BIRMINGHAM CITY
University

CMP6228 - Unknown Assignment

Untitled CMP6228 Report

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CMP6228 - Deep Neural Networks

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Introduction

This module consists of two assignments in a similar fashion to CMP6230. By week 8, you must have found and written a **proposal** (20%) detailing the problem to be solved with deep learning.

The second assignment is worth 80%, and is a full report detailing the design, development and evaluation of a deep learning model to solve the proposed problem. From this, an immediate observation is once again the medical field - image classification of people with some kind of disease from an X-ray dataset of some sort. Recall previous data sources - Kaggle, IEEE DataPort, UCI ML. Try to avoid the same topics as others if possible, though that's perhaps even less likely than it was in other modules if image classification is the main objective.

It is unlikely this module can be completed on your laptop, as TensorFlow will be used. Colab is proposed as an option, which could perhaps be feasible enough, though that may likely depend on the size of the chosen dataset, of which no specific value count was given. (Nor feature count, though this is likely irrelevant in an image classification scenario)

Because of this assignment being almost identical to CMP6202 (only difference is the model and the fact that you'll likely be doing image classification rather than text), it's likely that elements of it can be adapted to Assignments 1 and 2. It's likely to be a very math-heavy module.

The Moodle page for this module is not immediately available; as such, you can't really plan ahead for what will be done on a week-by-week basis. Because of this uncertainty, it might be best to prioritise this module over CMP6207.

Tech stack

- Previously seen libraries:
  - Conda
  - Numpy
  - Scipy (sort-of seen before but not properly)
  - Scikit-learn
- Pillow
  - An image processing library.
- h5py
  - Appears to be used for serialization of models, like Pickle was in CMP6230.
- Keras & TensorFlow
  - Keras apparently uses TensorFlow to maximise efficiency with tensor calculations.
  - A tensor is a multidimensional array or matrix.

Keras has two ways of composing models: Sequential and Functional.

Sequential

Multiple predefined models are stacked in a linear pipeline like a stack or queue:

```
model = Sequential()
model.add(Dense(N_HIDDEN, input_shape=(784,)))
model.add(Activation('relu'))
model.add(Dropout(DROPOUT))
model.add(Dense(N_HIDDEN))
model.add(Activation('relu'))
model.add(Dropout(DROPOUT))
model.add(Dense(nb_classes))
model.add(Activation('softmax'))
model.summary()
```

Functional

Uses an API where complex models can be defined such as DAGs (!!!), models with shared layers, or multi-output models. Not much info was given on this, likely requiring your own research.

Conclusion

Overall, something was done...