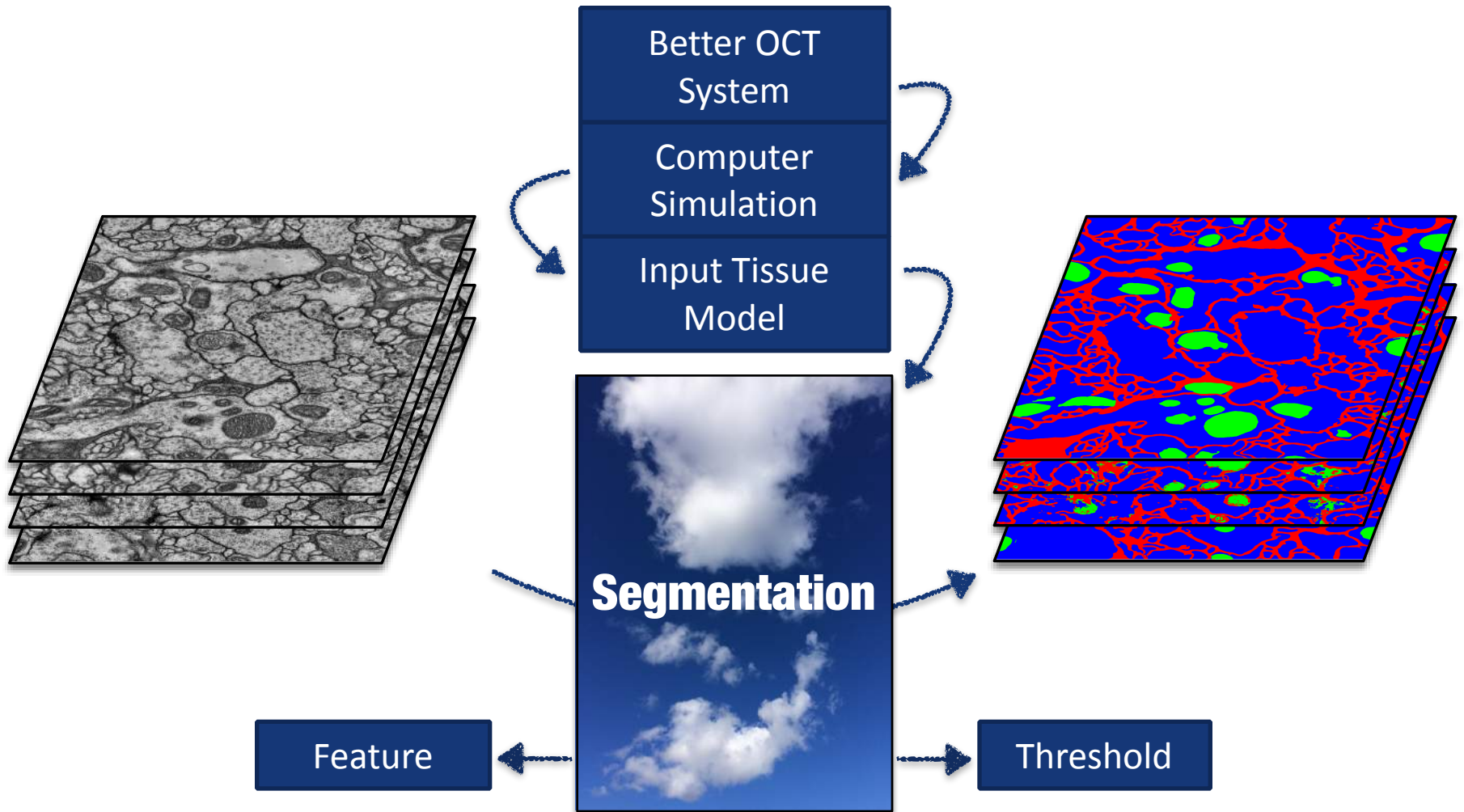


Image Segmentation for OCT



Good afternoon everyone.

What I have been working on these days is image segmentation, which is the process of partitioning a digital image into sets representing certain objects.

But why do I need to do image segmentation? As you can see, the project I have been working on is about OCT, the abbreviation of optical coherent tomography, which is a medical imaging technique quite similar to ultrasound but with much higher resolution. In order to develop a better OCT system, there are bunches of parameters to be optimized. Instead of building many OCT systems to test out these parameters, we can use a computer to simulate the formation of OCT images. It is faster and cheaper. In order to obtain an accurate result of simulation, an input model of real tissue and its optical properties is really needed. In order to obtain that model, we proposed a method in which higher resolution images from electron microscopy are segmented, assigned with corresponding optical properties and used as the input model.

But how can I do image segmentation? I believe it is easy for you to recognize most cell structures in the image once the name of the structures are pointed out. I'm not sure how human manages to do that. But computers recognize them by feature and threshold. In our real life, feature is the characteristic of the object such as height of the table, correspondingly, the feature here is the characteristic of the each point such as the average brightness of the points nearby, whereas threshold is the critical value of some certain feature to decide which class that point more probable belongs to. However, manually finding the features and the threshold is not an easy work. So we adopted a machine learning method, whose idea is basically adding in a lot of features and finding the threshold automatically. Of course, in terms of 'learning', some pre-classified points are given to the computer, for it to learn. Look, that is a clearly segmented image it gives. A nice input model will be obtained after assigning each parts with corresponding optical properties.

Thank you very much and I'm glad to meet you all here in Perth.