EasyXT, a Matlab Class For Easing Communication With Imaris Xtensions

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Introduction

Matlab has often been a tool of choice in research for its ease of use and availability in academic environments. One recent years, Bitplane’s Imaris software tool has opened up to the open-source community by creating ImarisOpen, a web platform to share Xtensions (usually in the form of Matlab Scripts). These extensions have access to Imaris’s programming interface through a Java library. Unfortunately this library is not obvious to use for someone who has never programmed. Furthermore, the fact that this library is in Java forces Matlab scripts to abide to Java’s strict typecasting, making extension creation sometimes difficult.

The Class

This Matlab class wraps most of the ImarisLib.jar functions available, notably the functions that are responsible for creating spots or surfaces, extracting statistics, selecting objects. More importantly, typecasts are never needed, and the different types of objects returned are more user-readable (Fig. 1).

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Cell Lineage Clustering

Our goal was to identify groups of control Drosophila larval wing tissues that express a multi-color lineage-tracing marker. Each cell has a particular combination of 4 stably-expressed fluorophores. The goal was to detect and cluster individual cells using k-means on the intensity values of 4 channels. This way, cells expressing similar levels could be labeled as likely to belong to the same lineage. Furthermore, each intensity cluster was further segregated using nearest neighbor clustering to identify bundles of cells likely to have been spawned by the same mother cell. EasyXT makes the channel cleanup, spot detection and subsequent analysis (Fig. 2) keep and straightforward. The cluster analysis was performed using Matlab’s k-means function. The output is a visual representation of the clusters as well as a .csv table containing the centroids of each subcluster for further analysis. This whole pipeline is presented to the user as a GUI (Fig. 3).

EasyXT Distribution and Outlook

EasyXT has been uploaded to the ImarisOpen website to ease communication with users and centralise development and requests. It is a work in progress and we hope that it will soon to simplify the creation of new Imaris extensions and be free to simplify the creation of new Imaris extensions and be useful to many users.