Project Details

ACTL3143 & ACTL5111 Deep Learning for Actuaries

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A complete deep learning project

This is an individual project over the term.

You will:

1. specify a *supervised learning* problem,

2. collect and clean the data,

3. perform an exploratory data analysis (EDA),

4. create a simple (non-deep learning) benchmark model,

5. fit two different deep learning architectures,

6. perform hyperparameter tuning,

7. write a discussion of the results.

Project components

The deliverables for the project will include:

1. report part one due at noon on Friday in Week 5 (10%),

2. recorded presentation due at noon on Friday in Week 8 (15%),

3. report part two at noon on Monday of Week 10 (15%).

Report part one (10%)

This first part is a basically a specification document for your overall project.

You will need to:

1. clearly explain your chosen supervised learning problem,

2. describe where you collected the data and how you cleaned it,

3. include a basic exploratory data analysis,

4. describe how you will assess the performance of your models,

5. give the performance of a simple benchmark model.

Upload to Moodle by **noon on Friday in Week 5**.

Presentation

Create a 3–5 minute recording covering:

1. the problem you are investigating,

2. the source of the data,

3. the deep learning approaches you are using, and

4. preliminary results you have (table of metrics).

Deliverable: YouTube link (public or unlisted) to a special StoryWall page. Presentations will be "public" to the class.

Suggestions: aim to be fully public and give peer feedback.

Presentation marking scheme

- **Content** (6%): did you cover the four points on previous slide?

- **Style** (6%): are your slides/figures professional and do they enhance the presentation?

- **Delivery** (3%): is the presentation interesting and within the time limit?

> 💡 **Tip**
>
> It is a critical skill to be able to condense a complicated project into a short pitch. The project report is where you will give us all the details.

Presentation tips

- Each project is different, you decide which parts to focus on.

- Not necessary to film yourself.

- Nice to *briefly* show the data (look at my lecture slides for example).

- Don't go overboard on EDA. Mention the *most important* 1–2 facts about the data (e.g. class imbalance)

- You can avoid adding 'UNSW' & the course code.

Report requirements

You are asked to cover the four requirements in the draft, and also:

- fit two different deep learning architectures,

- perform hyperparameter tuning,

- write a discussion of the results and any potential ethical concerns.

Deliverable: Report (PDF file), Jupyter Notebook, and dataset
(e.g. CSV or ZIP file). Submission not public, probably to Moodle.

Report marking criteria

- **Content** (8%): did you cover the seven points in the ML workflow?

- **Style** (5%): does your report look professional, are your plots/tables useful and unpixelated, do you have spelling or grammar errors, are you within the page limit, and is the text easy to read?

- **Code** (2%): is your code clean and well-commented, have useless cells been pruned, does it give errors when the "Run All" button is pressed?

Avoid screenshots & code in the report.

Some comments on the report

- **Focus on deep learning**: I'm most interested in seeing your ability to use and explain your neural networks. For example, your mastery of the Lee–Carter model is less important to demonstrate.

- **Hyperparameter tuning**: The tuning is one significant change from the weekly StoryWall tasks. Add a table (for each neural network) showing (at least) two hyperparameters that you tuned.

- **Use appendices**: If you run out of space, use appendices which are not counted in the page limit. E.g., the less urgent parts of your EDA can go in here.