Artificial Intelligence III: Artificial Intelligence and Deep Learning

Assignment

The objective of the assignment is to investigate a machine learning problem within the framework of a real-world dataset. You can select a machine learning topic that is relevant to the study.

The project consists of three main components: 1) selecting an engaging topic and dataset, 2) implementing one or more suitable machine learning techniques, and 3) writing a report.

Evaluation Criteria

- Understanding on machine learning 50%
- Experimental Setting, Analysis and Discussion 30%
- Report Writing 10%
- Submission requirements 10%
- Novelty +10% (bonus)

Requirements

Programming

- You can freely choose any programming platforms and languages, but Python is highly recommended. A Python tutorial is provided.
- readme.txt, which includes the following items, should be prepared
  - The programming language and platform you used
  - The procedure of executing your problem
  - Description of the purpose of each program file
- Compress all related program files and readme.txt as a ZIP file named "XXXX-YY-Program.zip", where XXXX is your student ID and YY is your name.

Report

- No programming code should be included.
- Complete sentences should be used and avoid point form.
- The report should be less than 5 pages according to the provided

template file. Only the words in blue can be modified, and DO NOT CHANGE the format setting. The template can be downloaded from the following link:
http://www.mlclab.org/teaching/AI/notes-bio/report.docx

- You should save your report as a PDF file named as "XXXX-YY-Report.pdf", where XXXX is your student ID and YY is your name.

Submission and Due Date

- Compress "XXXX-YY-Program.zip" and "XXXX-YY-Report.pdf" as "XXXX-YY.zip", where XXXX is your student ID and YY is your name.
- Send these the final zip file to your monitor by 30-April-2026.

Applications and Ideas

If you choose your own application, please discuss it with me in advance.

Spambase
Application: http://archive.ics.uci.edu/ml/datasets/Spambase
Project idea:

- Identify spam
- Investigate the similarity of e-mails

Blood Transfusion Service Center
Application: http://archive.ics.uci.edu/ml/datasets/Blood+Transfusion+Service+Center
Project idea:

- Predict whether a donor donated blood in March 2007

Yeast Data Set
Application: http://archive.ics.uci.edu/ml/datasets/Yeast
Project idea:

- Predict the Cellular Localization Sites of Proteins

Glass Identification Data Set
Application: http://archive.ics.uci.edu/ml/datasets/Glass+Identification
Project idea:

- Predict the type of glass base on their oxide content (i.e. Na, Fe, K, etc)

The ORL Database of Faces (difficult)

Application: http://www.cl.cam.ac.uk/research/dtg/attarchive/facedatabase.html

Project idea:

- Recognize faces based on pictures

Atari Games "Breakout" (Reinforcement Learning)

Application: http://gym.openai.com/envs/#atari

Project idea:

- Play "Breakout" with RL agents to achieves better performance than human players

Netflix Prize Dataset

Download: https://www.kaggle.com/netflix-inc/netflix-prize-data

Project Idea:

- Predict the rating a user on a movie
- Investigate similar movies or users

Object Recognition

Download: https://www.kaggle.com/jessicali9530/caltech256

Project idea:

- Predict identify and recognize object
- Investigate the similarity of objects

Facial Expression Recognition

Download: https://www.kaggle.com/c/challenges-in-representation-learning-facial-expression-recognition-challenge/data

Project idea:

- Predict the emotion of a person on a facial image
- Investigate the similarity of emotions