Graduate Summer School: Intelligent Extraction of Information from Graphs and High Dimensional Data

Monday July 11, 2005

12:00 *Week 1: High-dimensional data, relational data and kernel methods*

8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*

9:00–10:00 **Lawrence Saul** (University of Pennsylvania)
TUTORIAL - Spectral Methods for Dimensionality Reduction (Part 1)

10:00–10:30 *Break*

10:30–11:30 **Peter Jones** (Yale University)
TUTORIAL - High dimensional geometry: concentration and curvature (Part 1)

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Michael Jordan** (University of California at Berkeley)
TUTORIAL - Graphical models: parametric and nonparametric perspectives (Part 1)

2:30–3:00 *Break*

3:00–4:00 **David Heckerman** (Microsoft Research)
Learning Graphical Models from Data

4:15–5:15 **Gilad Lerman** (University of Minnesota)
Multiscale geometric clustering of data sets

5:30–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Tuesday July 12, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Lawrence Saul** (University of Pennsylvania)
TUTORIAL - Spectral Methods for Dimensionality Reduction (Part 2)

10:00–10:30 *Break*

10:30–11:30 **Peter Jones** (Yale University)
TUTORIAL - High dimensional geometry: concentration and curvature (Part 2)

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Michael Jordan** (University of California at Berkeley)
TUTORIAL - Graphical models: parametric and nonparametric perspectives (Part 2)

2:30–3:00 *Break*

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3:00–4:00 **Leon Bottou** (NEC)
Fast kernel classifiers through online and active learning

4:15–5:15 **Mauro Maggioni** (Yale University)
Diffusion Geometry and High-Dimensional Data

Wednesday July 13, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Lawrence Saul** (University of Pennsylvania)
TUTORIAL - Spectral Methods for Dimensionality Reduction (Part 3)

10:00–10:30 *Break*

10:30–11:30 **Peter Jones** (Yale University)
TUTORIAL - High dimensional geometry: concentration and curvature (Part 3)

11:30–1:30 *Lunch (Hosted by IPAM)*

1:30–2:30 **Michael Jordan** (University of California at Berkeley)
TUTORIAL - Graphical models: parametric and nonparametric perspectives (Part 3)

2:30–3:00 *Break*

3:00–4:00 **Leslie Greengard** (New York University)
Biological network analysis

4:15–5:15 **Leslie Greengard** (New York University)
Fast Multipole Method

Thursday July 14, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Lawrence Saul** (University of Pennsylvania)
TUTORIAL - Spectral Methods for Dimensionality Reduction (Part 4)

10:00–10:30 *Break*

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10:30–11:30 **Grace Wahba** (University of Wisconsin)
TUTORIAL - Reproducing Kernel Hilbert Spaces and why they are important.

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Grace Wahba** (University of Wisconsin)
TUTORIAL - The Multicategory Support Vector Machine (of Lee, Lin and Wahba)

2:30–3:00 *Break*

3:00–4:00 **Grace Wahba** (University of Wisconsin)
TUTORIAL - Regularized Kernel Estimation (RKE) From Dissimilarity Data

4:15–5:15 **Ingo Steinwart** (Los Alamos National Laboratory)
Some theoretical aspects of support vector machines and related kernel-based learning methods

Friday July 15, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Tina Eliassi-Rad** (Lawrence Livermore National Laboratory)
Relationship Detection in Semantic Graphs

10:00–10:30 *Break*

10:30–11:30 **Daphne Koller** (Stanford University)
TUTORIAL - Probabilistic Models of Relational Data (Part 1)

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Daphne Koller** (Stanford University)
TUTORIAL - Probabilistic Models of Relational Data (Part 2)

2:30–3:00 *Break*

3:00–4:00 **Ronald Coifman** (Yale University)
Diffusion geometries as organisational tools for information and data analysis

4:15–5:15 **John Lafferty** (Carnegie Mellon University)
Rodeo: Sparse nonparametric regression in high dimensions

Monday July 18, 2005

12:00 *Week 2: Image analysis and machine learning*

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Guillermo Sapiro** (University of Minnesota)
TUTORIAL - Geometry in high dimensional data and image processing (Part 1)

10:00–10:30 *Break*

10:30–11:30 **Guillermo Sapiro** (University of Minnesota)
TUTORIAL - Geometry in high dimensional data and image processing (Part 2)

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Guillermo Sapiro** (University of Minnesota)
TUTORIAL - Geometry in high dimensional data and image processing (Part 3)

2:30–3:00 *Break*

3:00–4:00 **Ronald Resmini** (NGA)
Dimension Reduction of Hyperspectral Image (HSI) Data

4:15–5:15 **James Theiler** (Los Alamos National Laboratory)
Adventures in High Dimensional Data Analysis: Hyperspectral Gaseous Plume Detection

5:30–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Tuesday July 19, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Yann LeCun** (New York University)
TUTORIAL - Energy-Based Models (Part 1)

10:00–10:30 *Break*

10:30–11:30 **Mehryar Mohri** (New York University)
TUTORIAL - Rational Kernels: A Unifying Kernel Framework for the Analysis of Text, Speech, and Biological Sequences (Part 1)

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Kevin Vixie** (Washington State University)
TUTORIAL - Metrics and Regularizations in Image Analysis (Part 1)

2:30–3:00 *Break*

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3:00–4:00 **Rick Chartrand** (Los Alamos National Laboratory)
Detecting Nuclear Materials from Cosmic-Ray Muon Scattering Data

4:15–5:15 **Tom Asaki** (Los Alamos National Laboratory)
Proton and X-ray tomography: Image analysis successes and challenges

Wednesday July 20, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Yann LeCun** (New York University)
TUTORIAL - Energy-Based Models (Part 2)

10:00–10:30 *Break*

10:30–11:30 **Mehryar Mohri** (New York University)
TUTORIAL - Rational Kernels: A Unifying Kernel Framework for the Analysis of Text, Speech, and Biological Sequences (Part 2)

11:30–1:30 *Lunch (Hosted by IPAM)*

1:30–2:30 **Kevin Vixie** (Washington State University)
TUTORIAL -Metrics and Regularizations in Image Analysis (Part 2)

2:30–3:00 *Break*

3:00–4:00 **Martial Hebert** (Carnegie Mellon University)
Unsupervised and weakly supervised extraction of information from image and video data

Thursday July 21, 2005

8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*

9:00–10:00 **Yann LeCun** (New York University)
TUTORIAL - Learning Invariant Representations in High Dimension:Application to object detection and recognition in images.

10:00–10:30 *Break*

10:30–11:30 **Ron Kimmel** (Technion, Haifa, Israel)
TUTORIAL - Introduction to numerical geometry of images

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Kevin Vixie** (Washington State University)
TUTORIAL - Metrics and Regularizations in Image Analysis (Part 3)

2:30–3:00 *Break*

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3:00–4:00 **Frédéric Cao** (Institut National de Recherche en Informatique Automatique (INRIA) - Lorraine)
A contrario detection of clusters, and application to shape recognition

4:15–5:15 **Bruno Olshausen** (University of California at Davis)
Natural image statistics and biological vision

Friday July 22, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **Yann LeCun** (New York University)
TUTORIAL - Learnable Metrics and Trainable Graph Machines.

10:00–10:30 *Break*

10:30–11:30 **Ron Kimmel** (Technion, Haifa, Israel)
TUTORIAL - Matching isometric manifolds by flat embedding

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Stanley Osher** (Institute for Pure and Applied Mathematics)
Inverse scale space for image restoration

2:30–3:00 *Break*

3:00–4:00 **Demetri Terzopoulos** (New York University)
Face recognition

4:15–5:15 **Richard Tsai** (Princeton University)
Visibility Optimizations

Monday July 25, 2005

12:00 *Week 3: Streaming data and networks*

8:00–9:00 *Continental Breakfast*

9:00–10:00 **James Abello** (Rutgers University)
TUTORIAL - Massive Graph Mining (Part 1)

10:00–10:30 *Break*

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10:30–11:30 **Prabhakar Raghavan** (Yahoo! Research)
TUTORIAL - Web classification and clustering using links

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Godfried Toussaint** (McGill University)
Proximity Graphs for Instance-Based Learning

2:30–3:00 *Break*

3:00–4:00 **Carey Priebe** (Johns Hopkins University)
Scan statistics on graphs

4:15–5:15 **Piotr Indyk** (Massachusetts Institute of Technology)
Near(est) neighbor problem in high dimensions

5:30–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Tuesday July 26, 2005

8:00–9:00 *Continental Breakfast*

9:00–10:00 **James Abello** (Rutgers University)
TUTORIAL - Massive Graph Mining (Part 2)

10:00–10:30 *Break*

10:30–11:30 **Prabhakar Raghavan** (Yahoo! Research)
TUTORIAL - Segmentation problems

11:30–1:30 *Lunch (on your own)*

1:30–2:30 **Edward Scheinerman** (Johns Hopkins University)
Random Dot Product Graphs

2:30–3:00 *Break*

3:00–4:00 **Andrew Moore** (Carnegie Mellon University)
Data structures and algorithms for tractable statistical mining of very high dimensional data.

4:15–5:15 **Michael Mahoney** (Yale University)
Fast Monte Carlo Algorithms for Matrix Operations and Massive Data Set Analysis

Wednesday July 27, 2005

8:00–9:00	*Continental Breakfast*
9:00–10:00	**Shalev Itzkovitz** (Weizmann Institute) *TUTORIAL: Analysis of Biological Networks (Part 1)*
10:00–10:30	*Break*
10:30–11:30	**Prabhakar Raghavan** (Yahoo! Research) *TUTORIAL - Vector space retrieval: extension, efficiency and evaluation*
11:30–1:30	*Lunch (on your own)*
1:30–2:30	**George Cybenko** (Dartmouth University) *Mathematics and algorithmics of process detection*
2:30–3:00	*Break*
3:00–4:00	**Terence Critchlow** (Lawrence Livermore National Laboratory) *Research Challenges in the BioEncyclopedia Project*
4:15–5:15	**William Szewczyk** (Department of Defense) *Dynamic Generalized Linear Models for Graphs*
5:30–7:30	*Dinner (Hosted by IPAM)*

Thursday July 28, 2005

8:00–9:00	*Continental Breakfast*
9:00–10:00	**Shalev Itzkovitz** (Weizmann Institute) *TUTORIAL: Analysis of Biological Networks (Part 2)*
10:00–10:30	*Break*
10:30–11:30	**Prabhakar Raghavan** (Yahoo! Research) *TUTORIAL - Variable Latent Semantic Indexing*
11:30–1:30	*Lunch (on your own)*
1:30–2:30	**Christos Faloutsos** (Carnegie Mellon University) *Finding patterns in large, real networks*
2:30–3:00	*Break*
3:00–4:00	**John Lafferty** (Carnegie Mellon University) *Conditional random fields*
4:15–5:15	**John Conroy** (Institute for Defense Analyses) *Content and the Scan Statistic for Enron*

Friday July 29, 2005

8:00–9:00	*Continental Breakfast*
9:00–10:00	**Shalev Itzkovitz** (Weizmann Institute) *TUTORIAL: Analysis of Biological Networks (Part 3)*
10:00–10:30	*Break*
10:30–11:30	**Robert Nowak** (University of Wisconsin) *Statistical Inference in Sensor Networks*
11:30–1:30	*Lunch (on your own)*
1:30–2:30	**Robert Burleson** (Lawrence Livermore National Laboratory) *Information to Insight*
2:30–3:00	*Break*
3:00–4:00	**Erik Bollt** (Clarkson University) *Cycles, Communities, Ergodicity and Communications in Network Topologies*