Immersive semi-virtual microscope for student-centric pathology learning

In response to COVID-19, universities were forced to move online, resulting in the use of virtual atlases for histology/histopathology tutorials. The utilisation of online histology atlases has been an appropriate compromise in response to an acute issue. Whilst content is still accessible, there is an inevitable loss of tactile learning as students can no longer interact with the physical microscope.

We propose a solution to this problem which leverages cheap and readily available technologies to offer an immersive experience which imitates the use of the light microscope. Firstly, a virtual histology atlas will be created on the OpenSeaDragon framework[1].

Secondly, we aim to develop a physical device built on the ESP32 consisting of control knobs to imitate the design of the microscope[2]. Such a device will interface with the application to control slide movement via the browser or through a websocket connection. The main goal is to create a cheap device with a low barrier to entry to mimic the physical microscope, promoting self-directed learning and enabling remote education, particularly to students in rural clinical schools and to those studying from home. Such a system could additionally serve to benefit less resourceful medical schools across the world without their own histopathology slide collections.

[1] – The first applicant (Weber) currently works with the University of Sydney School of Medical Sciences, is familiar with web development and the OpenSeaDragon architecture

<https://ouibaa.github.io/pages/educational_resources/histology_blue_12/>

<https://ouibaa.github.io/pages/hobbies/vidhistapp/>

<https://ouibaa.github.io/pages/educational_resources/dental_histopath_example_CA/>

[2] – The first applicant (Weber) has also collaborated with the University of Sydney TechLab to deliver Educational resources and tutorials in Arduino with the School of Medical Science