

## ECE 484W

### Assignment #4

**Turn in your report via Canvas (each individual needs to do it; accumulated 10 points deduction for every 12 hours window late submission)**

**Turn in your video clip (less than one minute; each individual needs to do it) via Canvas to demonstrate each required task (Accumulated 10 points deduction for every 12 hours window late submission.). If your video clip does not demonstrate each required task, you will lose 10 points for each missing task. If you do not submit your video clip, we will not grade your report.**

**If you submit your report/video clip multiple times, I will grade the last attempt and your submission time will be the time for your last attempt**

#### **Requirement:**

You will need to display video data on the on-board monitor. In more detail:

1. In your Qt GUI, add buttons for “transfer test image” and “transfer overlay image”. If the “transfer test image” button is pressed, the test image should be sent through the virtual RS232 port or USB interface to the FPGA board, transferred into video memory, and displayed on an onboard VGA screen. Note that the VEEK-MT2S may support a different resolution; it is fine if you restrict your test images to this resolution. If the “transfer overlay image” button is pressed, transfer the overlay image via the virtual RS232, USB, or Ethernet interface to the FPGA board and store it. Need to create a program (**No “open source” code**) in C/C++ or python in VEEK-MT2S board to perform the overlay and display the resulting picture on. You need to implement a mechanism in your Qt interface to turn the overlay at the FPGA on and off.
2. Enhance the functionality of your brightness and contrast sliders by having them communicate their values through the virtual RS232/USB or Ethernet port interface to the FPGA board, then create another program in C/C++ or python in VEEK-MT2S board (**No “open source” code**) to adjust the brightness and contrast of test image based on brightness and contrast values from your Qt program. In other words, you should implement image processing algorithm on VEEK-MT2S board.

Here are some resources and tips for your reference:

- Some materials: VEEK-MT2S\_v.1.0.3\_SystemCD\Manual\
- Some example code used in OpenCV:  
VEEK-MT2S\_v.1.0.3\_SystemCD\Demonstration\SoC\_Advanced\

To be noted:

1. You need to put a copy of your code in the Appendix Section in your report. You can have a usecopy of your partial code to help you explain your experimental results and design method in other sections in your report if needed.
2. You need to put detailed comments for your code.
3. Follow the guidelines in the syllabus for writing the report. In each assignment, I put a lot of emphasis on “why” and “explain the results”.
4. In the section of Alternative Design, you need to state what the problem is, how you overcome it (e.g., alternative design/solution) with proof (e.g., experimental results to compare it to the original design) to meet the basic requirement, as well as how much improvement it makes.