Anly 590 - Project Proposal

Artificial Neural Networks and Deep Learning

Due Date: November 8th 2018

1 Introduction

Your final project will have two components a poster and a paper write up. As one of your steps in preparing a project you will need to create an outline along with data, objectives, limitations and expected outcomes. This assignment is a guide to structure your project.

You will submit this assignment as a formal proposal both on github and as a printed copy (one per group). You will be assessed on the clarity of your idea, understanding of the problem, data sources, use of class concepts, use of external concepts and creativity.

2 Team

Most machine learning research is now done in teams. Forming a team is the first step to completing your project. Form a team of 3 members,

3 Objectives

After forming a team deciding on what you want to accomplish is next. Given the tools presented in class how will you use artificial neural networks and deep learning to solve a problem?

Using the questions below as a guide, outline high-level objectives of your project.

- What problem do you want to solve?
- What is the expected end result?
- How is it unique compared to other ideas, some ideas include:
  - An application to new data
  - A new interpretation
  - A new type of network (i.e. a new loss function)
  - A deployed application

- For interesting examples see
  - *Food2Vec* `https://altosaar.github.io/food2vec/`
  - *Automatic Colorization* `http://tinyclouds.org/colorize/`
  - *Tensorflow.js* `https://js.tensorflow.org/`

4 Data

Before building a model you will need to define the appropriate data sources. With respect to your data source describe:

- How many data sources will you be using
  - Where do they come from
  - Note: when reference data always provide a link to it's source
- Data dimensions and if appropriate dictionary/schema
- Possible limitations of the data
- Areas where you could improve the collection of future data
- Why the current data source is appropriate
- If your team is working on a supervised problem, what is your input feature vector and output?
- If your team is working on applying an unsupervised approach what are you trying to do with the data?

5 Assessment Metrics

How you evaluate the performance of your model is more than simply selecting a loss function and minimizing it. Additional considerations include how your model performs on different data sets, under different loss metrics and with other baseline models.

Write a short outline describing:

- What loss metric you will be using and why?
- What baseline datasets will you be using to evaluate your models performance?
- What other models are used as baselines - how do you expect your approach to compare?
- What is considered state of the art in the field and how does it compare to your method?

6 Approach

Write a paragraph for each of the questions below:

- At a high level what are the expected outcomes of your project
  - What approach will you be taking and why?
  - Describe possible limitations of your approach
- Where are you going to train your model?
  - Will you be using a cloud provider or running it locally?
  - What are some limitations if running it on the cloud vs locally?
- What API will you use to train your model (i.e. Tensorflow, Keras, PyTorch)

- Additional resources and ideas for projects can be found in the file "Deep learning Resources, Project Links and News.pdf" in the Projects folder on Canvas.

7 Deliverable

Your **project proposal** should be typed in markdown with the following structure:

1. Team
2. Project's Goal and Objectives
3. Data
4. Assessment Metrics
5. Approach

It is due November 8th 2018.