WEB-BASED INTERACTIVE EDITING AND ANALYTICS FOR SUPERVISED SEGMENTATION OF BIOMEDICAL IMAGES

Rahul Kumar Singh

Dr. Kannappan Palaniappan, Thesis Supervisor

ABSTRACT

Biomedical imaging and image analysis is a vital source of information for quantitative studies in life sciences and improving healthcare medical diagnostics. Various imaging algorithms have been developed to extract essential features and information that assists in this process. One critical aspect is assessing the quality of automatic image and video analysis algorithms. The accuracy of automatic algorithms is usually evaluated against ground truth, which is determined by manual annotations provided by multiple experts at different locations, to develop robust object detection, segmentation and classification algorithms. Another aspect of manual annotations is supervised segmentation i.e. finding boundaries of regions associated with objects of interest in images and videos.

FireFly is a tool that was developed for manual and assisted expert annotation of images and videos for algorithm development and discovery. FireFly is a web-based Rich Internet Application that is built on Adobe Flex, PHP and MySQL. In the context of big data, FireFly is used for managing large image collections, video sequences, collaborative ground truth generation, tracking and labeling for high-throughput studies and algorithm development. The primary objective of this project was to enhance FireFly's capabilities to allow interactive creation and editing of annotation objects like segments, contours and automatic back-end analysis of Biomedical images by interfacing with MATLAB executables.