# Final Project Information:

## Course Goals:

The ultimate goal of this course is to prepare you to apply machine leaning algorithms to real-world applications within your field of study. Also, this course provides an in-depth knowledge of most popular machine learning algorithms so that you could start doing research in the field of machine learning and artificial intelligence. Another goal of this course is to make you familiar with vulnerabilities of machine-learning-based systems and how to build trustworthy systems.

## Project Topics:

The earliest decision to make is to choose a topic for your final project. However, this is not an easy decision to make. Below, you can find the list of most important categories that projects usually fall into:

**Application-based Projects:** Choose an interesting application (or problem) within your own field of study or the one that interests you, and then, apply a machine learning algorithm to solve it.

**Algorithmic-based Projects:** Propose and develop a new machine learning algorithm for a specific problem; or, develop a new variant of an existing algorithm with better performance and efficiency; or, pick a machine-learning-based system proposed for a problem and reveal its vulnerabilities.

**Note 1:** Choose **an application that you are really curious to solve via machine learning**, and then, choose your project based on your current or future interests. If you're already involved in a research or industry project, then you may already have a great idea for your project.

**Note 2:** If a project is found to be very good and got a high grade, it has the potentials to **be submitted to a conference**. Of course, this is not going to be accomplished during the course as it needs more effort. Promising research works are normally published in top conferences and journals. For your inspiration, you can see the most important venues where machine learning research works are commonly published below:

ICML: https://icml.cc/Conferences/2020
AAAI: https://aaai.org/Conferences/AAAI-20/
NeurIPS: https://neurips.cc/Conferences/2020
ICWSM: https://www.icwsm.org/2020/

**Note 3:** Once you come up with an idea for your final project, it'd be useful to **check past research** by searching related keywords on an academic search engine (e.g., https://scholar.google.com/).

**Note 4:** An important part of your project involves **finding an appropriate dataset for the chosen topic**. This dataset may need to be pre-processed before being used by any machine learning algorithm. Alternatively, you may need to create your own dataset which can take a considerable amount of time in some cases.

## Project Steps:

The final project consists of 3 consecutive steps, including proposal, final report and presentation.

**1.1. Project Proposal:** You come up with an idea in the first few sessions of the course and write a brief summary of the problem you intend to solve, and then, receive feedback from the TA and a final approval. In case you're doing this project for another class simultaneously, You should get an approval from both this class Professor/TA and the other one.

**1.2. Final Report:** A final report needs to be written for each project that is at most 5 pages long (including figures and tables). Only 3 extra pages are allowed for appendices, references and to report what each member has contributed to the project. This report has a significant share of your final grade.

**1.2.1. Template:** I will share a guideline for this writeup in the first few weeks.

**1.2.2. Contribution:** A section should be included in the final report that precisely describes what each team member has contributed to the project.

**1.2.3. Source Code:** The project implementation should be uploaded in a Github repository and a link to the source code needs to be included in the report. Also, the Github repository should have a brief "README.md" file that describes how to run the code. Implementations are only allowed to be in either Python, R, C/C++ or Java programming language.

**1.3. Presentation:** The final project needs to be presented virtually as well. This presentation could be an abstract version of your report and can take no longer than 15 mins. All team members should take part equally in each presentation.

## Project Evaluation and Grading:

Projects are evaluated based on the final report, the implementation and presentation. All these steps contribute equally to your final grade. There will be a peer assessment and a group assessment to calculate the individual mark of each student.

## Project FAQs:

**1.1. Should projects be accomplished individually or in groups?**

Projects can be implemented and reported both individually and in groups.

**1.2. What is the maximum allowed team size and how does grading differ as a function of team size?**

Projects are highly recommended to be accomplished in groups that are no larger than 3. A separate file will be shared to let you know how group projects will be evaluated.

**1.3. Do grammatical and spelling errors in the report impact the final grade?**

Yes. Writing is an important part of this project. Thus, vague and erroneous reports would negatively affect your grade.

**1.4. What datasets can be used for the project?**

Links to the most popular and trustworthy datasets will be released in Canvas during the course.

**1.5. Should the project use only the algorithms and methods taught in the class?**

No. You are allowed to use other methods to solve the proposed problems in your projects. You can consult the TA for further questions and consultation.

**1.6. Is it acceptable for this project to be part of my on-going research?**

The proposed project should be new and you are not allowed to use existing work or research for this project. However, the project can depend on your existing or past research works. In this case, you must clearly state what part of this project has been done before.

**1.7. Where projects are going to be presented?**

Projects will be presented virtually right after the end of semester. All students must attend this meeting.

**1.8. What is the late date policy?**

A specific date and time will be announced later as the deadline for receiving final reports. Projects that are received even 1 min after the specified time will be ignored.

**1.9. Can we use any libraries such as scikit-learn of python or we have to implement everything from scratch?**

Yes. You're allowed to use any libraries for your projects. However, you cannot copy and paste other projects and codes written by others. Projects that result in high similarity scores with online resources will be disregarded.

**1.10. Will we be provided with any cloud computing resources or servers?**

You are not provided with any servers or resources. However, you can check out Google Colab to access an adequate amount of computing and memory resources.