COMP840/COMP780
Machine Learning Applications and Tools
Course Syllabus *

BASIC INFORMATION
Course Information
Credits: 4
Term: Fall 2018
Time: Thursday 1-3:50pm
Location: **Rm126**, Pandora Mill building

Instructor Information
Name: Karen Jin
Office: Rm 139, Pandora Mill building   Office hours: https://calendly.com/karenajin
Email: karen.jin@unh.edu

Course Description
Introduces students to practical approaches of machine learning. The course is an exploration of creative applications of artificial intelligence using modern machine learning components and tools, including deep learning techniques. Different application domains are considered, such as computer vision, natural language processing, and cyber security. Students learn to evaluate the effectiveness of machine learning systems as well as their potential prediction problems.

Course Objectives
Upon completion of this course, students should be able to:
- Learn how to promote yourself using tools such as Github, Juypter Notebook and Kaggle.
- Use Python's essential libraries including pandas, NumPy, SciPy, scikit-learn and Matplotlib.
- Learn how to use Tensorflow to build Machine Learning models and deploy them on Cloud ML Engine.
- Learn to apply Machine Learning techniques to both well-known data sets and new datasets with supervised learning and unsupervised learning.
- Create a reproducible portfolio that highlights your ability to perform as a Machine Learning practitioner.

Required Text:
- Aurélien Géron , "Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems", O'Reilly, 2017
  Notebooks available from https://github.com/ageron
- Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2016
  Text and notebooks available from https://github.com/jakevdp/PythonDataScienceHandbook

Course materials are available through MyCourses and my JupyterHub: www.comp840.club

Grading:

- **Homework: 20%**
  - Bi-weekly (approximately)
  - Individual assignments
  - Full Credit or No Credit (if incomplete or late)

- **In-class Quizzes: 10%**
  - Beginning of every class
  - From past week's content including assigned reading
  - One A4-size page of handwritten note allowed
  - Lowest quiz thrown out

- **Individual Project: 30%**

  Machine Learning
  - Must use a Classification technique
  - Must use a real data set (not fake data set, i.e. randomly generated numbers)
  - Must deploy model you created
  Juypter Notebook Documentation
  - Muse have Juypter Notebook Documentation
  - Must explain in detail the accuracy of model
  - Explain the tradeoffs you made
  - Do exploratory data exploration
  Presentation: Each student will give a 10-minute presentation in class. Presentation tentatively scheduled on November 29th and December 6th.

- **Group Project: 40%**
  Teams of 2 people will be formed. Each team will deliver a machine learning regression model. To receive full credit for the Group Project you must fulfill these requirements:

  Code base: All members of the team must commit code on the project
  Machine Learning:
  - Must use a Regression technique
  - Must use a real data set (not fake data set, i.e. randomly generated numbers)
  - Must deploy model you created
  Juypter Notebook Documentation:
  - Muse have Juypter Notebook Documentation
  - Must explain in detail accuracy of model
  - Explain the tradeoffs you made
  - Do exploratory data exploration
  Presentation: Each group will give a 10-15 minute presentation in class. Presentation tentatively scheduled on December 6 and 13th.

Both Individual and Group Project will be judged according to the following criteria
- Reproducibility of the Project: Is every step reproducible in Juypter Notebook?
- Creativity: Did you create new insights that you shared to the class?
- Craftsmanship: Did you take care in crafting your presentation and put thought into little details like thoughtful data visualization?
- Difficulty: Was this a challenging problem you tackled?
- ML Technique: How did you approach the problem?
- Software Engineering Carpentry: Did you apply software engineering best practices?
- Resume Worthiness: Will this project get you a job?

COURSE POLICIES REGARDING STUDENT BEHAVIOR

Attendance
Students are responsible for attending scheduled meetings and expected to abide by the University Policy on Attendance (as stated in the *UNH Student Rights, Rules, and Responsibilities*). Students who miss a scheduled meeting have the responsibility to email instructor about the circumstances for missing the meeting within a week of the absence.

Late submissions
Policy for late submissions is very strict and applies only in exceptional cases of student illness, accident, or emergencies that are properly documented. A late submission of an homework or project artifact may be granted only if the student:
- Emails prior to the deadline and
- Explains and provides evidence for the circumstances that have prevented the student from meeting class requirement.

Failing to comply with these rules may result in no credit for the course.

STATEMENT ON ACADEMIC HONESTY
An internship is a learning opportunity, and as such, it is subject to the same academic honesty policy as any other coursework at UNH. Any attempts to defraud the internship site of hours, deception concerning hours spend at the internship, or fabrication of project proposal, report, or poster are subject to the same academic misconduct penalties as any in-class coursework.
See http://www.unh.edu/vpsas/handbook/academic-honesty for more information.

STUDENTS WITH DISABILITIES
UNH Manchester is committed to providing students with disabilities with a learning experience which assures them of equal access to all programs and facilities of the University, which makes all reasonable academic aids and adjustments for their disabilities and provides them with maximum independence and the full range of participation in all areas of life at UNH Manchester. Students who need to document their disability and determine any accommodations, services, or referrals should schedule an appointment with the UNH Manchester Disability Services Coordinator by calling 641-4170. For more information, please see http://manchester.unh.edu/student/disability.

<center>* Subject to changes and revisions</center>