جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Contemporary Topics in Machine Learning - CS 394D

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 394D
Course Title	Contemporary Topics in Machine Learning
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	10:30 AM - 12:00 PM | Sun Tue

Instructor(s)				
Name	**Email**	**Phone**	**Office Location**	**Office Hours**
Peter Richtarik	PETER.RICHTARIK@KAUST.EDU.SA			By appointment.

Teaching Assistant(s)	
Name	**Email**
TBA	

Course Information	
Comprehensive Course Description	In this course we will cover a range of contemporary topics in machine learning, with a specific focus on issues having to do with optimization. The course material will consist of selected recent research papers published in the last 1-5 years in venues such as ICML (International Conference on Machine Learning), NIPS (Neural Information Processing Systems), ICLR (International Conference on Learning Representations) and JMLR (Journal of Machine Learning Research).
Course Description from Program Guide	
Goals and Objectives	○ Get closely familiar with selected recent research papers in machine learning and optimization (in venues such as ICML, NIPS, ICLR, JMLR). ○ Conduct independet research by building on recent published results. ○ Present research results in a final course report, formatted as a research paper. Some of the research reports are expected to be of publishable quality - the students who produced such reports will be encouraged to talk to their advisors about the possibility to submit their reports as a paper for publication. ○ Learn to communicate ideas clearly (students will be asked to present what they have learned in class by delivering a lecture or a series of lectures). ○ Learn how to critically read a research paper. ○ Learn how to interact with a speaker by asking questions.

Required Knowledge	-Close familiarity with at least one high level programming language (e.g., Julia, C++, Java, Python, MATLAB, ...) -Mathematical maturity (background in linear algebra, calculus, probability theory, algorithms, modelling, and optimization). -Prior experience with writing a research paper is not necessary. For instance, all students who took CS390FF (Big Data Optimization) in Fall 2017 qualify.
Reference Texts	Links to papers the course will be based on will be provided throughout the course. To some extent, the list may be modified based on the background and interests of the students. The papers will be drawn from recent (last 1-5 years) machine learning conference and journal publications (e.g., ICML, NIPS, ICLR and JMLR). Example topics: variance reduction, reinforcement learning, dictionary learning, GANs, deep learning, ...
Method of evaluation	**60.00**% - Research Project **30.00**% - Oral presentation **10.00**% - Attendance and Participation
Nature of the assignments	10% Participation + activity (interaction with the speaker; quality of questions and insights, ...) 30% Each student will be required to learn new material by independent reading of relevant research papers assigned to them, and present the results in class as a lecture (or lectures). The quality of the presentation(s) (clarity, pace, interaction, level of detail, pedagogical value, ...) will be assessed. Presentations are expected to be delivered via slides (powerpoint / beamer / ...) + possibly whiteboard. 60% Quality of the final report / paper : - technical contribution - originality of the idea - clarity of the text - quality of experiments / code / system
Course Policies	Absences can be allowed in exceptional circumstances only, and need to be reported in advance.
Additional Information	The course instructor and the TA will help each student identify suitable research topics related to the selected/assigned area/topic/papers that will form the basis of the final written report (paper). Students are encouarged to discuss the topics with others (e.g., their advisor, peers), but all work (write up, code, ...) should be their own.

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/28/2018 Tue 01/30/2018	TBA
2	Sun 02/04/2018 Tue 02/06/2018	TBA
3	Sun 02/11/2018 Tue 02/13/2018	TBA
4	Sun 02/18/2018 Tue 02/20/2018	TBA
5	Sun 02/25/2018 Tue 02/27/2018	TBA
6	Sun 03/04/2018 Tue 03/06/2018	TBA
7	Sun 03/11/2018 Tue 03/13/2018	TBA
8	Sun 03/18/2018 Tue 03/20/2018	TBA
9	Sun 03/25/2018 Tue 03/27/2018	TBA
10	Sun 04/01/2018 Tue 04/03/2018	TBA
11	Sun 04/08/2018 Tue 04/10/2018	TBA
12	Sun 04/15/2018 Tue 04/17/2018	TBA
13	Sun 04/22/2018 Tue 04/24/2018	TBA
14	Sun 04/29/2018 Tue 05/01/2018	TBA
15	Sun 05/06/2018 Tue 05/08/2018	TBA
16	Sun 05/13/2018 Tue 05/15/2018	TBA
17	Sun 05/20/2018 Tue 05/22/2018	TBA
18		TBA

Note

The instructor reserves the right to make changes to this syllabus as necessary.