University of Washington

ME 574

Introduction to Applied

Parallel Computing for Engineers

Project Proposal

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*Title: Image deconvolution for optical microscopy*

*Introduction*

The resolution and contrast of digital images captured in optical microscopy can be improved leveraging deconvolution. [1] It is also a process of using algorithms to reduce the noise and distortion in photographs. Paralleled computing can accelerate process of deconvolution especially in large datasets.

Our objective is to implement deconvolution algorithm on 2D optical microscopy images based on CUDA. Several algorithms could be utilized such as Richardson–Lucy[4] and Jansson-Van Cittert algorithm[5] . We will also explore extending this approach to three-dimensional images.

*Approach*

We plan to use Python as our main programming language with pillow, scipy, numpy, matplotlib, TensorFlow for implementations of image and deconvolution algorithms.

*References*

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3. [Asa Giannini and John Giannini. (2016) 2D and 3D Fluorescence Deconvolution Manual.](chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https:/pages.stolaf.edu/wp-content/uploads/sites/803/2016/12/Giannini_Giannini_Deconvolution_Manual_20161215.pdf)
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