SPRING 2015 - STAT 853 G200

APPLICATIONS OF STATISTICAL COMPUTING (4)

Class Number: 9436 *Delivery Method: In Person*

COURSE TIMES + LOCATION:

We 9:30 AM – 11:20 AM
AQ 5008, Burnaby

Fr 10:30 AM – 12:20 PM
AQ 2122, Burnaby

INSTRUCTOR:

Jinko Graham
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Office: SC-K10553

PREREQUISITES:

Prerequisite: : STAT 830 or equivalent or permission of instructor.

Description

CALENDAR DESCRIPTION:

An introduction to computational methods in applied statistics. Topics can include: the bootstrap, Markov Chain Monte Carlo, EM algorithm, as well as optimization and matrix decompositions. Statistical applications will include frequentist and Bayesian model estimation, as well as inference for complex models. The theoretical motivation and application of computational methods will be addressed.

COURSE DETAILS:

Course Outline:

1. Foundations: review of Bayesian inference, finite precision arithmetic, pseudorandom number generation, computational efficiency in matrix operations.
2. Low-rank approximation of data: Singular-value decomposition and applications.
3. Monte Carlo estimation: importance sampling, Markov chain Monte Carlo
4. Variational Bayes approximations to posterior distributions

Grading

Assignments	35%
Participation	15%
Projects	50%

NOTES:

All grading is subject to change

Materials

RECOMMENDED READING:

-*Monte Carlo Statistical Methods, 2nd ed.* by Christian P. Robert and George Casella. Publisher: Springer
-*Numerical Optimization* (2nd ed.), by J. Nocedal and S.J. Wright, published by Springer-Verlag, 2006
-*Introducing Monte Carlo Methods with R*. By C. Robert and G. Casella, published by Springer, 2010
-*Numerical Analysis for Statisticians (2nd ed.),* by K. Lange, published by Springer, 2010

GRADUATE STUDIES NOTES:

Important dates and deadlines for graduate students are found here: http://www.sfu.ca/dean-gradstudies/current/important_dates/guidelines.html. The deadline to drop a course with a 100% refund is the end of week 2. The deadline to drop with no notation on your transcript is the end of week 3.

REGISTRAR NOTES:

SFU's Academic Integrity web site http://students.sfu.ca/academicintegrity.html is filled with information on what is meant by academic dishonesty, where you can find resources to help with your studies and the consequences of cheating. Check out the site for more information and videos that help explain the issues in plain English.

Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. http://www.sfu.ca/policies/gazette/student/s10-01.html

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