Python-Based Deep Learning and AI Lecture Schedules

Xiao-Ning Tank Zhang

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E-mail: xnzhang@genetics.ac.cn
Office Hours: BJ 09:00-11:00 a.m. 14:00-17:00 p.m.
Office: BaiLab 718 DreamStudio

Web: tank.netlify.com
Class Hours: BJ 18:00-20:00 p.m.
Class Room: *Skype or TeamViewer*

Course Description

This course is based on how students learn how to use machine learning. By addressing the problem, you can learn how machine learning methods are actually used, and at the same time, Allows you to develop programming skills. Pear for several libraries used primarily by Python Basic machine learning methods such as regression analysis, logistic analysis, discrimination analysis, model evaluation, linear model selection, The techniques required for machine learning modeling, including penalization models, can be learned by actually implementing them through Python. It also uses TensorFlow to implement and learn many deep learning techniques. Artificial Neural Network , CNN(Convolutional Neural Network), RNN (Recurrent Neural Network). Not only the basic deep learning techniques but also LSTM (Long Short-Term Memory), RBM (Restricted Advanced deeper such as B oltzmann Machine), AE (Auto Encoder), GAN (Generative Adversarial Network) Learn and learn until Ning technique

Prerequisites and Co-requisites

- Python Programming Basics
- Statistical Learning

Course Objectives and Learning Outcomes

This course enhances students' ability to solve problems by applying programming and machine learning. The course also allows students to understand a variety of deep learning techniques and uses tensorflow to implement them. It increases the ability to do it.

Once students have taken this course, they will be able to:

- You will be able to program native file programs.
- You can use machine tools to implement machine learning techniques.
- Tensorflow will be available.
- You can use tensorflow to implement deep learning techniques.

Required Readings, Textbooks and other Materials

[1] A. Géron. *Hands-on machine learning with Scikit-Learn and TensorFlow: concepts, tools, and techniques to build intelligent systems*. " O'Reilly Media, Inc.", 2017.

[2] J. Hearty. *Advanced Machine Learning with Python*. Packt Publishing Ltd, 2016.

[3] A. C. Müller, S. Guido, and others. *Introduction to machine learning with Python: a guide for data scientists*. " O'Reilly Media, Inc.", 2016.

Course Teaching and Learning Methods

- Lecture: Learn about the Python Libraries, machine learning principles, tensorflow, and deep learning techniques
- Simulation/ Demonstration: There are examples available for implementing machine learning techniques using python and implementing deep learning techniques using tensorflow. Each person will practice in the scope
- Group: Conduct presentations and discussions by conducting group projects on solving problems using machine learning and deep learning techniques.

Course Policy

I will detail the policy for this course below. Basically, don't cheat and try to learn stuff. Don't be that guy.

Grading Policy

- **20%** of your grade will be determined by a midterm during normal class hours.

- **20%** of your grade will be determined by a term paper that documents your appreciation of Foghat's "Slow Ride", the most important song ever written. "Slow Ride" is what Mozart wishes *Don Giovanni* could have been.

- **10%** of your grade will be determined by your attendance and participation in class. Generally, ask questions and answer them.

- **20%** of your grade will be determined by a 20-page term paper on when exactly "The Love Boat" jumped the proverbial shark. You will address whether this shark-jumping can be attributed to Ted McGinley, the introduction of Jill Whelan as "Vicki", or some other cause.

- **30%** of your grade will be determined by a final exam.

Attendance Policy

Late Arrival of the Professor Policy

My current university, from what I have been told, asks professors to have policies written into their syllabus about what students should do if the professor is more than 15 minutes late to class. This seems like an anachronism. I will inform students via e-mail in advance of class if class is cancelled for the day. I will also contact our department secretary if something happened on the way to work. Failing that, assume the worst happened to me. I ask the students make sure that my story gets the proper treatment on an *Investigation Discovery* show. I also ask that my story be narrated by Keith Morrison.

E-mail Policy

I am usually quick to respond to student e-mails. However, student e-mails tend to do several things that try my patience. I have a new policy, effective Fall 2019, that outlines why I will not respond to certain e-mails students send. Multiple rationales follow.

1. The student could answer his/her own inquiry by reading the syllabus.
2. The student missed class for which there was no exam. I do not need to know the exact reason for a missed class. Students with excusable absences are responsible for giving me a note *in hard copy* that documents the reason for the missed class. An e-mail is unnecessary unless the impromptu absence involved missing a midterm or final.
3. The student wants to know what topics s/he missed during a class s/he skipped. The answer is always "you missed what was on the syllabus."
4. The student is protesting a grade without reference to specific points of objection. See the policy on protesting a grade in the syllabus. These e-mails tend to be expressive utility on the part of the student and do not require a response from me. Students interested in improving their knowledge of material should see me during office hours.
5. The students wants to know how many classes s/he missed at some point during the semester. I assume the student has a better answer to that question than me until the end of the semester.

6. The student is requesting an extension on an assignment for which the syllabus already established the deadline. The answer is always "no".
7. The student is "grade grubbing" or asking to round up a grade. The answer is always "no".
8. The student is asking for an extra credit opportunity, a request that amounts to more grading for the professor. The answer is "no".

Make-Up Exam Policy

There are **NO** make-ups for missed exams. Don't bother asking.

Academic Dishonesty Policy

Don't cheat. Don't be that guy. Yes, you. You know exactly what I'm talking about too.

Disabilities Policy

Federal law mandates the provision of services at the university-level to qualified students with disabilities. Make sure to include all that relevant information here.

Assignments and Student Assessments

Assignments

- group: We perform group projects about solving problems using machine learning and deep learning techniques.
- 10 Homework and Grading with level of A-F

Assignments

- Attendance 10
- Mid-term Exam 20
- Final Exam 40
- Assignments 30

Course Schedule

Students must read the following before Tuesday's class session. Important: class readings are subject to change, contingent on mitigating circumstances and the progress we make as a class. Students are encouraged to attend lectures and check the course website for updates.

Week 01, 09/09 - 09/13: Syllabus Day

No class Thursday (Political scientists usually have a conference to start the semester).

Read *all* associated documents on course website.

- Taking Good Notes
- Dos and Dont's of Writing for Students
- Assorted Tips for Students on Writing Research Papers
- Exam Grading Policy
- Fun with Attendance and Grades (i.e. Students Should Attend Class)

Week 02, 09/16 - 09/20: Python Installation, Foundation and Library Numpy

[1] J. Hearty. *Advanced Machine Learning with Python*. Packt Publishing Ltd, 2016.

Week 03, 09/23 - 09/27: Library Module of Scipy, Pandas

Your "Slow Ride" appreciation paper is due in Thursday's class.

Week 04, 09/30 - 10/04: Basic linear regression analysis of model estimation

Week 05, 10/07 - 10/11: Logistic Regression Analysis

Week 06, 10/14 - 10/18: ROC & AUC Curve, Resampling

Week 07, 10/21 - 10/25: Model Evaluation, Linear Model Selection

Week 08, 10/28 - 11/01: Penalizing Model, Nonlinear Analysis

Week 09, 11/04 - 11/08: Midterm exam

Week 10, 11/11 - 11/15: Tensor Supply Installation, Foundation

Week 11, 11/18 - 11/22: ANN , DNN

Week 12, 11/25 - 11/29: RNN , LSTM

Week 13, 12/02 - 12/06: RBM

Week 14, 12/09 - 12/13: AE

Week 15, 12/16 - 12/20: GAN

Week 16, 12/23 - 12/27: Final Exam

Week 17, 12/30 - 01/03: Party and Reward