

Assignment 2: Prototype Deep Learning System

Due Date: 9:00am Monday, April 9, 2018

(Assignments should be submitted as zip archives to
annick@nextcanada.com)

Late submissions will not be accepted.

This assignment asks you to familiarize yourself with one of the most popular deep learning frameworks: TensorFlow, PyTorch, Caffe, or MXNet (other frameworks can be considered if justified). It involves applying some of the theory covered in the Deep Learning lectures to a concrete problem facing your business.

- What we expect to see is a simple but original idea that you describe clearly, relate to existing methods, implement, and test on a small- or medium-scale problem (note this is just a prototype, not a deployment of a machine learning system).
- To do this you will need to write code, run some simulations (which may or may not require external data sources), make some figures, read a few background articles, read some technical documentation or blog posts on your chosen framework, collect some references, and create a Jupyter notebook which describes your model and demonstrates your results.

1 Deliverables

Each team needs to submit one assignment (i.e. it is expected that if there are multiple technical co-founders, they will collaborate). Business stream co-founders may also contribute to the assignment.

Please submit the following files in a zip archive to the email address above:

1. A Jupyter notebook demonstrating your prototype
2. (Optional) An `anaconda environment.yml` file (similar to the one provided to you at the beginning of the course) containing all dependencies to run your notebook

Late submissions will not be accepted.

Submissions must follow the formatting guidelines below.

Technical Presentation Requirements

Jupyter notebooks should be professional, well documented, and emphasize visualization. It is expected that all cells will execute in no more than a few seconds (on a conventional workstation),

otherwise you should warn the user. A user should be able to run your notebook on any platform without installing any other libraries or dependencies other than creating an environment based on your supplied `environment.yml` file. Instead of including a dataset with your submission, if your notebook requires external data, then either provide a comment which specifies a URL from which it can be downloaded, or include a cell which uses the command-line (e.g. `wget` or `curl`) to download the file.

Environment files must conform to Anaconda specifications. If you do not provide an environment file, we assume that your notebook will just run in the standard `nextai` environment we provided.

Projects will be judged on the basis of visual appearance, the grammatical correctness and quality of writing, and the visual appearance and readability of any graphics, as well as their contents.

Selecting a topic

Most importantly, choose a topic that interests you. This may be supervised learning, unsupervised learning, reinforcement learning, or hybrids (e.g. semi-supervised learning). You may take this opportunity to explore more advanced paradigms like structured prediction, transfer learning, domain adaptation or few-shot learning.

The project should focus on a topic that falls within the scope of deep learning, but this is to be taken broadly (i.e. a representation learning algorithm that does not use multiple layers is still acceptable even if it is not considered *deep*).

You do not need to submit a project proposal in advance, but you are **encouraged to talk to your assigned AI Scientist in Residence for feedback and/or questions**.

Marking Scheme

The following criteria will be taken into account roughly equally when marking **the notebook**:

1. Clarity of problem statement and description of approach.
2. Discussion of relationship to previous work and references.
3. Quality of code and its documentation.
4. Visualizations: attractive, properly labeled, informative.
5. User experience.
6. Fit with the problems facing your business.