Analysis of Structure Movement of Neural Growth Cone

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Abstract

Growth cone is a sensory and motile part at the tip of a neuron and its main function is path finding. In previous works many chemical cascades and simple structure of growth cone were revealed. However, to understand the whole function of growth cone, deeper research on structure, especially on finger like structure, filopodia, is desired. Here, in this thesis, we developed a new method to segment growth cone and also count and categorize filopodia. Furthermore, evaluation of previous method and this new method were also established. By using this new software, deeper and more detailed research of structure of growth cone in time-lapse images is now possible (Figure 1). The method has been tested on real data and evaluated against manually annotated ground truth with promising results.
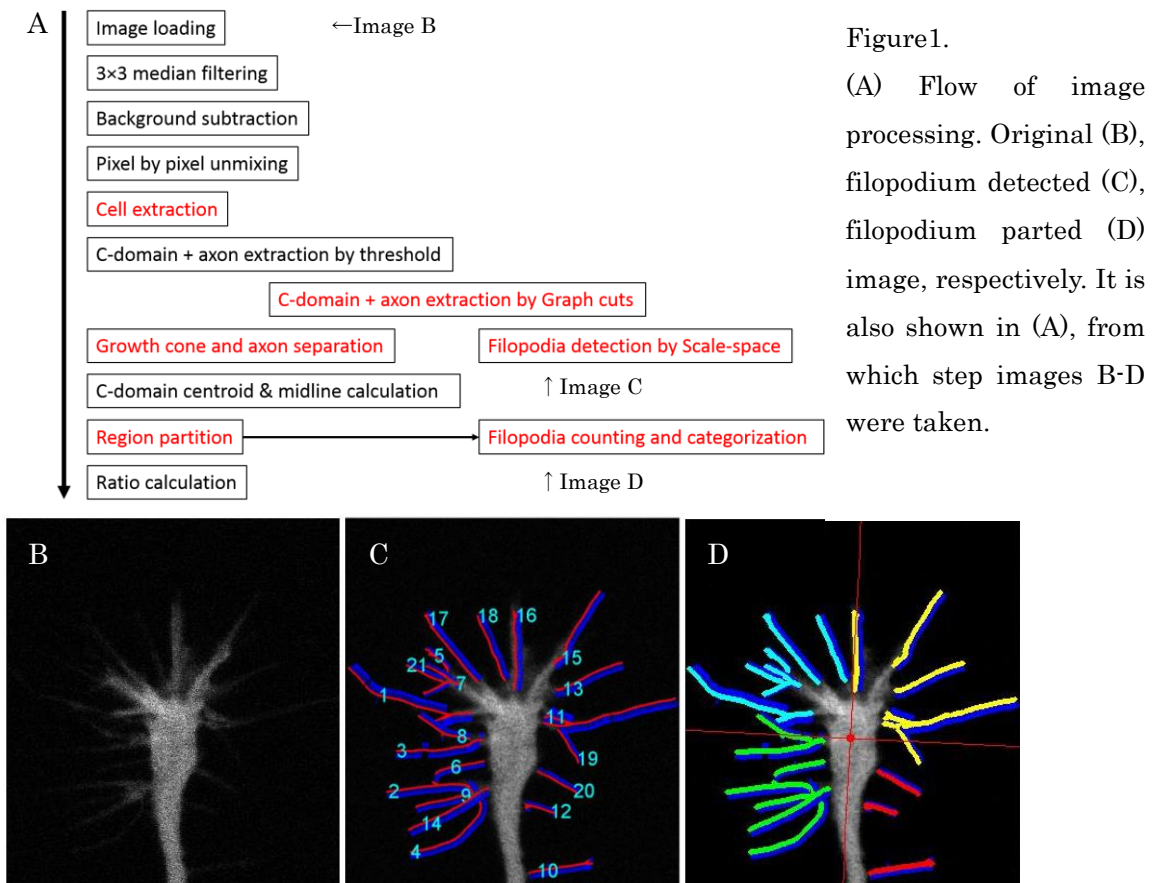
Figure1.
(A) Flow of image processing. Original (B), filopodium detected (C), filopodium parted (D) image, respectively. It is also shown in (A), from which step images B-D were taken.