

Level 4 Project

Week 9 Meeting
(Week 8 Recap)

Completed work

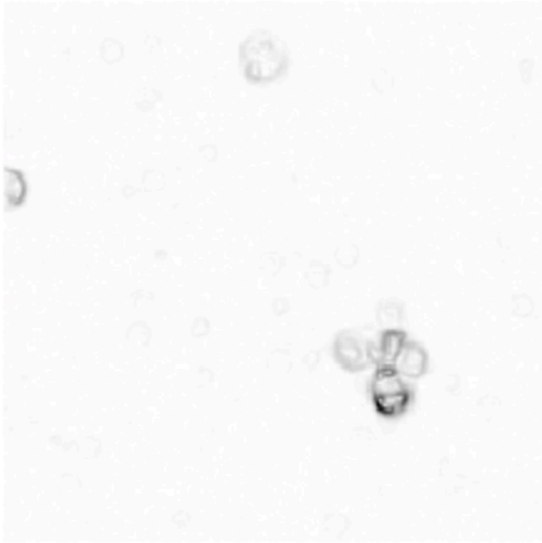
- Dissertation work: reviewed research done on using autoencoders for dimensionality reduction
- Moved code to Colab
- A lot of autoencoder tuning: attempts at...
 - Resizing dataset
 - Scaling values
 - Visualising filters
 - Adding layers
 - Changing layer parameters
 - Adding normalisation post-activation
 - Relu vs leakyrelu
 - Trying autoencoder on MNIST dataset
- Kept track of (most) progress in presentation

Completed work

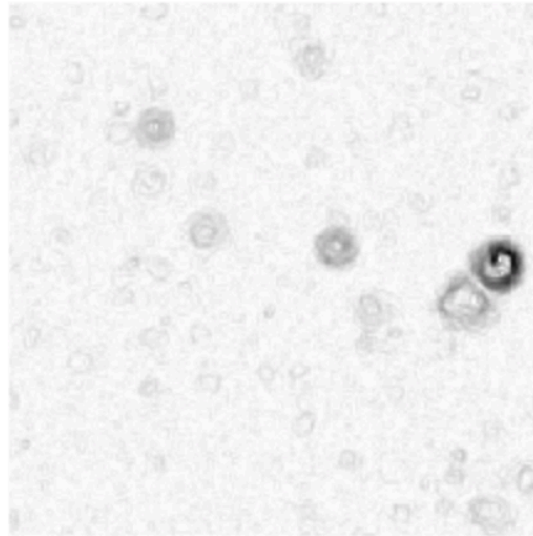
- Solution?: image preprocessing with edge detectors
 - Tested how to make the cells pop out more with Fiji ImageJ
 - Replicated that in code:
 - Used a sobel filter
 - Getting some more promising results
 - But still not ideal
 - Attempted to get better quality: stagnating loss

Unstimulated, conA, empty well (validation set)

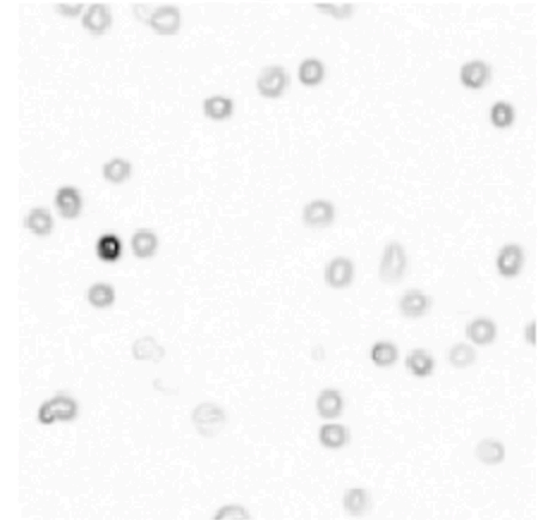
original



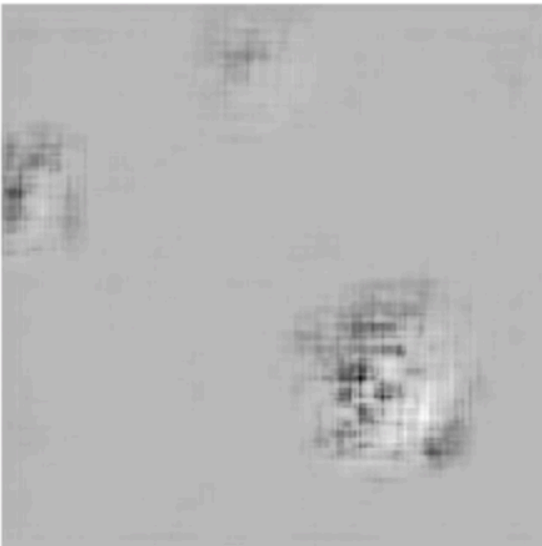
original



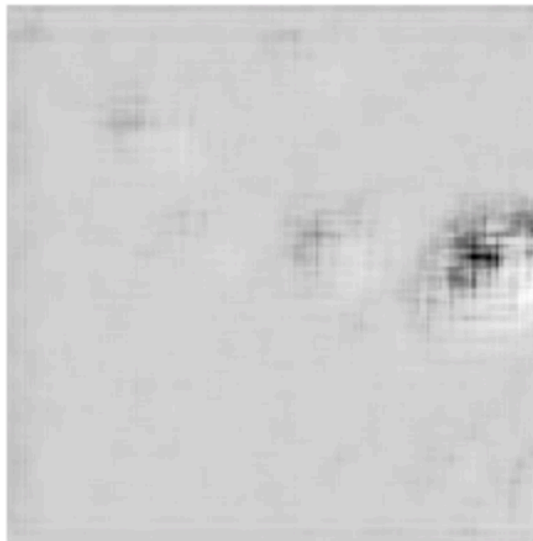
original



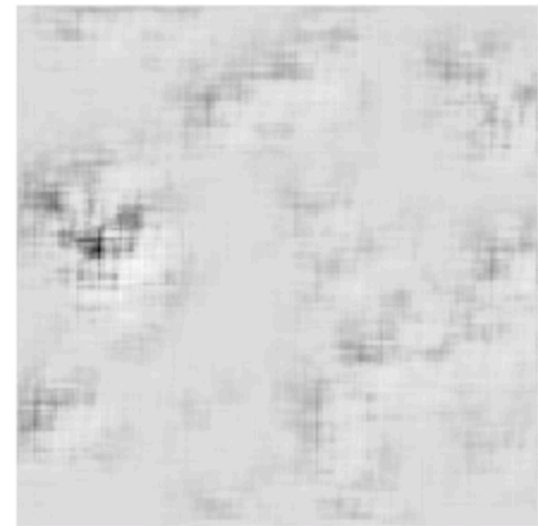
decoded



decoded



decoded



Questions

- Quick recap:
 - We want to use autoencoder to learn reduced version of the cell images
 - And use that in a clustering/visualisation algorithm like t-sne?
- Dataset:
 - Even smaller images?
 - Would it be better to calculate the overlap first, then compress?
 - Should I do data augmentation?
- Running through algorithm:
 - Train/test/validation split

Rough plan for semester, reworked

- **Week 8**

- Clean up code!
- More dimensionality reduction in the encoded images
- Apply chosen clustering algorithm
- Tune clustering algorithms to improve performance

- **Week 9**

- Tuning autoencoder to get good images even with reduced dimensionality
- If no improvement, work on image pre-processing again

- **Week 10**

- Final autoencoder tuning if needed
- Run through clustering algorithm