Processing of Imaging Mass Cytometry Data from Pancreatic Cancer Samples

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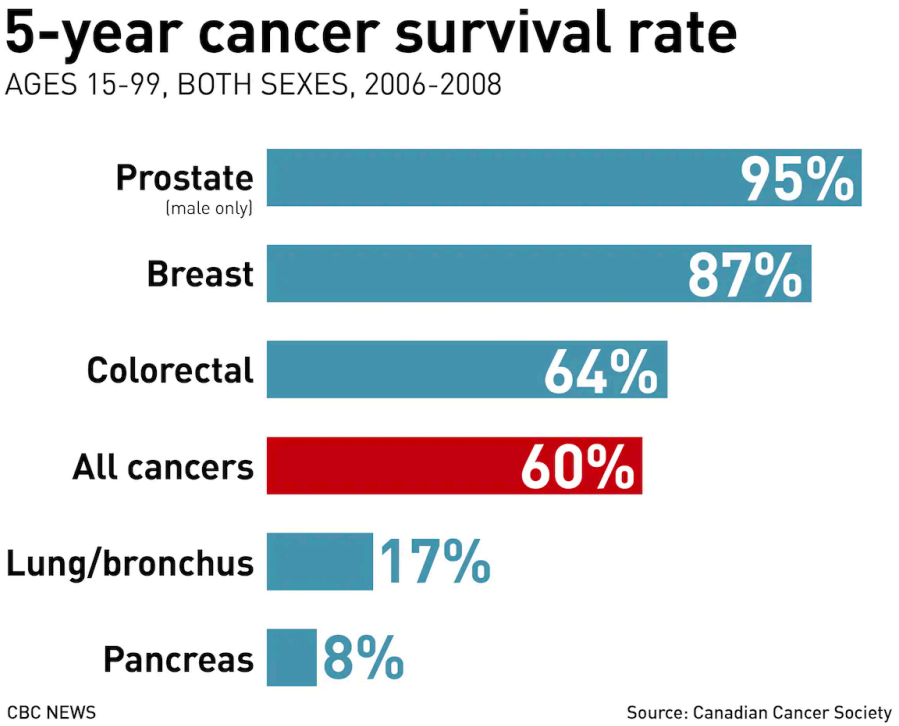
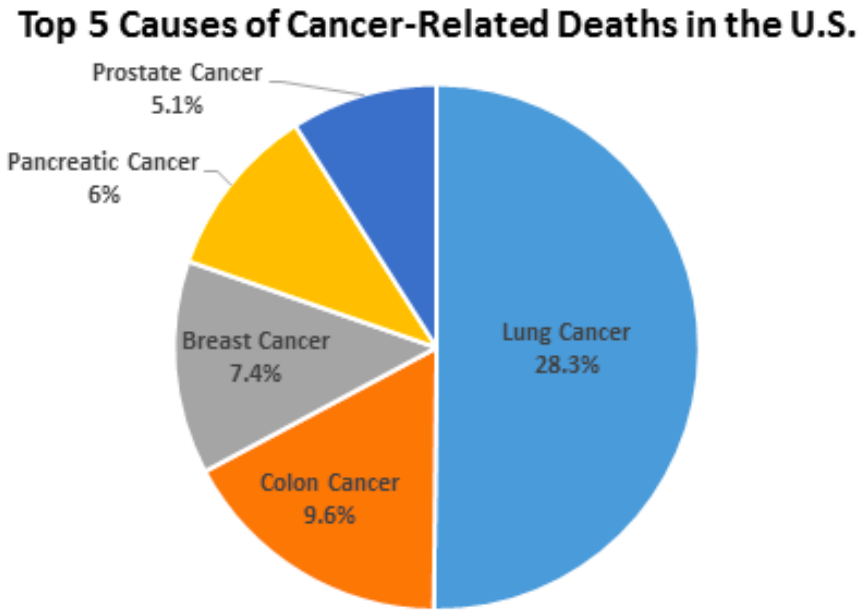
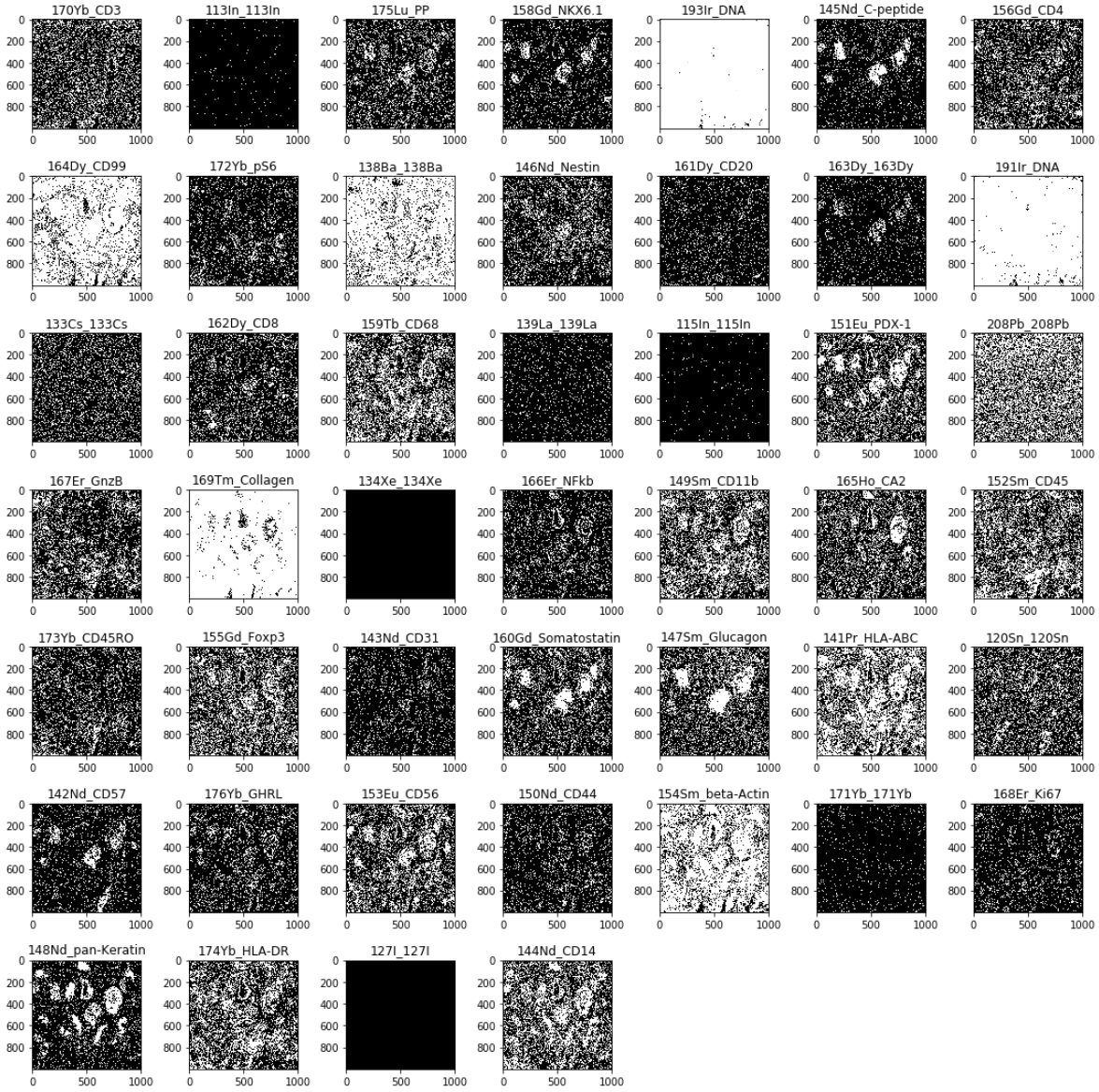
Introduction





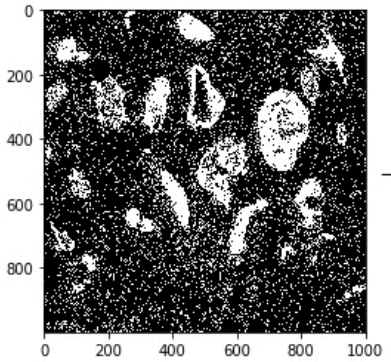
Dataset



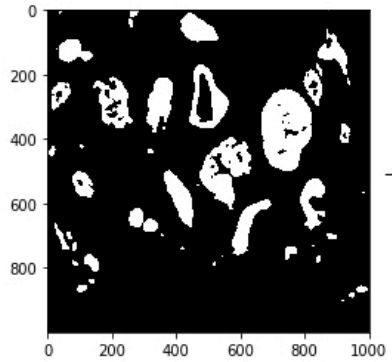
- Imaging mass cytometry (IMC) data
- 9 pancreata of pancreatic ductual adenocarcinoma (PDAC) patients
- 3 to 4 regions of interest (ROI) per sample
- 46 markers
- Total of 36 ROIs and 1,656 images

Preprocessing

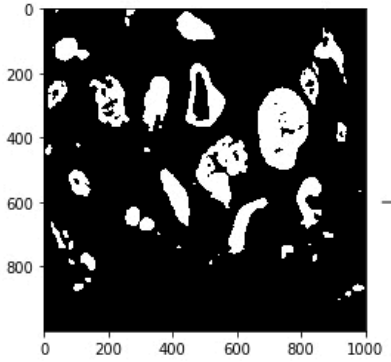
Normalization



Filtering



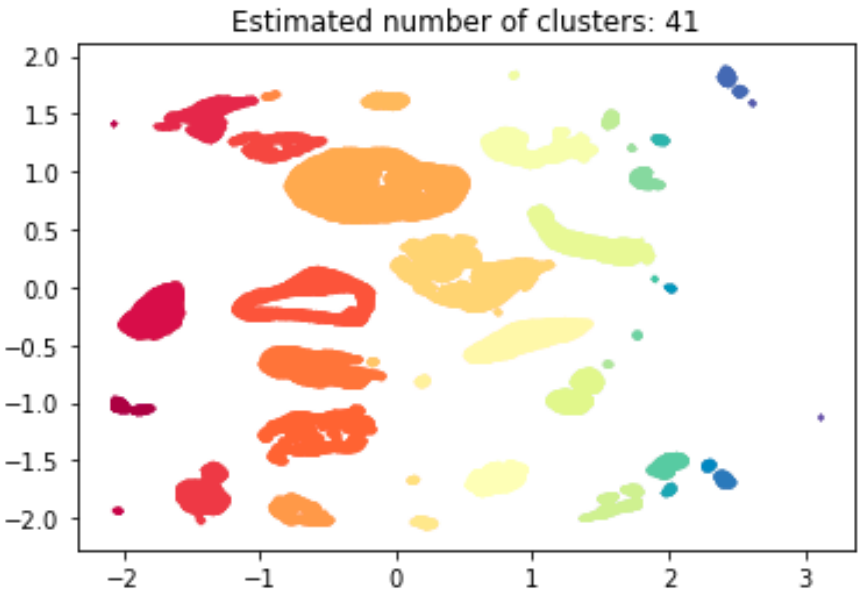
Thresholding



Vectorization

```
array([[  0, 258],
       [  0, 259],
       [  0, 260],
       ...,
       [999, 243],
       [999, 244],
       [999, 245]])
```

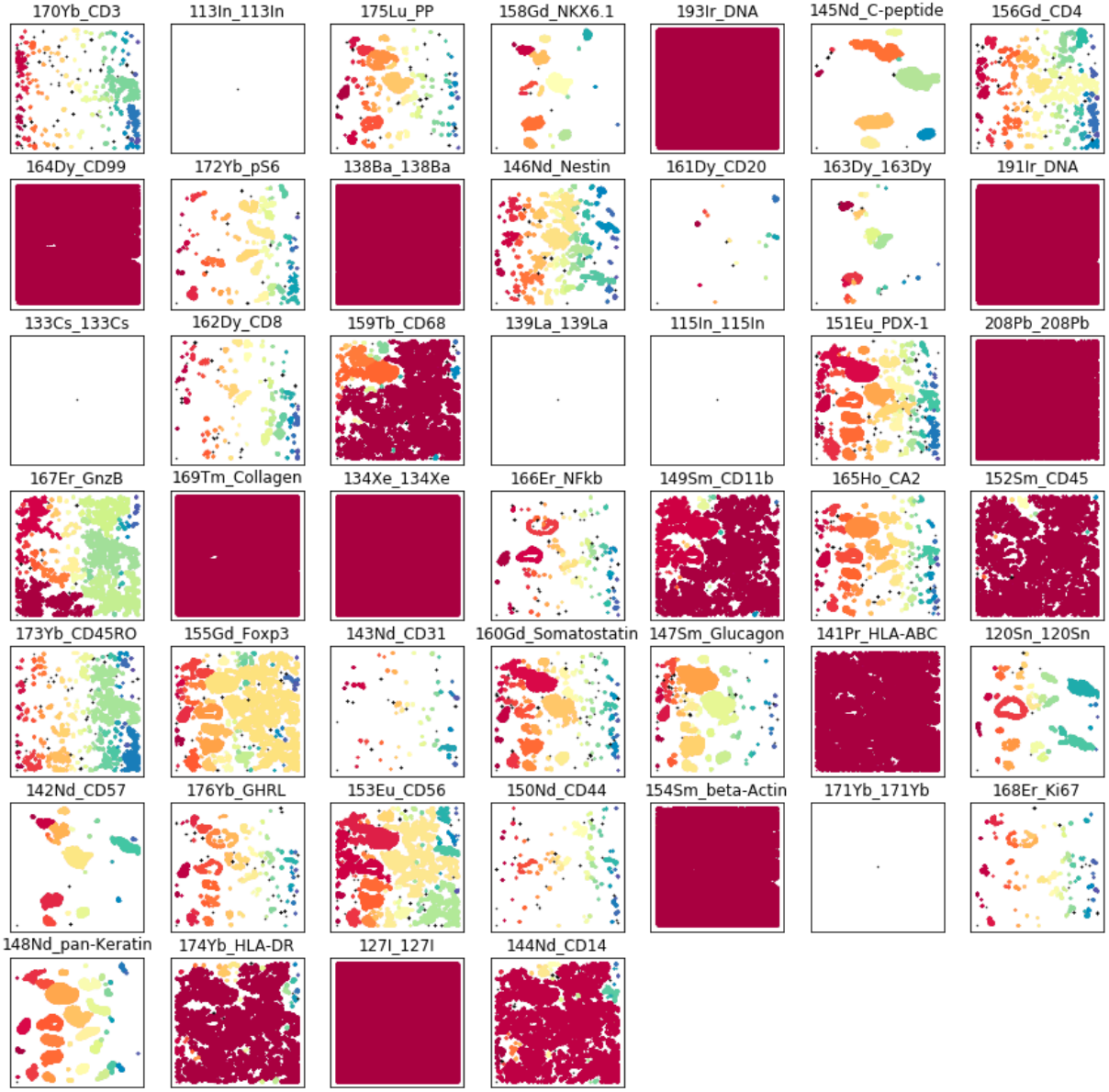
Clustering



Resulting clusters from DBSCAN on a representative pan-Keratin image

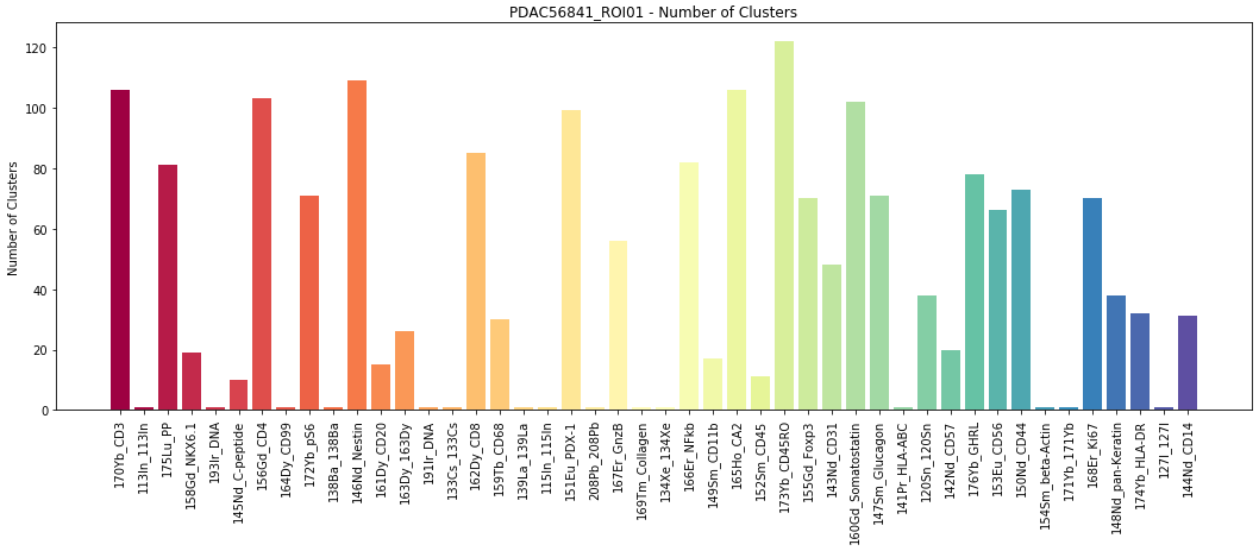
- Detect structures in the images
- DBSCAN clustering
- Epsilon = 0.05
  MinPts = 5

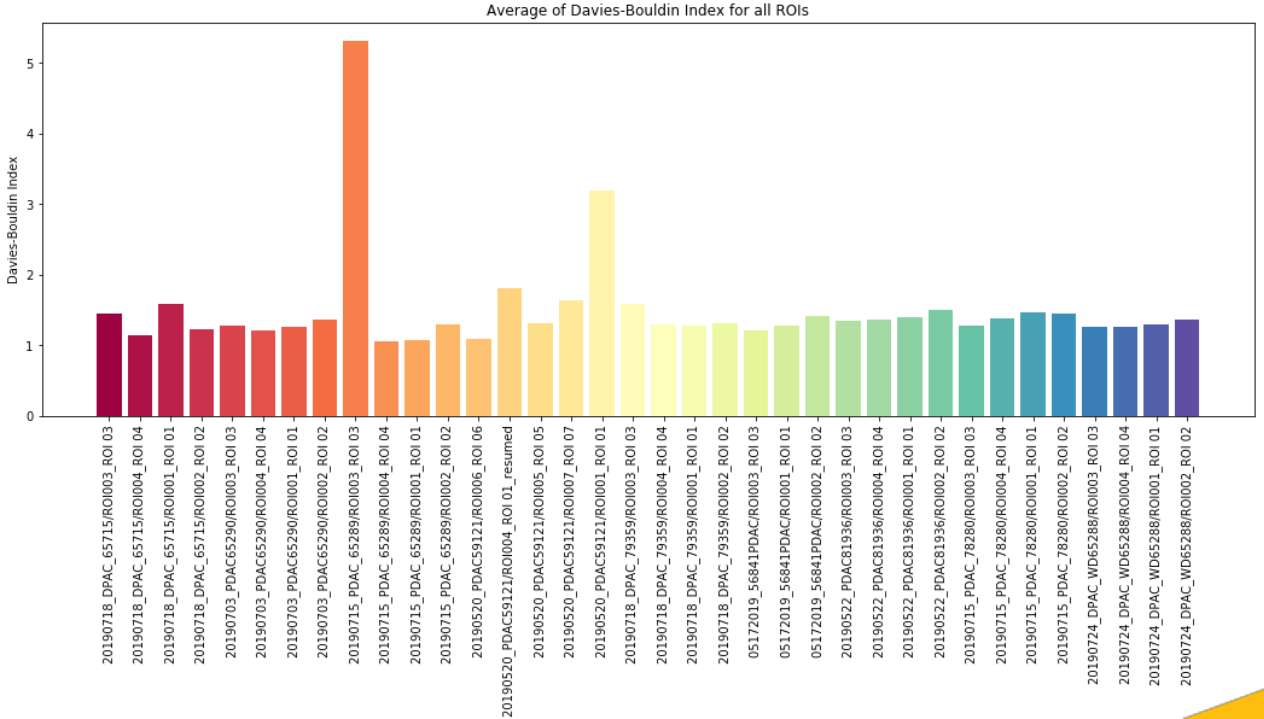
Results and Discussion – Clustering



- Resulting clusters on a representative ROI
- Pink and white images resulted in only 1 cluster

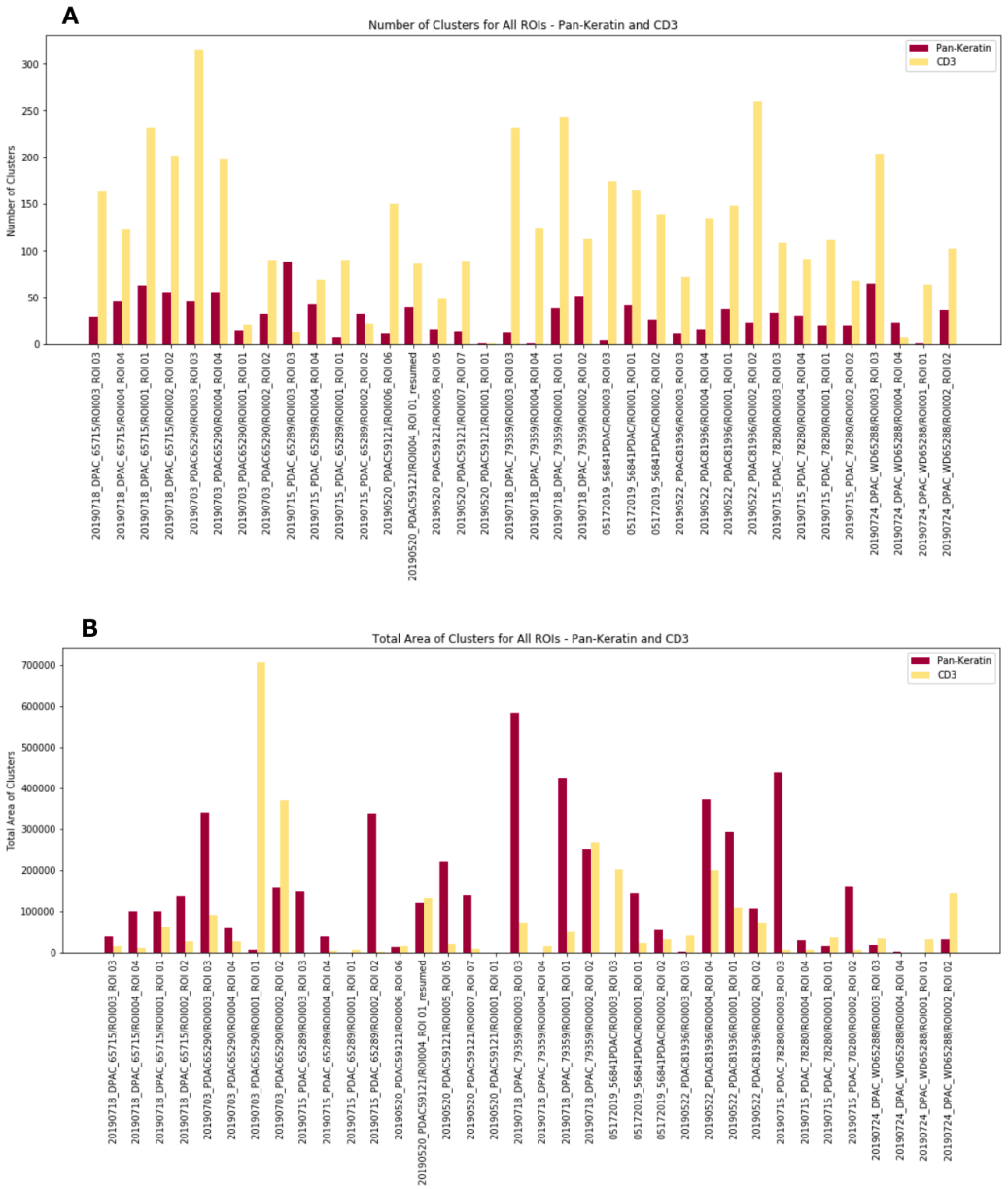
Results and Discussion - Measurements





- Number of clusters of a representative ROI
- Average of Davies-Bouldin index for all ROIs

Results and Discussion – Comparative Analysis



- Comparison between pan-Keratin and CD3 markers

Conclusions

- DBSCAN clustering on IMC data has proven capable of identifying the different structures of the markers
- There are limitations to this study and room for improvements
- Cancer cells could inhibit the infiltration of T cells and thus affect tumor progression
- Data can be additionally interrogated in a future work

Thank you!

Questions?

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