**Meeting Note**

28/10/2019

Project: E. coli bacteria image segmentation

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**Discussion summary**

* We demonstrated the preliminary segmentation result over a manually cropped sub-image by using K-Means as the major approach and simply let the intensity value of pixel be the input feature vector. However, the performance is not good enough if the image contains some interference. Prof. Chen suggested us to try a variety of feature to discriminate the cells from the interference.
* There is a problem emerge from dividing the image into several sub-images and then integrate the results of segmentation: the cells lie on the boundary of two or more sub-images may lead to inconsistent segmentation result in different sub-image, for instance, the half of a cell may bigger while the other half is smaller. Prof. Chen suggested that we may overlap the sub-images to make the boundary cells get a consistent segmentation result. The details of its implementation need to be considered.
* Neuron network has become a popular classification method nowadays, and we discussed the feasibility of using it in our project. This method may produce excellent segmentation results. However, we need to provide it with enough labeled training data, which is not so easy.
* It’s useful to build a pipeline to organize and automate the workflow. We may spend a lot of time testing different feature vectors and refining the segmentation result, and a pipeline will simplify this process greatly.
* The input image may contain some noise, which has an adverse effect on the segmentation result. Thus, we need to find some denoise methods to address this problem.

**Next meeting targets**

* Discuss further improvements in terms of the process of the feature extraction
* Ask for advice on the problems we encounter in the next few weeks

**Literature survey**

* Timo Ojala, Matti PietikaÈ inen and Topi MaÈenpaÈa, “Multiresolution Gray-Scale and Rotation Invariant Texture Classification with Local Binary Patterns," IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, VOL. 24, NO. 7, pp. 971-987, 2002
* Prakasa, Esa, “Texture Feature Extraction by Using Local Binary Pattern," Jurnal INKOM. 9. 45. 10.14203/j.inkom.420., 2016