Level 4 Project

Week 5/18

Schedule for weeks 4-5 (17-18)

- *Finalise image segmentation techniques*
  - *Deliverables:*
    - *Code for the image segmentation techniques, along with an explanation of why it was chosen*

- Investigate using the masks obtained for a UNet like autoencoder structure.
  - Deliverable: code for the UNet structure, working with the cell dataset.

Additional work

- Jupyter notebooks → Python files
- Start evaluating
- Keep writing the dissertation
  - Materials & methods

U-Net

- Want to do more research this week to see if there is anything I can add to make it more useful
  - How can masks be exploited?
    - Grayscale vs. binary

Main.py tool for evaluating

```
usage: main.py [-h] --input INPUT [--weights WEIGHTS WEIGHTS] [--
live]
```

- Tested visualisation
  - Have added images
  - Outlier visualisation makes sense!
- Training would still take too long on my machine
  - Currently using local h5 weights files
  - Training on Google colab with a Jupyter notebook
- Good news: it seems that clustering is working

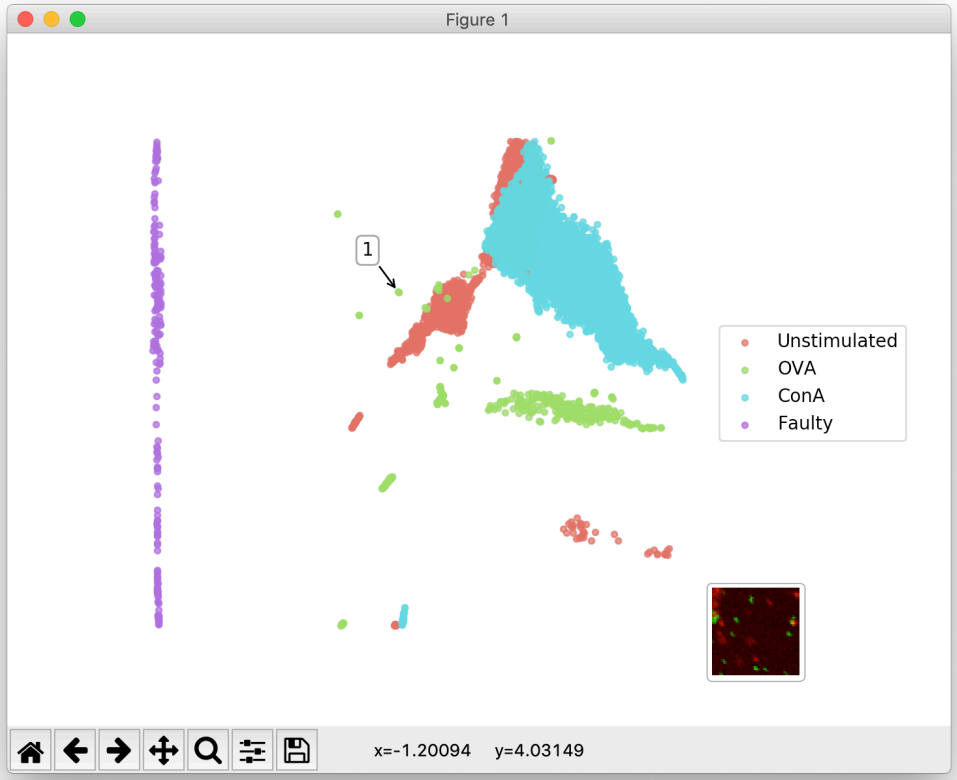
Figure 1
1
Unstimulated
OVA
ConA
Faulty
x=-1.20094 y=4.03149

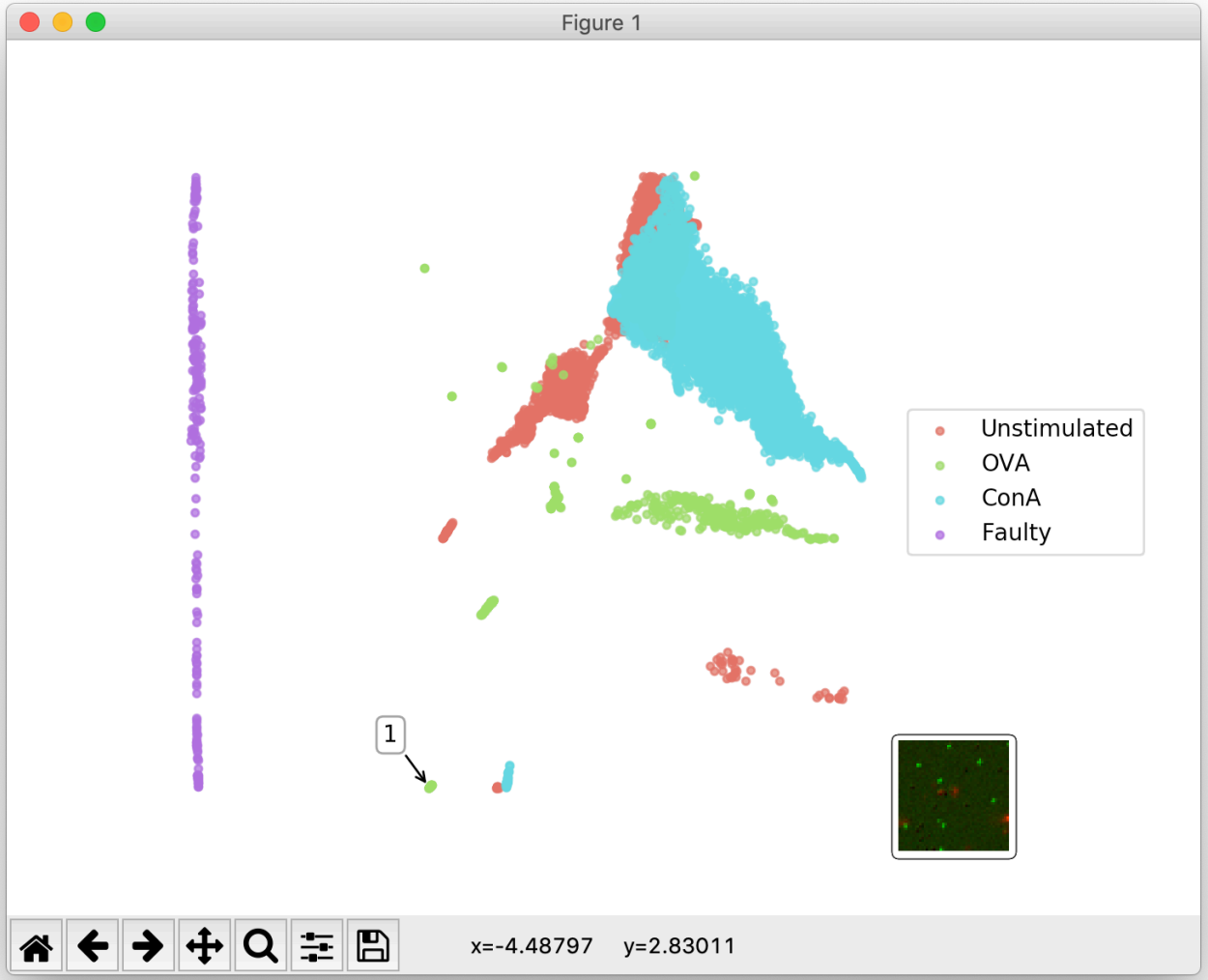
Figure 1
1
Unstimulated
OVA
ConA
Faulty
x=-4.48797 y=2.83011

Some clusters are there...

- So some recognition is happening
- Steps:

1. Compressed version from autoencoder
2. Run high-dimensional visualisation
    1. If clusters are found
    2. It is worth classifying
3. Classify:
    1. Based on category?
    2. Or, interaction vs. no interaction

Materials & methods

- Sections:
  - Microscopic images
  - Handling a high dimensional dataset
  - Preprocessing
  - Autoencoders for dimensionality reduction
  - Image segmentation for cell detection and background correction

Work to come this week

- UNet research
- Build classifier to predict: classes or interaction vs no interaction?
- Get weights from autoencoder trained on masked dataset
- Start evaluating and saving figures in a dedicated folder