Remote Diagnostic Camera

Overview
This project involved improving upon the design of a remotely controlled and flexibly mounted video monitoring system that is used for diagnostic purposes with Xerox industrial printers. The system will connect a video camera to an Android tablet over Wi-Fi and remotely control it using a custom made application. The camera will stream video to the tablet that can be saved and analyzed to determine drift of a moving paper source and then plot the results. A prototype was created last semester and there are a series of improvements that could be made.

Objectives
- Improve the video streaming capability
- Improve the image quality
- Improve the diagnostic image analysis
- Improve the reliability of the system
- Improve the form factor of the system

Approach
- Review the old prototype to understand how it worked
- Decide what areas of the prototype could be improved
- Split improvements into three categories; image analysis speedup, application stability, update camera connection and video stream
- Research and purchase a higher quality camera according to a set of qualifications
- Research and purchase a new tablet that allows utilization of a built in GPU to improve image analysis processing time
- Work on documentating and stabilizing the application Android code to make the app less buggy, cleaner, and more efficient
- Integrate all three categories into the system and perform testing and debugging
- Compare results of new system to the old prototype
- Do final analysis of entire system to ensure everything works properly before handing off new prototype to sponsor

Outcomes
- Easier connection from tablet to video camera.
- Utilization of new tablet’s GPU gives a 2x speedup on image analysis time.
- Application does not crash, has been cleaned up overall, and documentation has been added to code.
- Improved video stream quality and simpler controls for the video camera.