	58
Ritwesh	Established I2C communication using the non-PYNQ SD card for OV5647 and IMX219 image sensors and began investigating the hardware and software tools the team will utilize in more detail.	7.5	73

o **Plans for the upcoming week**

- Deniz: Work on transferring MIPI code, help out with display port as needed
- Liam: Continue to work on VDMA presentation and PYNQ code, as well as help out Ritwesh with communicating to the camera.
- Taylor: Work with the team to finish loading an image from the display.

- Ritwesh: Work with Deniz to familiarize with the Linux environment in more detail. Help Taylor display an image to the display on the PYNQ SD card. Help Liam work on the VDMA code for the PYNQ SD card in Jupyter Notebook.

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 advisor to discuss the project status and start working on a presentation discussing the software and hardware tools that will be utilized in more detail.