

COMPSCI590.2

Sample Projects

Project

- Groups of ≈ 3 people
- Week of Oct 17, project starts.
- Week of Nov 7, checkpoint.
- Nov 28/30, Presentations in class

Format

- Read 1 (or 2 related) paper carefully
- Search for related literature
- Write a survey
 - Highlight the important proof ideas in the paper
 - Briefly describe some related works
- (Optional) Find a related open problem that you are interested in and research and/or try to write some codes and see how some heuristic algorithms work in practice.

Examples

- Word Embedding
- RAND-WALK: a latent variable model approach to word embeddings.
Linear algebraic structure of word senses, with applications to polysemy. [Arora, Li, Liang, Ma, Risteski]

Examples

- Spectral algorithms for Partially observed Markov Decision Process
- Reinforcement Learning of POMDPs using Spectral Methods[Kamyar Azizzadenesheli, Alessandro Lazaric, Animashree Anandkumar]

Examples

- Tensor algorithms for Latent Parse Trees
- Identifiability and Unmixing of Latent Parse Trees
[Hsu Kakade Liang 2012]
Spectral Learning of Latent-Variable PCFGs:
Algorithms and Sample Complexity[Cohen Stratos
Collins Foster Ungar 2014]

Examples

- IRLS and Slime Mold: Equivalence and Convergence [Damian Straszak, Nisheeth K. Vishnoi]
- Interesting paper that shows why IRLS (iterative reweighted least squares) for sparse recovery is similar to “slime molds”.

Examples

- Non-convex optimization
- Stochastic Variance Reduction for Nonconvex Optimization [Sra et al.]

Example

- Tensor regression
- Learning from Multiway Data: Simple and Efficient Tensor Regression [Rose Yu, Yan Liu]