Machine Learning

Course Overview and Introduction to Machine Learning

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Course Information

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- Language: English and Vietnamese

What We Learn in This Course

- Artificial Intelligence (AI) and Machine Learning (ML) concepts
- Supervised ML and Unsupervised ML
- Data quality, pre-processing and visualization
- Algorithms: regression, classification and clustering
- Evaluating predictive models

Expected Outcomes

- Explaining the basic concepts and terminologies in ML
- Distinguishing the stages in an ML project
- Understanding the working mechanism of ML algorithms
- Being able to utilize softwares for exploring and analyzing data
- Developing teamwork skills and presentation skills

Course Outline

- Fundamental Topics
  - Linear Regression
  - k-Nearest Neighbor
  - Logistic Regression
  - Decision Tree
  - Naive Bayes
  - Support Vector Machine
  - Clustering
  - Artificial Neural Network
- Extended Topics
  - Subset Selection: Lasso, Elastic Net, Stepwise Feature Selection
  - Hypothesis Testing for Linear Regression
  - Hypothesis Testing for the Lasso

Grading

- Progress
- Lab exercises
- **Final project**
  - Build and evaluate an ML model using a real-world dataset of your choice, categorized under one of the following fields:
    - Education
    - Agriculture
    - Healthcare
    - Environmental Sustainability
  - Develop a website showcasing your project
  - Prepare slides and presentation
  - Summarize your report with 3 or 4 pages including introduction, problem setup, method, experiments, conclusion, and tasks assigned to each member
  - English report is preferred, but Vietnamese report is also OK
- **Final exam**

Schedule for the Final Project Presentations

- 3 groups / week
- Week 12: Groups 1 $\sim$ 3
- Week 13: Groups 4 $\sim$ 6
- Week 14: Groups 7 $\sim$ 9
- Week 15: Groups 10 $\sim$ 12

AI vs ML vs Deep Learning (DL)

- AI
- ML and Traditional Programming
- DL
- Applications

Types of Problems in ML

- Supervised learning
  - Regression
  - Classification
    - Binary classification
    - Multi-class classification
- Semi-supervised learning
- Unsupervised learning

Q & A

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