

CSC 340
Artificial Intelligence
Project 1: Machine Learning

Learning Objectives:

- Students will gain hands-on experience in applying machine learning algorithms to real-world problems
- Students will learn how to preprocess and analyze data, select and optimize machine learning models, and evaluate their performance.
- Students will have a strong foundation in machine learning techniques and their applications in various domains.

Project Description:

Develop diverse machine-learning models tailored to the provided dataset. The dataset comprises three distinct documents spanning from Spring 2014 to Fall 2023, each containing 9 or 10 individual sheets representing each year. Within these sheets, data is provided for multiple 4+1 programs operational during the semester, along with grade distributions across various programs.

Project Tasks:

- **Data Preprocessing:** Cleanse, transform, and scale the dataset to render it compatible with model requirements. This entails addressing missing values, and outliers, and handling categorical features.
- **Exploratory Data Analysis:** Conduct an in-depth exploration of the dataset to uncover relationships among its features and gain valuable insights.
- **Formulate Questions:** Develop a minimum of two distinct questions based on the dataset to guide the analysis and model development process.
- **Model Selection:** Opt for suitable machine learning algorithms, including options like linear regression, decision trees, random forest, or artificial neural networks, for the project tasks.
- **Model Evaluation:** Assess the performance of the selected models using various metrics and compare their effectiveness.

Deliverables:

- A detailed **report** documenting the entire project, including data preprocessing, EDA, model selection, and evaluation.
- A well-**documented** and **commented** codebase, including scripts for data preprocessing, model training, and testing.
- A **presentation** summarizing the project's key findings, insights, and limitations.