CE889:Neural Networks and Deep Learning

LAB 6:INTRODUCTION TO TENSORFLOW AND GROUP PROJECT DESCRIPTION

HEAD OF MODULE:

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Lesson Aims:

- Group project description
  - Ask any questions about the group project
- Understand the basics of TensorFlow
- XOR problem with TensorFlow

Group Project

- Groups of 4 people.
- Kaggle competition: https://www.kaggle.com/c/rossmann-store-sales

- Design and implement a Deep Learning architecture to solve the Kaggle challenge.

- Submit your results to the Kaggle website to get a score from the competition site.

- Presentation of your results and architecture explaining how the network works and what kind of tuning you did for the hyperparameters.

Group Project objectives

- **Pre-processing of data**
  - Understand how to load CSV files with training & testing data.
  - Understand how to handle categorical values when using NN.
  - Understand how to handle dates.
  - Capable of handling missing data.
- **Deep Learning Implementation**
  - Capable of implementing a deep learning architecture using TensorFlow or Pytorch.
  - Understand how different deep learning architectures work.

Group Project objectives

- **Comparison of architectures**
  - At least 1 Deep Learning architecture, MLP (with 1 or multiple) layers is not allowed.
  - Show evidence of optimisation process of hyperparameters and not only simple implementation.
  - Show a table with the different results.
- **Competition**
  - The group that builds the deep learning architecture with the best performance metric in the Kaggle website wins.
  - A score from the Kaggle website is needed.

Your team Presentation

A title slide with your team number and the names of your team members

1-4 Slides on Pre-processing

- What data did you use and why
- How did you process this data
- Was there any data you didn't use and why

1-3 slides on the type of Deep NN

- Why, did you use that one
- Topology/Architecture

1 Slide on the score that you achieved

- When you submitted you results on the Kaggle website what rank / score did you achieve (with screen Shots)

1 Slide on what each team member contributed to the task

TensorFlow

What is TensorFlow?

TensorFlow is a machine learning library that allow users to easily build complex machine learning models.

In TensorFlow 2.0, Keras API was integrated to TensorFlow. Keras is a high-level API that allow machine learning engineers and researchers to easily define layers, optimizers and loss functions for their machine learning models.

Advantages of TensorFlow

- Machine learning engineers and researchers can now focus on training and testing different ML models instead of investing time in building the code.
- TensorFlow 2 + Keras allow the users to define layers in a single python line.
- In the backend, TensorFlow builds the model to be as fast as possible.
- The library easily allows you to make use of GPUs if available.

TensorFlow exercise

Open the python notebook for this lab and we will work on an exercise to understand the basics of TensorFlow.