EE/CprE/SE 4920 BI-WEEKLY REPORT 2

09/06/2024 – 09/19/2024
Group number: 6
Project title: Video Pipeline for Machine Vision
Client: JR Spidell
Advisor: Dr. Philip Jones

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

o **Bi-Weekly Summary**

The team successfully sent a TPG image to a DisplayPort monitor and fixed the color output and noticeable shift issues seen earlier. The team has begun working on updating a slideshow for the full video pipeline to write code for the IMX219, MIPI controller, and VDMA, to output video data from the IMX219 image sensor to a DisplayPort monitor.

o **Past two week accomplishments**

- **Deniz:** Deniz helped work with Liam to set up the Python code that configures and monitors the MIPI block. He also worked with Taylor briefly to help set up the VDMA code in the notebook for the whole pipeline. Currently, he is working with the rest of the team to monitor and debug the MIPI component to get video data through the pipeline.

- **Liam:** During this time, Liam worked with Ritwesh to set up the Python code for the newest overlay, which includes the MIPI block and VDMA. He was able to write to the image sensor. Liam then worked with Deniz to correctly read and write from the CSI-2 and DPHY blocks. He backed up the image and updated the team's second board image to have the current code.

- **Taylor:** Worked with Ritwesh to update the code for sending a pattern from TPG to VDMA so that the proper color transformation occurs to output RGB data to the display. Taylor and Ritwesh also worked to update the DisplayPort code to get the TPG pattern to display on the monitor. Taylor met with Deniz to update the VDMA configuration code in Jupyter Notebook to be compatible with the MIPI block. Taylor read through the MIPI datasheet and updated the team's slide deck with register information and configuration settings.

- **Ritwesh:** Helped find a color transformation to output TPG data as RGB (as desired) and fix the noticeable shift between colors from the TPG. He worked with Taylor to get a TPG image to a DisplayPort monitor. Ritwesh also created a configuration code for the IMX219 to test with the full video pipeline. He updated the team's video pipeline slides with information on protocols used by the pipeline's components and configurations for the MIPI CSI-2 and D-PHY registers.

o **Pending issues**

There are no pending issues at this time.

o **Individual contributions**

Name	Individual Contributions	Hours this Report	Cumulative Hours
Deniz	MIPI configuration and monitoring code,	12	15
Liam	Backed up the image and started Python code for MIPI/VDMA overlay to configure image sensor, DPHY, and CSI-2.	14	20
Taylor	Read through the MIPI datasheet and added register configurations to the team's slide deck. Updated the TPG to VDMA code to output the proper color format. Updated the code for the display to output a TPG image to the monitor. Updated the VDMA code to be compatible with the MIPI block.	12	19
Ritwesh	Helped fix the color output and noticeable shift from the TPG, got a TPG image to the DisplayPort monitor, and created configuration code for the IMX219 for the full pipeline. He added information on the protocols used by the pipeline components and configurations for the MIPI CSI-2 and D-PHY registers	12	22

	to the team's pipeline slideshow.		

o **Plans for the upcoming two weeks**

- **Deniz:** Work on debugging the MIPI block, read up on some known unknowns regarding MIPI configuration

- **Liam:** Continue to work on the MIPI overlay and attempt to send the images from the image sensor to the VDMA block.

- **Taylor:** Work with the team to debug the image sensor and MIPI code.

- **Ritwesh:** Work with Deniz and the team to monitor the MIPI controller status registers to understand if the IMX219 video data is received by the MIPI controller as desired.

Action Item	Task Owner	Expected Date
Have the first scheduled recurring bi-weekly meeting with the team's advisor	All	10/03/2024
Receive an image frame from the IMX219 sensor to MIPI CSI-2	All	10/03/2024

o **Summary of bi-weekly advisor meeting**

The team met with the advisor to discuss and get feedback on the 491 Project Review, as well as schedule bi-weekly advisor meetings for the semester.