NLP 2024
Homework 1B instructions

Code a classification model!

Slides provided by:

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Rationale

- This is a **mandatory** follow up of HW 1.A to make it “computational”
- Each student will deliver their homework individually
- You cannot share (in any way!) your homework
    - All the students involved **for any reason** in code sharing will see **ALL** their homeworks rejected

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Sentence Classification task

- Sentence Classification task is the task of classifying an entire sentence (or any other span of text) using a predefined set of classes.

- Some common use cases are sentiment analysis and natural language inference.

- You should use all tokens in the sentence to compute a cumulative representation of it that can be used to predict the correct class.

Baselines

What is a baseline

Given a task, you can always define a **baseline**, i.e., a trivial approach that solves it in a naïve way.

Baselines act as the foundation for assessing the effectiveness of more sophisticated approaches.

Baseline approaches serve to:

1. **establish a performance standard** against which progress can be assessed
2. offer a **reference point for evaluating** the effectiveness of sophisticated models
3. **spot important imbalance in the given data**.

Let's have a look at the most intuitive baselines for our classification tasks...

Random Baseline

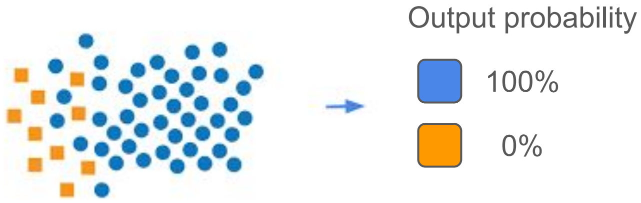
- The Random baseline selects a label uniformly at random among the possible labels.

- If your model cannot beat this, there is something wrong with your approach...

Majority Class Baseline

- The Majority Class baseline always predicts the most frequent class in the training set.

- This baseline is suitable to spot imbalanced datasets where the majority class dominate the distribution.

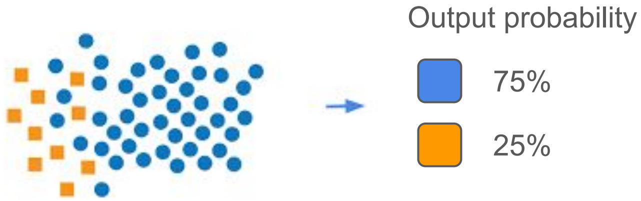


https://www.linkedin.com/pulse/some-tricks-handling-imbalanced-dataset-image-m-farhan-tandia

Stratified Baseline

- The Stratified baseline predicts the classes following the distribution of labels in the training set.

- This baseline also is useful to spot imbalance in the data distribution.



Output probability

🟦 75%

🟧 25%

https://www.linkedin.com/pulse/some-tricks-handling-imbalanced-dataset-image-m-farhan-tandia

Implement your Baseline

- The first thing to do in this task (and in general, when your are experimenting) is to choose and set up a trivial baseline.

- **Baselines need to be trivial and are meant to be surpassed**. In this way, you can compare your idea and your work with it (i.e., *is my model better than flipping a weighted coin*?)

- Implementing a simple baseline is a requirement.

The data

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Subset of original dataset pool

For HW1B, you will use a subset of the datasets of HW1A. Each student will have one of their (previously assigned) dataset to work on (see this document), already converted to the JSONL format.

- `0-emotivita`: only task A
- `1-homotransfobia`: only task A
- `5-discotex`: only task 2
- `7-AMI` : only task 1
- `8-sardistance`: only task 1
- `9-haspeede`: only task 1
- `18-accomplit`: only task 1
- `21-ironITA`: only task 1
- `22-GxG`: no genre distinction
- `24-sentipolc`: only task 1
- `27-haspeede3`: only task 1
- `28-pretens`: only task 1

Fallback Dataset

Students lacking any of the selected datasets will be given another dataset complying to the format of HW1A (processed by us).

The *fallback* dataset is HaSpeeDe (only data of task A), which you can download from this link.

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Fallback Dataset

The .jsonl files schema is as follows:

- `text`: the **sentence** to be classified
- `choices`: the possible **labels** ("*odio*" or "*neutrale*")
- `label`: the **index** of the correct label

Fallback Dataset

Folder structure:

- `train-taskA.jsonl`
- `test-news-taskA.jsonl`
- `test-tweets-taskA.jsonl`

You will train your model on the training data and test it on the two different test sets.

Your implementation

- You will provide the code for training and evaluating an LSTM on your assigned dataset.

- Feel free to take inspiration from Notebook #4 extra, but do not simply copy from it!
  - You can experiment with the choices of modules (RNNs, LSTMs, etc.), the model architecture, the number of hidden dimensions, and with the hyperparameters (i.e., training epochs).
  - You shall consider only the topics up to the BiLSTM to solve this task (i.e., no Transformers, no BERT, no pre-trained models) and cannot use PyTorch Lightning.
  - Please do note that the last point applies **also to the sophisticated baseline** (the extra).

Submission and Deadline

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Grading

- Each student will be evaluated on their individually assigned dataset.
- We will assign up to 30 points for the task, including extras you can obtain up to 33/30 points:
- We will follow this breakdown:
  - Report validity and adequate explanation of the work done: ½
  - Code provided and working: ¼
  - Performance of your (best) model: ¼
- **Extra points**
  - +1 for attendance on Friday 19th
  - +2 for doing a comparison with a simpler model (i.e., a custom baseline)

Extra points

- We will assign **1 point** to each student who will be present in class on Friday, 19th and will start the homework with us.
    - This is a good opportunity to ask questions and get answers right away from your TAs :)

- We will assign **2 points** to each student who will implement another (simpler!) model (e.g., using Word2Vec) and will do a comparison analysis of the performances
    - If you choose to do this extra task, you can use **up to 1 page and a half** (always excluding figures and tables)

Report

You will write an **individual report** (up to 1 page, excluding tables, figures, and references). Be concise.

1. Introduction
2. Description of the dataset (**brief**)
3. Architecture of your model (figures are okay)
4. Design choices of your model (*why did you choose to do x instead of y?*)
5. Baselines implemented (**brief**)
6. Results section (*how does your model compare to the baselines?*)
7. Instructions to run your code (**unambiguous**)
8. Any other information you think may be useful for us

Report Format

- Use **Latex** to write the report. If you don't know how to use it, it is a good time to start learning :)
- I suggest you to write your report using **Overleaf** for the easiest possible experience
- **Use the current ACL template** (available as Overleaf template or in GitHub)
- Each report should consist of **up to 1 page**, excluding tables, figures and references (which should be at the end of the report).

Deadline

- Delivery deadline: **23:59ish Tuesday April 30th Italian time (CET)**

- **Late submission penalty:** we will deduct 1 point for each day after the deadline, up to a maximum of -5 points.

  No submissions are accepted beyond 23:59 Sunday May 5th (CET)

What to deliver - Example of folder structure

Example of folder structure:

- **HM1_B-<student_id>/**
  - hw1b_report.pdf *# your 1-page and a half report*
  - hw1b_train.py *# this launches the training step*
  - hw1b_evaluate.py *# this launches the evaluation on the test set*
  - **src/** *# put here all the rest of your code, if needed*
  - **data/** *# put here the assigned data*

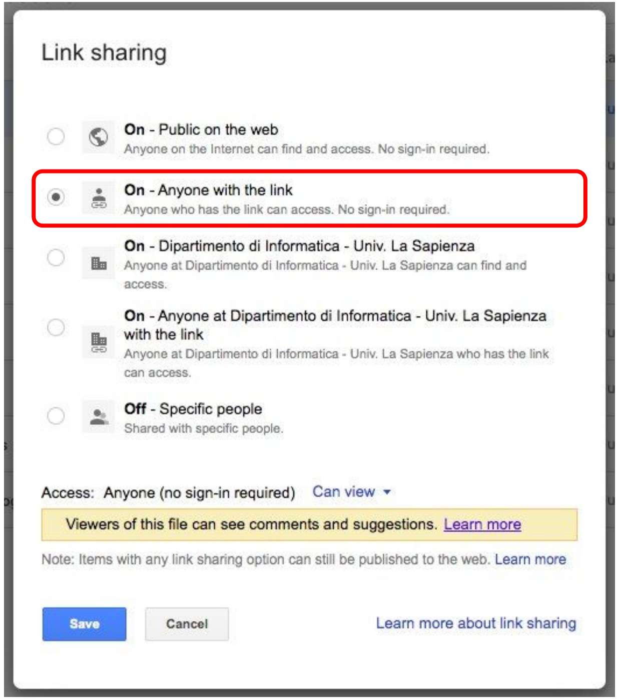
If you want, you are free to provide your code in a notebook, as long as it works and it is easily runnable with the ‘Run all’ button.

What to deliver – Example of folder structure

Note that you **cannot in any way modify the test set** of the dataset assigned to you.

Keep in mind that, after you submit, we will evaluate your model on the original test set.

Submission Instructions



Link sharing

○ **On** - Public on the web
Anyone on the Internet can find and access. No sign-in required.

● **On** - Anyone with the link
Anyone who has the link can access. No sign-in required.

○ **On** - Dipartimento di Informatica - Univ. La Sapienza
Anyone at Dipartimento di Informatica - Univ. La Sapienza can find and access.

○ **On** - Anyone at Dipartimento di Informatica - Univ. La Sapienza with the link
Anyone at Dipartimento di Informatica - Univ. La Sapienza who has the link can access.

○ **Off** - Specific people
Shared with specific people.

Access: Anyone (no sign-in required) Can view ▾

Viewers of this file can see comments and suggestions. Learn more

Note: Items with any link sharing option can still be published to the web. Learn more

- Upload the zip on your **institutional** Drive and make it **link-shareable** and **public** to anyone (an automatic script will download it).

- Make sure it is accessible via an incognito page of your browser!

- You have to submit the homework through the submission form on Google Classroom. You will be asked to fill a form with the requested information and the **link** to the zip you uploaded on Drive.

Plagiarism

Collaboration among students is **not** allowed.

We will check for plagiarism both manually and automatically.

It is **not allowed** to:

- Copy from other students.
- Share your code across students.
- Use ChatGPT or similar systems **for report writing**

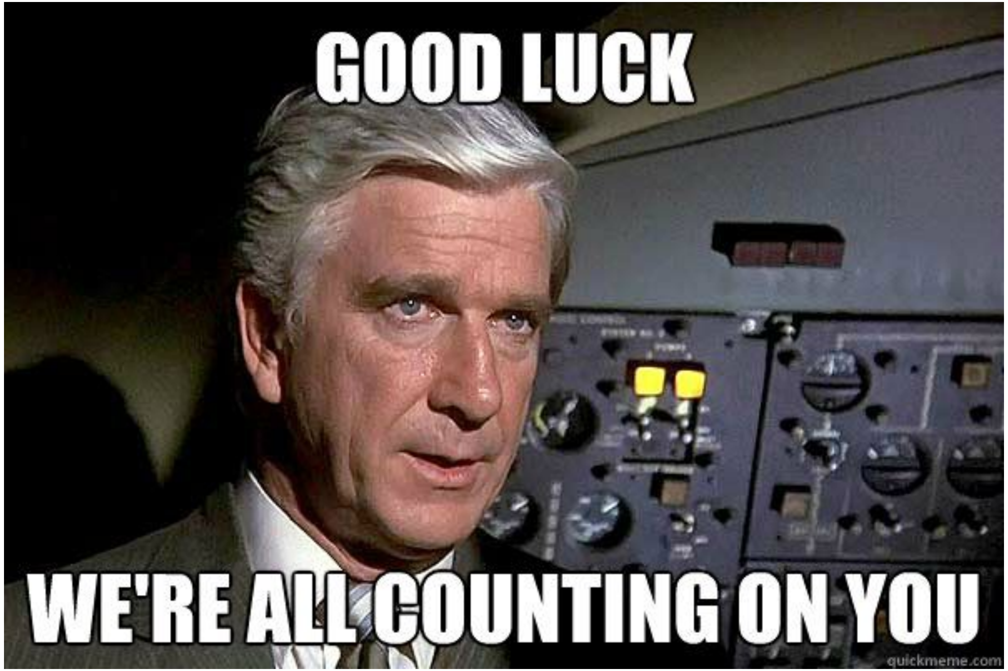
Projects under any of the above conditions will be **desk-rejected**

Any doubts? (hopefully not)

Use the Classroom group if you have any questions. Only **after you cannot solve your issues in the group**, write to **ALL the TAs**, so to have a higher reply rate ;)

- Luca Moroni: moroni@diag.uniroma1.it
- Luca Gioffrè: gioffre@diag.uniroma1.it
- Lu Xu: xu@diag.uniroma1.it
- Tommaso Bonomo: bonomo@diag.uniroma1.it
- Alessandro Scirè: scire@diag.uniroma1.it

Start the mail subjects with “**[NLP 2024 HW1.B]**”


GOOD LUCK
WE'RE ALL COUNTING ON YOU
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