Presentation 2021: Peddi Sai Varshith: caMicroscope-Hardware Integration

Peddi Sai Varshith: 2021 Google Summer of Code caMicroscope-Hardware Integration

- Project Walk-Through and Full Scope: HERE
- Video Presented on 19 August 2021

Google Summer of Code Challenge

Title: Integrate an optical microscope with a camera and motorized stage – Collaboration with FDA

Mentors: Nan Li and Brandon Gallas

Overview: The FDA has created eeDAP, an evaluation environment for digital and analog pathology. eeDAP is a software and hardware platform for designing and executing digital and analog pathology studies where evaluation regions of interest (ROIs) in the digital image are registered to the real-time view on the microscope. This registration allows for the reduction or elimination of a large source of variability in comparing these modalities in the hands of the pathologist: the field of view (the tissue) being evaluated. There are many other research and commercial use cases for eeDAP. eeDAP is written in Matlab, which is commercial software that requires a license and is not designed for digital pathology image viewing and annotation. We would like to move the eeDAP features into caMicroscope. The user will be able to control a digital camera and an x-y programmable microscope stage, with caMicroscope. It may or may not be useful to consider use of custom tile sources in openseadragon.

About Peddi Sai Varshith and the 3D Printed Hardware

Peddi Sai Varshith, is a 3rd-year undergraduate student at Keshav Memorial Institute of Technology, Hyderabad, India. His skills include proficiency in python (along with NumPy, Pandas, Matplotlib), JavaScript, Git, GitHub, and web development. He is a part of a technical club (Recurse) at college, which organized Tech-fests to encourage the students to have the taste of STEM competition.

The hardware system in this video consists of a motorized x-y-z stage which we designed and fabricated in-house with our 3D printer. This is fitted with an optical objective lens of magnification 40x and an eyepiece of 10x, a bright field light source and a digital camera to take WSI images of biopsy sample slides. We have developed a GUI which controls the x-y-z motion of the motorized stage, to perform step and repeat process to get an array of images. These images are then cropped, stitched and converted into a set of image tiles in a folder. The WSI image thus formed is further processed using a filtering algorithm to deliver five sets of WSI

images with decreasing resolution and increasing field of view, thus completing the image pyramid data.