Artificial Intelligence & Its Applications

Assignment

The assignment aims to explore an interesting artificial intelligence problem of your choice in the context of a real-world data set. You will decide a related AI topic of the study.

The project includes 1) picking an interesting topic and the dataset, and 2) applying at one or more appropriate artificial intelligence techniques.

Important Criteria

- *Novelty*: Novelty is very important
  - novel application for existing algorithms
  - novel idea to solve existing problem
- *Motivation and Problem Statement* should be stated clearly
- *Discussion*: The results should be discussed and explained.
- *Clarity*: The writing style and the clarity of the written paper.

Report Requirement

Final Report

The study should demonstrate your deep understanding on the selected application and AI algorithms.

Content

- Title
- Introduction: describes the problem you tackle
- Method: a description of the method(s) you tried and the novelty if any
- Experiment: describe the setting and results of the experiment. Discussion should also be included. No programming code should be included.
- Conclusion

Point form should NOT be used in writing the report.

Report Format and Page limit

- ***The report should not be longer than 2 pages*** in the default standard of Microsoft WORD file. The detail template is attached as: http://www.mlclab.org/teaching/AI/assignment/template.zip

Submission and Due Date

The final report is named as "XXXX_YY.pdf"
Compress all related program files as a ZIP file named "XXXX_YY.zip"
where XXXX is your student ID and YY is your name.

Send these two files to your monitor by 14-August-2020.

Example: Application and Idea

National Highway Planning Network (NHPN)

Application: http://osav-usdot.opendata.arcgis.com/datasets/0ad03e8a10e9445f8d2f14f0955b18cb_0

Project idea:

- Calculate the shortest path from one location to another

ego-Facebook

Application: https://snap.stanford.edu/data/ego-Facebook.html

Project idea:

- Search someone's potential social relationships through each person's friends list in Facebook

Amazon product co-purchasing network and ground-truth communities

Application: https://snap.stanford.edu/data/com-Amazon.html

- Search for all other products that may be purchased together when buying a product

Patent citation network

Application: https://snap.stanford.edu/data/cit-Patents.html

- Search who / which patents cited this patent, which patents are cited in this patent, and what other patents are cited in the patents that cited this patent.

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