

# MAL Practical Evaluation 2025

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The objective of this project is to advice the Director of a mobile phone operator to predict the churn rate of his company thanks to a data set.

The "celldata.csv" contains  $n = 8000$  observations for

- the target variable: *churn*, and
- $p = 10$  covariables *CreditScore*, *Geography*, *Gender*, *Age*, *Tenure*, *Balance*, *NumOfProducts*, *HasCrCard*, *IsActiveMember*, *Salary*
- Data Acces in Python:

```
import pandas as pd  
df = pd.read_csv('celldata.csv')
```

## Questions:

1. Considering the machine learning models studied during the first part of the MAL course, what machine learning model(s) would you advice to the Director of the mobile phone operator for predicting the churn rate of his company? Justify your answer.
2. Considering that the "Gender" variable is a sensitive attribute, study the Independence, Separation and Sufficiency criteria for the advised ML method?

## Before December 15th 2025, 09h00.

This project must be carried out by groups of two students.

The project zip file should contain a Python jupyter notebook and a pdf report file. The length of the pdf report should not exceed 6 pages.

**DON'T FORGET!** The names of both students should be written in the first two lines of the jupyter notebook and the pdf report file with the name of the institutions (ensIIE or UEVE) and the master if any (M2QF, M2DS, M2IA...)

- If **one of the students of the group is enrolled in the M2DS master's program**: the project should be sent to christophe.ambroise@univ-evry.fr with the subject MAL/M2DS project
- If **both students of the group are enrolled in the M2DS master's program and not ensIIE students**: the project should be sent to mal.ensiie@gmail.com with the subject MAL/M2QF project
- If **one of the students of the group belongs to ensIIE**: the project should be uploaded in the ENSIIE Project website, in the repository MAL2025Proj