

Group projects

General instructions:

- Five team members per group
- Each group can propose a topic related to Deep Learning or choose from one of the topics available in this document (after choosing the topic and having the approval, the professor will provide the corresponding dataset).
- The proposed groups and topics should be communicated by email to the professor before October 27th, 2024.

Deliverables:

The following three deliverables will be evaluated:

- A code (it can be in Jupyter Notebook) with the models and analysis to solve the project
- A written report (which can be embedded as markdown in the code if the group decides so) that explains the approach, technical solution, and the results.
- A presentation (10 minutes + 5 minutes of questions), that will take place in the last sessions of the year (November 27th and December 4th). All team members should participate in the presentation.

Note: The code and notebooks delivered **must be original and fully developed by the students**. Any use of external sources and/or AI tools should be properly acknowledged and cited. Software to check the originality of the projects is likely to be used.

Technical instructions (common to all projects):

- The code must run end to end and should perform the following tasks:
 - 1) Load the data (some datasets will be provided, which will consist mainly of images or text data)
 - 2) Process the data to properly to feed a Deep Learning Model
 - 3) Train a suitable Deep Learning model to perform the task required (more than one model should be trained – using any hyperparameter optimization techniques)
 - 4) Analyze the results obtained based on error metrics and discuss the results accordingly
- Make sure you understand all the lines of code that you have in your code, and the libraries used
- You can use a repository (for example GitHub) to store the code, but it is not mandatory

Proposed topics:

Image classification – prevent drivers' distractions

The project consists of building a classification system that recognizes what a driver is doing in a picture. With the goal of developing a warning system that prevents drivers from distracting. The classes are:

- c0: safe driving
- c1: texting - right
- c2: talking on the phone - right
- c3: texting - left
- c4: talking on the phone - left
- c5: operating the radio
- c6: drinking
- c7: reaching behind
- c8: hair and makeup
- c9: talking to passenger

Image classification – Recognizing natural scenes

The project consists of building a classification system that recognizes when picture include different elements of the city and nature based on previously labelled images.

Sentiment Analysis

The project consists of building a classification system that can detect when a film review is “positive” or “negative” based on previously labelled film reviews from IMBD.

Relevance analysis of economic news

The project consists of building a classification system that can detect when a piece of written news is “relevant” or “non-relevant” for the economy based on previously labelled news.

Text translation

The project consists of building a machine learning model that can translate sentences from one language to another (for example French to English) based on previously translated sentences.