**Weekly report**

*Work on TFRecords and CASIA dataset*

Seemed to get TFRecords to work in a network but the accuracy was jumping all over the place as below.

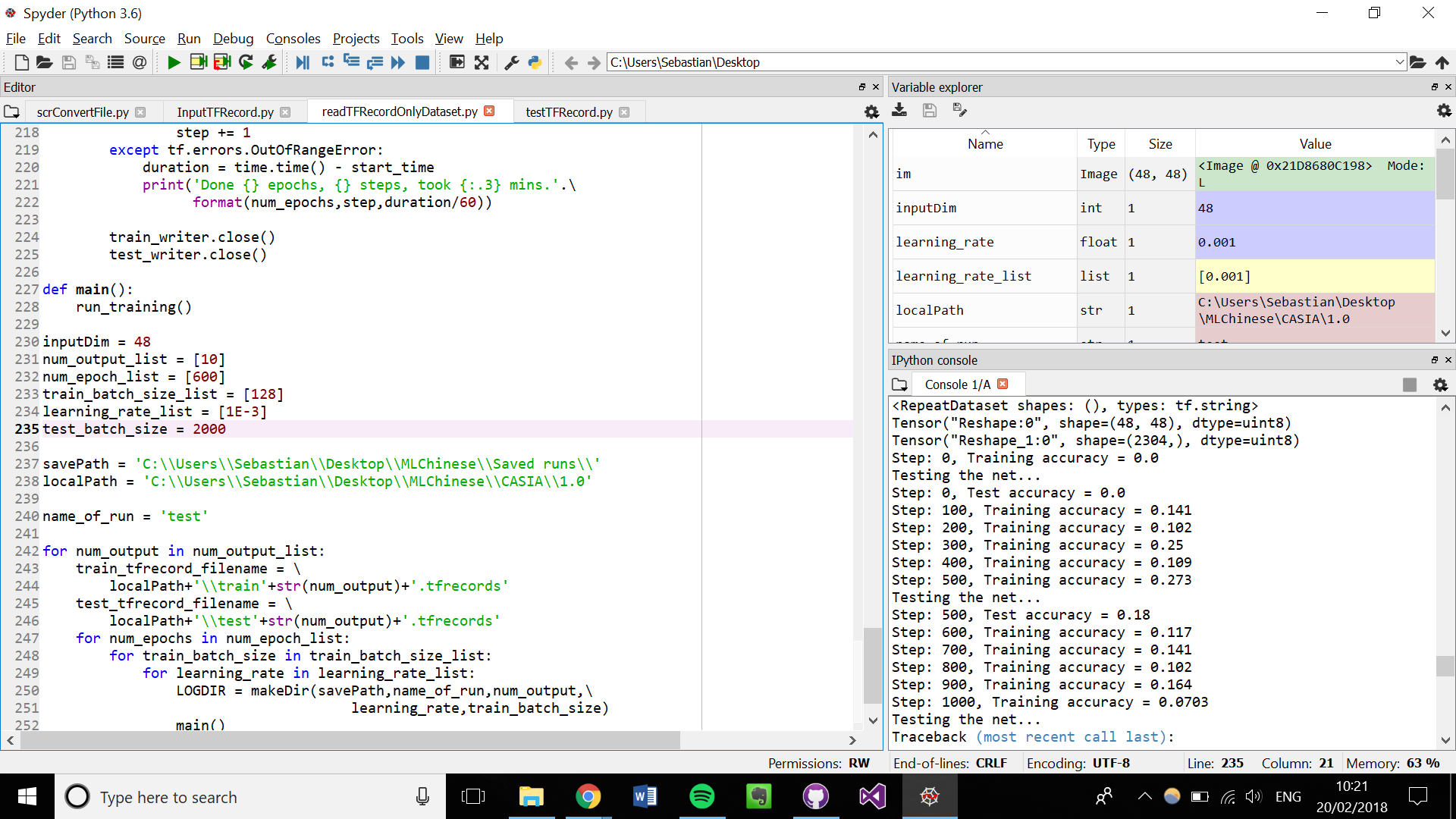


Figure : Training and testing accuracy jumping around all over the place

It turned out that there were no labels for the data. This was quickly fixed.

In the meantime, we figured out how to augment our images with rotation, translation, changing the brightness, and scaling. Scaling didn’t work well so we didn’t implement it.

Right now this data augmentation is applied to the whole dataset, once, so it’s not that useful. Ideally we want to augment the data each epoch.



Figure 2: Example of rotated image (over-rotated to show the rotation)



Figure : Example of adjusted brightness image



Figure : Example of image translation (over-translated to show effect)



Figure : Scaling doesn't seem to work because the lines on the characters are so thin that the image is too grainy

*Using the text in the CASIA database*

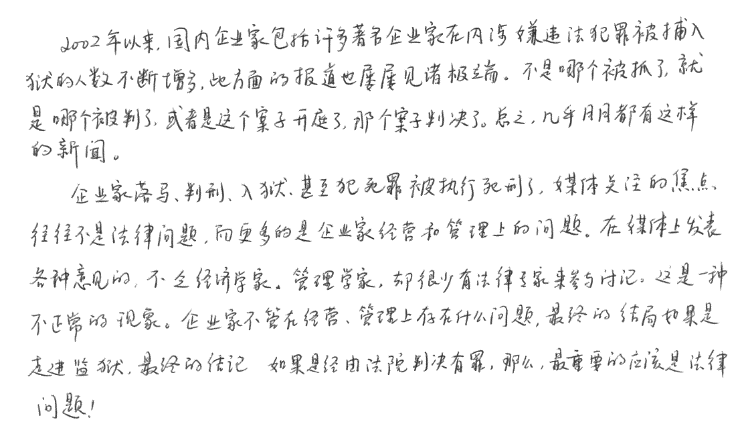


Figure 6: Sample of text from the CASIA database

We realised that if we want to work on calligraphy, we may want to build a neural network that can segment text into characters, or just read text as it is.

To test how good it was, we used Tesseract on the a sample text file from the CASIA database as above. Tesseract identified ~5 characters correctly, although it did seem to do well at segmenting the characters.

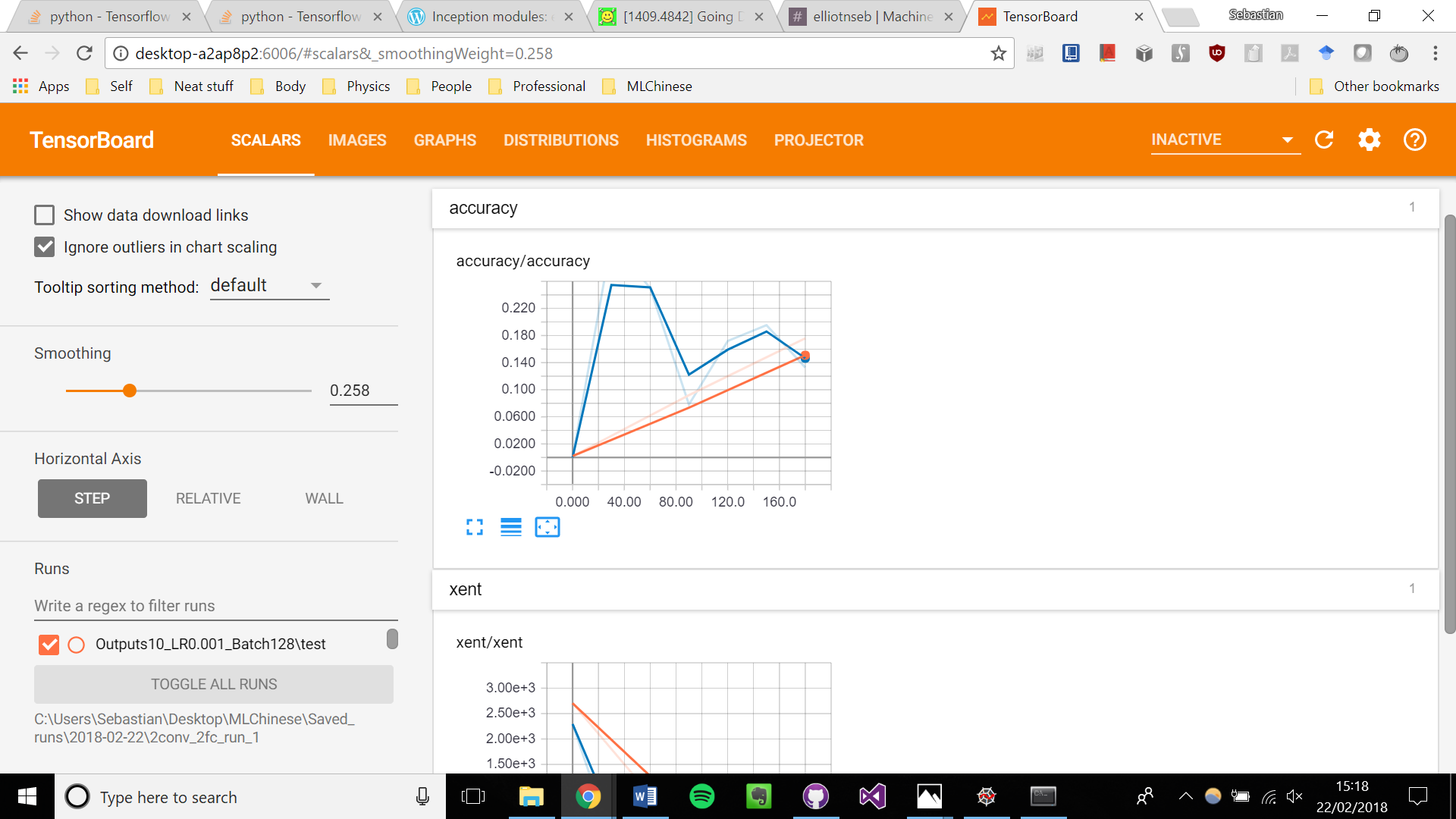


Figure 7: The beginning of training a 2-convolutional neural network with TFRecords files

We finally got TFRecords to work, successfully built a simple network with it, and also built a convolutional network which we ran as above for a brief while.

A big plus is that shuffling the data gives a huge(!) change in the accuracy training time. It seems to be very effective. Now we can also read in all the .gnt files we want, rather than limiting ourselves with samples of .gnt files.

*Crossroads in our research*

We are at a significant crossroads in our research.

We have emailed the Professors that organise the CASIA database and they have told us that there is no large database of labelled Chinese characters.

There are several options to proceed. The simplest and the one to start with is just to train our network to a reasonable accuracy on isolated handwritten Chinese characters, and then manually split up a piece of calligraphy into isolated characters, feed it into our network, and see how it does.

*Work on transfer learning*

I have continued to work on transfer learning. I have done more work on incorporating TFRecords into the transfer learning scripts however this is not yet complete. In addition, we have decided that when it comes to retraining the final layer, this will have to be done using .npz files as the bottlenecks cannot easily be saved as TFRecords format. However, as the bottlenecks do not need augmenting and as they are used to train only one layer, this is not significant.

**Action points for the next week**

1. Work on the bottleneck script so that it can save the bottlenecks as a dataset.

2. Continue to work on a script to retrain the final layer of a CNN using loaded bottlenecks

3. Figure out how to read in TFRecords

4. Once we can read in TFRecords files, ensure they can be put in the network to train it.