

Homework DL4CV

Welcome to the Homework of the Deep Learning for Computer Vision course, where you have the opportunity to test what you have learned during the course and compete with your classmates.

The objective of this assignment is to demonstrate that you have learned the concepts shown in class by constructing your own convolutional neural network in Tensorflow2, by writing a Python notebook and by producing a scientific report in which to describe your experience.

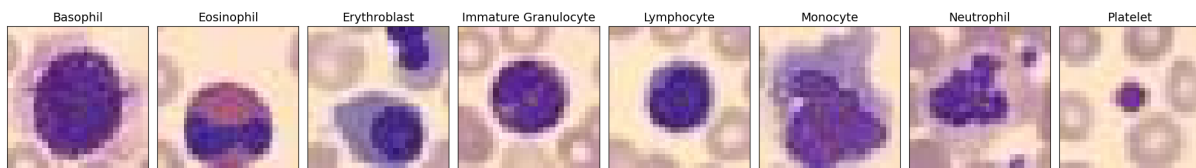
There is a lot of time available, so don't rush, take time to reason and collaborate within your team and, most importantly, have fun! :)

For problems strictly related to the organisation of the Homework, please write an email to eugenio.lomurno@polimi.it.

Description

In this Homework assignment, you are asked to solve a problem in which you have to **classify** in the best possible way **images** of cells taken with an electron microscope.

In detail, the provided dataset contains **15092 samples** and is organised into **8 classes**: basophils, eosinophils, erythroblasts, immature granulocytes, lymphocytes, neutrophils, monocytes, and platelets. The size of the images is **48x48 pixels**.



The dataset containing the images, the corresponding labels and the dictionary for mapping the labels to the respective classes are all contained within the file *data.npz* in the folder *Homework_1*.

The use of external data is strictly forbidden!

In detail, what **may** be used:

- Libraries seen or not seen during lectures and labs.
- Models pre-trained on ImageNet by keras.applications.

And what **may not** be used:

- Any data source that has not been provided by us.
- Any pre-trained model not belonging to keras.applications and/or not pre-trained on ImageNet.

Submission

Before the deadline, your team leader must send an email to eugenio.lomurno@polimi.it containing:

- **Object**: DL4CV2023_Homework
- **Content**:
 - Team Name: My_team_name (if you team name is My_team_name)

- Member 1: Name_1 Surname_1, Serial_ID_1, name_1.surname_1@studbocconi.it
- Member 2: Name_2 Surname_2, Serial_ID_2, name_2.surname_2@studbocconi.it
- Member 3: Name_3 Surname_3, Serial_ID_3, name_3.surname_3@studbocconi.it
- **Attachment:**

A single zip file named *My_team_name.zip* (if you team name is *My_team_name*) containing:

 - **The notebook** renamed *FinalNotebook.ipynb* with which the final model was produced, which must be working and well commented. It must contain the `test_model` function described in the *Starting_Kit.ipynb* notebook.
 - **The final model**, saved as *FinalModel* via the `.save` function used in the lesson.
 - **The homework report** of exactly 3 pages, excluding any references, saved as *Report.pdf* and generated from the *ReportTemplate.rtf* file in the *Homework_1* folder.

Evaluation

Your best model will be evaluated by us after the competition is over on a private test set that will be provided to you after the evaluations. At the same time, the team leaderboard will be made public. The metric used to evaluate the model will be **Accuracy**. Homework evaluation will not be solely related to the leaderboard, but will be strongly influenced by the report and notebook delivered.

Timeline

Beginning: 20/10/2023 00:00:00 (UTC+2)
 End: 05/11/2023 23:59:59 (UTC+2)

Provided material

All the necessary material can be found in the folder *Homework_1*. Specifically, what you will find will consist of:

- This document.
 - The document *ReportTemplate.rtf* to be considered as a template and guideline for writing the final report.
 - The *data.npz* file containing the one and only data set to be used throughout the homework.
 - The *Starting_Kit.ipynb* notebook containing the scripts to read the *data.npz* file and the `test_model` function that will be used by us to evaluate your model, and that has to be opportunely modified according to your will. In this regard, it is strongly recommended to check the correct functioning of this function with respect to the model that you will send with the rest of the material to be evaluated.
- IMPORTANT:** your notebook must contain the `test_model` function (we repeat, eventually modified according to your will and your model).