ULaval **IFT&GLO**

Projet-Final (sur 20%)
à rendre le 24 août 2020 à 23h55mn

Professeur Brahim Chaib-draa *GLO-7050 : Apprentissage machine en pratique*

Les projets du cours sont les projets des versions du cours COMP 551, cours donné par les collègues de McGill, un grand merci à eux pour nous avoir donné l'autorisation de les utiliser.

Introduction

In this final course project, there are three different tracks.

Track 1 : Improving the baselines and performance

When people propose new models, they often spend more time on fine-tuning their proposed model than fine- tuning the baselines. Simple baselines like Naive Bayes, Random Forests, K-NN, if properly tuned, can be sometimes too strong to beat. In this track, your goal will be to select a paper (from the list of given papers, see Instructions below) and improve the baseline for the tasks considered in the paper. First implement the baselines mentioned in the paper and try to reproduce the baseline performance reported in the paper. Then try to fine-tune the baselines by doing extensive hyper-parameter tuning. Then, explore simple machine learning algorithms learnt in the class to improve the performance in the given task. Your job is to act like an adversary to the paper and try to beat their performance by using simple algorithms which has lesser computational complexity.

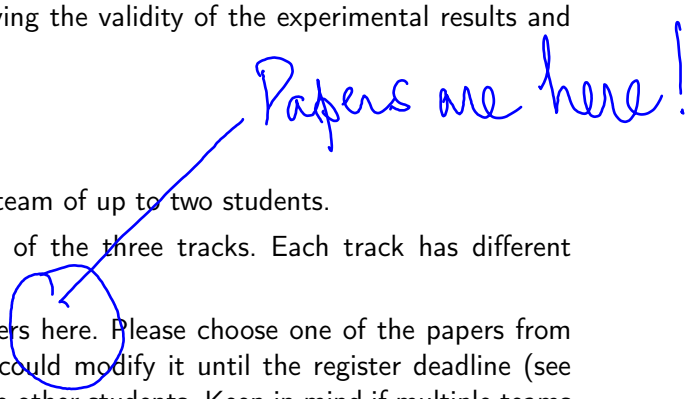
Track 2 : Model ablation study

The goal of this track is to take a recently proposed model (from the given list of papers, see Instructions below), papers which comes with code and try to explore the proposed model in depth. Specifically, you will first reproduce the results reported in the paper by running the code provided by the authors. Then you will try to tweak the model and try to understand the robustness of the model, importance of specific components of the algorithm or the model. You can also try to improve the model based on your ablation study. You should do a thorough analysis of the model by extensive set of experiments.

Track 3 : Reproducibility Challenge

One of the challenges in machine learning research is to ensure that published results are reliable and reproducible. In support of this, the goal of this track is to investigate reproducibility of empirical results in most recent papers. You should select a paper from the given list, and aim to replicate the experiments described in the paper. The goal is to assess if the experiments are reproducible, and to determine if the conclusions of the paper are supported by your findings. You can implement algorithms from scratch, or use any existing toolbox or software, as long as you reference everything

appropriately in your report. However, you should not use an already implemented version of the paper. The result of the reproducibility study should NOT be a simple Pass / Fail outcome. The goal should be to identify which parts of the contribution can be reproduced, and at what cost in terms of resources (computation, time, people, development effort, communication with the authors). Essentially, think of your role as an inspector verifying the validity of the experimental results and conclusions of the paper.



Instructions

1. This is a team project. You have to form a team of up to two students.
2. You are allowed to participate in only one of the three tracks. Each track has different evaluation criteria which is listed below.
3. For each track, we have listed a set of papers here. Please choose one of the papers from this list. After you submit the choice, you could modify it until the register deadline (see below) and you can also see the choice of the other students. Keep in mind if multiple teams choose the same paper then we will do relative grading of the teams with same paper. So try to avoid choosing a paper which is already chosen by many teams.
4. If you wish to work on a paper that is not listed (for instance a paper from or from Papers with code site, please email Fan Zhou and get permission. In the email, please provide us with the URL of the paper you would like to implement and briefly explain why this paper interests you (1 3 sentences). Fan Zhou will contact you to determine whether this paper is OK or you need to change to another choice.
5. Once you choose your track, team mates, and paper choice, fill this Google form on or before **July 1st, 8 pm**.
6. Unlike the previous projects, you are allowed to use any python package (Numpy, Sklearn, Pytorch etc.) for your experiments.
7. Please notice that not all papers are easily reproducible. If you tried your best but still couldn't achieve the exact results reported in the original paper, it is still OK for you to report the results you have as long as your experiments are rigorous and clearly show your efforts (hyper-parameter tuning/ analysis etc..) towards this project.
8. Some papers or baselines will require more computational resources than you have. You should keep this in mind when choosing a paper, but it is also okay to only work on a subset of the data/tasks in a paper, in order to make things tractable. We encourage you to explore some online computational resources such as Google Colab, Amazon AWS and ComputeCanada etc., in case you need.
9. If you have any problems about the final project, feel free to contact Fan Zhou or put your questions in the course fourm in monPortail.

Important Dates

1. Deadline for register your interested paper : July 1st, 8 p.m. via Google Form
2. Spotlight presentation : August 20th. (details will come).

3. Report and executive summary submission : August 24th, 23h55. If you submit the final report and executive summary after this deadline, there will be a penalty of 30% for 2 days extension. After that, no marks for the final project.

Evaluation Criteria

1. For all the three tracks, we will follow the following evaluation criteria :
   (a) Spotlight Presentation : 10%
   (b) Project Report : 70%
   (c) Executive Summary : 20%
2. For spotlight presentation, prepare a 5 minutes presentation describing your project.This should clearly outline the target question, describe the methodology, and preliminary results. More details will be announced later.
3. Written reports should clearly present the target questions, a clear and well motivated methodology, analysis and discussion on the findings. Concretely, for Track 1, the project should extensively cover the baseline models of the given paper and report on hyperparameter exploration ; for Track 2, detailed analysis of ablation study on the provided model code and parameter tuning ; and for Track 3, a thorough report on implementation goals, discussion and challenges. Submitted code will be evaluated according to the individual tracks.
4. Prepare and publish an executive summary (roughly 1 page) of your full report. Be as detailed as possible on key findings. You are encouraged to include a link to your full written report. Make sure to support any statement with as much evidence as you can. Include a copy of this executive summary as an appendix to your written report (in the same pdf file) when submitting on monPortail.
5. In the submission file to monPortail, you should include : 1) the codes for experiments (don't need to include the dataset), 2) excute summary and 3) report file.

Questions and clarifications

Pour toute question, prière d'utiliser le Forum du cours sur Monportail en clarifiant votre question, commentaire ou autre.