CP8322: Deep Learning in Computer Vision
Course Project: Reproducibility Challenge

This project is inspired[1] by the Machine Learning Reproducibility Challenge (https://paperswithcode.com/rc2020/task). The aim of this project is to replicate the central claim in a selected computer vision paper. This will include re-implementing the core methods and experiments in the paper. Importantly, your outcome can be positive (i.e., the results are reproducible) or negative (i.e., explain what was not reproducible and attempt to explain why this is the case). Keep in mind that not all results in papers are reproducible for a variety of reasons, e.g., missing details and (gasp) bugs in the code.

The project can be done in teams of at most three with the expectations of the project scope increased accordingly. The course does not provide any compute resources (GPU). Fortunately, there are a variety of free (but limited) online compute resources available, see https://paperswithcode.com/rc2020/resources. Please keep this strongly in mind in the selection of your project. The project consists of four parts: (i) paper selection, (ii) proposal, (iii) report, and (iv) code.

i. Paper selection. Select a computer vision paper that you will attempt to reproduce its reported results and have it approved by the course instructor. The paper must be chosen from either the main conference proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020 or European Conference on Computer Vision (ECCV) 2020, the two top tier computer vision conferences held in 2020. The core of the paper that you will reproduce must be an application of deep learning to a computer vision task. The proceedings for both CVPR and ECCV are openly available at https://openaccess.thecvf.com/CVPR2020 and https://www.ecva.net/papers.php, respectively.

ii. Proposal (5%). Upon paper selection approval, you will next submit a one page proposal in PDF format. The proposal will briefly summarize the paper and describe the contribution that you will attempt to reproduce. The proposal must include the following: deep learning framework to be used (e.g., PyTorch, TensorFlow, etc.), datasets required, list of experiments to be reproduced, and expected compute resources. Make sure you have the necessary compute re-

[1] Credit to Prof. Marcus Brubaker (York University) for sharing this project.

sources available to undertake the project. In terms of the experiments to be reproduced, focus on those that target the paper's central claim.

iii. Report (50%). The report in PDF format produced with LaTex will consist of a summary of the paper's main contribution and a description of your reproducibility attempt of the reported results in the paper, including: Were you successful in reproducing the results? If unsuccessful, provide conjectures of the possible source(s) of the discrepancy. Did you uncover critical details that were not clearly or at all documented in the paper? For group projects, state in detail the contribution of each team member.

iv. Code (25%). You must submit your code in a Git repository, e.g., GitHub. Tips for best reproducibility practices and principles can be found at https://github.com/paperswithcode/releasing-research-code and https://www.cs.mcgill.ca/~ksinha4/practices_for_reproducibility, respectively. The marks for coding will be based on proper coding structure and documentation. In addition, your commit history (including messages) will be assessed to ensure that the project was conducted at a reasonable pace. You must reimplement the core contribution yourself based on the description in the paper. In the case where special code is required that is outside the paper's main contribution (e.g., data loader and visualization), external code will be allowed but needs to be approved by the instructor.

Presentation (20%). You will prepare a 20 minute video presentation about your project. All presentations will be made public to the participants in the course. The presentation should include an overview of the method, the experiments that were attempted to be reproduced, and the outcome of your reproducibility attempt.