Classification of Cells Based on Geometrical Features and Supervised Machine Learning

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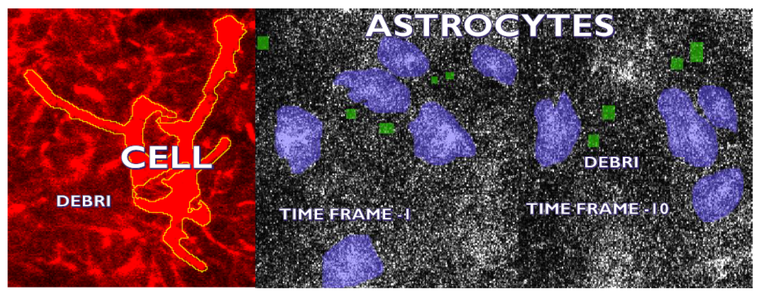
Introduction

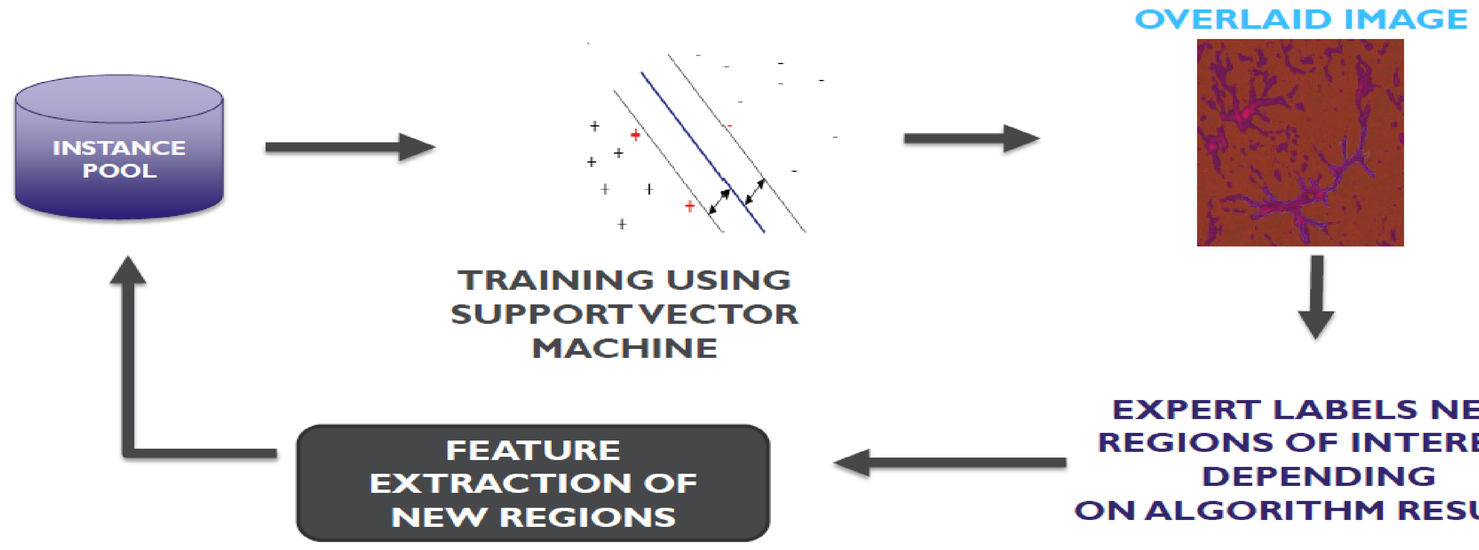
- Sparsity in Dataset.
- No full ground truth.
- Subjectivity in expert assesments.



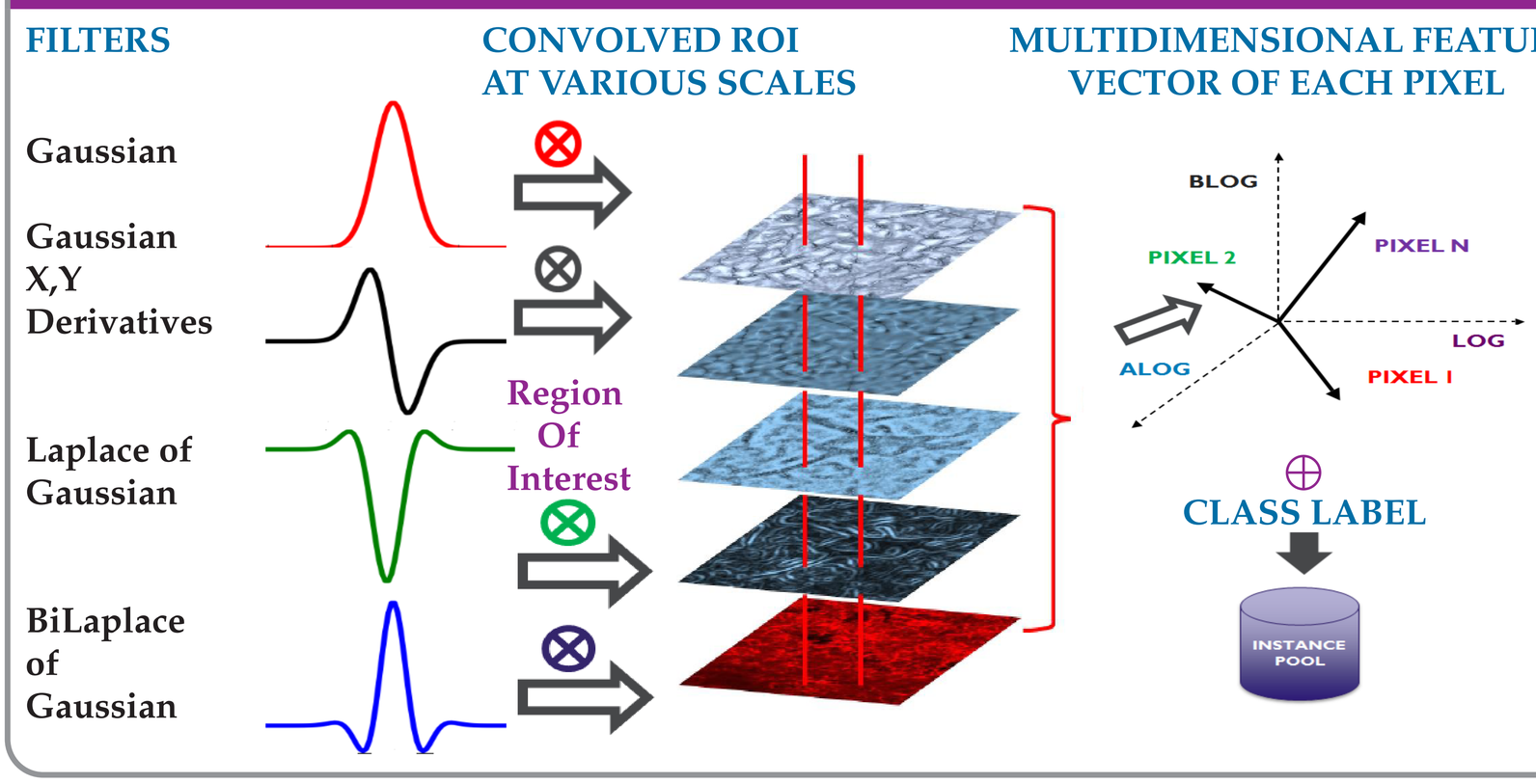
Anatomic & TimeLapse Images for Segmentation

Active Learning

Interactively collect new training examples by querying human user



Features Extraction



Conclusions & Outlook

Presented Approach is

- **Semi Supervised:** The results can be refined with iterations.
- **Cell Type Independent:** not only limited to specific type of cell.

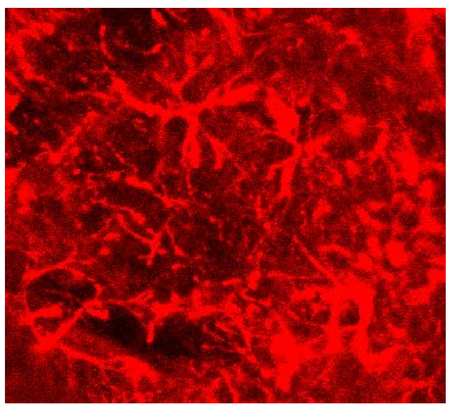
Future efforts will include implementing the Structural SVM or Relational Learning for finding the suitable patterns in astrocytic arbors.

Results

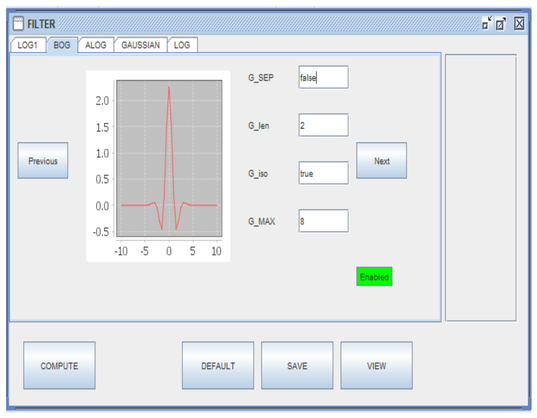
ACTIVE SEGMENTATION

- ImageJ plugin.
- Inspired by trainable Weka Segmentation.

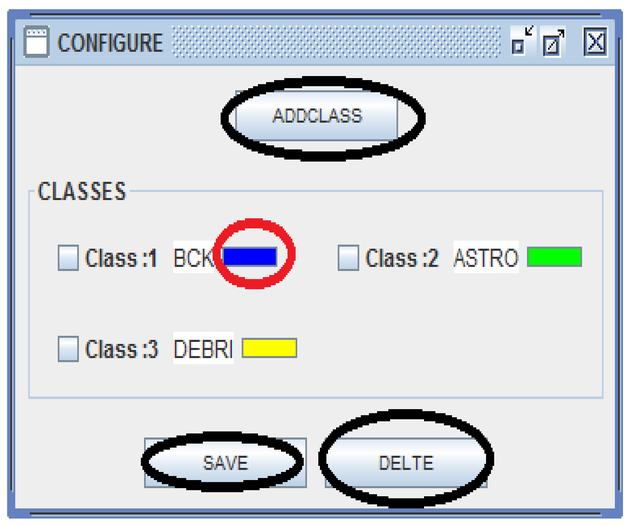
ASTROCYTES



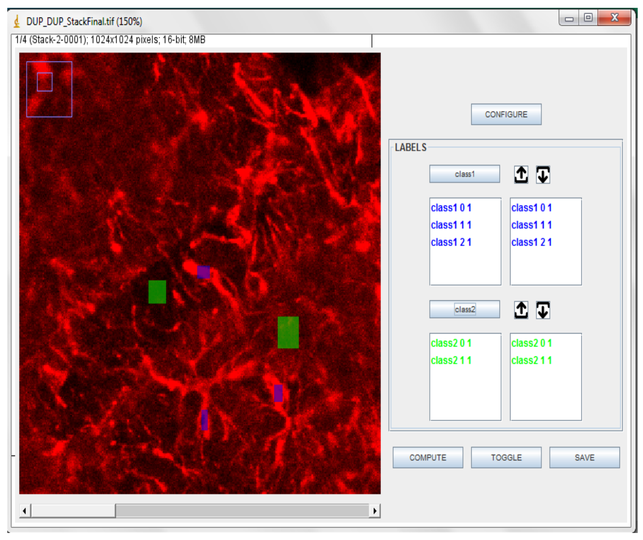
FILTER SCREEN



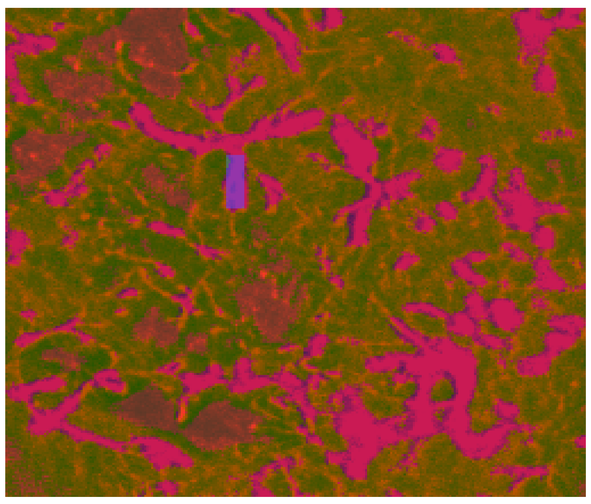
CONFIGURE SCREEN



TRAINING SCREEN



SEGMENTED ASTROCYTES



EVALUATION

Recall (R) is defined as the number of true positives (T_p) over the number of true positives plus the number of false negatives (F_n).

$$R = \frac{T_p}{T_p + F_n}$$

Google Summer of Code

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