STAT 689 Advanced Bayesian Modeling and Computation

Instructor
Bani Mallick
Office
459B Blocker
Phone
845-1275
Office Hours
3-4, T/R
Email
bmallick@stat.tamu.edu

TA
Shubhankar Ray
Office
459F Blocker
Phone
458-0570
Office Hours
—
Email
sray@stat.tamu.edu

Course website
http://www.stat.tamu.edu/~sray/stat689.html
Prerequisites
STAT 608, 613, 632 or approval of instructor.

Description of course

This is a research course intended for a mixed audience of graduate students in statistics and other fields who plan to use Bayesian methods in their own research. The topics covered will provide a broad exposure to the basic concepts, methodology and applications in Bioinformatics, Biostatistics, Signal Processing, Machine Learning and related areas. Students are required to work on a project with emphasis on hands-on Bayesian computation in Matlab/BUGS; and present it at the semester end.

References


Course Outline*

1. **Hierarchical Models.** Prior distributions, Bayesian Inference, Model assessment.

2. **Bayesian Computation.** Asymptotic Methods, Non-iterative, Markov Chain, Sequential and Reversible Jump Monte Carlo methods.

3. **Model Criticism and Selection.** Model Choice and Model Mixing.

4. **Bayesian Mixture Models and Variable Selection.**

5. **Bayesian Classification and Regression.** Linear and Non-linear Regression, Support Vector Machines, Partition Models, Classification and Regression Trees.

6. **Statistical Learning.** Principal component analysis (PCA), Clustering, Kernel methods, Support Vector Machines.

7. **Spatial Models and Markov Random Fields.**


* Course Material can be changed any time at the discretion of the instructor.

Grading Policy

The course grade will be based on some HWs (20%

Statement of Plagiarism

As commonly defined, plagiarism consists of passing off as one’s own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section Scholastic Dishonesty.

Statement of Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Koldus Student Services Building. The phone number is 845-1637.

Copyright Notice

The handouts used in this course are copyrighted. By handouts, I mean all materials generated for this class including syllabi, exams, in-class material, and computer examples. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.