Ayan Acharya

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Research Interests

Knowledge transfer using latent variable models, Bayesian non-parametrics for dynamic state space models, matrix completion, ensemble methods for clustering and classification.

Education

- **Ph.D.**, Electrical and Computer Engineering (Specialization: Data Mining & Machine Learning)
University of Texas at Austin, Austin, TX 78712 **GPA 3.92(/4.00)** Aug 2012-Aug 2015(expected)
- **M.S.**, Electrical and Computer Engineering
University of Texas at Austin, Austin, TX 78712 **GPA 3.92(/4.00)** Aug 2009-May 2012
- **Bachelor of Engineering**, Electronics and Telecommunication Engineering
Jadavpur University, Kolkata, India **GPA 9.10(/10.00)** Aug 2005-Jun 2009

Technical Expertise

- Engineering Software and Languages: Matlab, Python, SAS, R, Mathematica.
- Computer Programming Languages and Tools: C, C++, Java, Javascript, Scala, HTML, Bash, MySQL, Gradle, Maven, LaTeX.
- Operating Systems: Windows, LINUX/UNIX, Android.

Course Works in Graduate Level

Probability and Stochastic Process I; Machine Learning; Real Analysis I; Data Mining; Sparsity, Structure and Algorithms; Introduction to Mathematical Statistics; Bayesian Statistical Methods; Optimization of Engineering Systems; Computational Statistics Applied to Bio-informatics; Advanced Data Mining; Convex Optimization; Natural Language Processing.

Internship Exposure

- Development of recommendation system for travel sites in Cognitive Scale, Austin, TX, Summer 2014.
- Learning of Yahoo! category taxonomy using labeled data from multiple corpora in Yahoo! Labs, Yahoo! Inc., Summer 2013.
- Real time collision avoidance system in car based on monocular camera vision in Office of the Chief Scientist, Qualcomm Inc., Summer 2012.
- Enhancement of product category classification in eBay Research Labs, Summer 2011.

Graduate Level Research Experience (Supervisors: Dr. J. Ghosh & Dr. R. J. Mooney)

- **Knowledge Transfer with Latent Variable Models:** In several applications, scarcity of labeled data is a challenging problem that hinders the predictive capabilities of machine learning algorithms. Additionally, the distribution of the data changes over time rendering models trained with older data less capable of discovering useful structure from the newly available data. Transfer learning is a convenient framework to overcome such problems where the learning of a model specific to a domain can benefit the learning of other models in other domains through either simultaneous training of domains or sequential transfer of knowledge from one domain to the others. In all the approaches related to simultaneous learning, a low dimensional space is maintained that is shared across multiple domains. For sequential knowledge transfer, parameters of the model trained with data from an older domain are carefully adapted to fit the new distributions. Applications of such frameworks in problems like text classification, object recognition from images, network modeling for community detection and count data evolution have shown

promising results so far. Simultaneous knowledge transfer has also been integrated with active learning to gain additional benefits in domains where labeled data is expensive to obtain. Current research is focused on applications like simultaneous knowledge transfer with explicit feedback from human annotators, development of non-parametric dynamic state-space models for analysis of count data that changes over time, and dynamic network modeling for security applications and anomaly detection.

• **Matrix Completion:** The objective is to come up with theoretical bounds on matrix completion algorithms with and without noise induced.

• **Improving classification from classifier ensemble and clustering ensemble:** This work aims at building a more consolidated classification from a classifier ensemble and a clustering ensemble. At the core of the mathematical formulation, there is a non-convex function that is optimized using a new algorithm which, in principle, is similar to block co-ordinate descent type algorithm.

Research Publication in Graduate Level

- **Journal**

1. **A. Acharya**, E. R. Hruschka, J. Ghosh, and S. Acharyya. **An Optimization Framework for Semi-Supervised and Transfer Learning using Multiple Classifiers and Clusterers**, ACM Transaction on Knowledge Discovery from Data, 9 (1) , ACM, New York, NY, USA pp.1:1–1:35, 2014.
2. L. F. Coletta, E.R. Hruschka, **A. Acharya**, and J. Ghosh, A Differential Evolution Algorithm to Optimize the Combination of Classifier and Cluster Ensembles, International Journal of Bio-Inspired Computation, 2014.
3. L. F. Coletta, E.R. Hruschka, **A. Acharya**, and J. Ghosh, Using metaheuristics to optimize the combination of classifier and cluster ensembles, Submitted to Integrated Computer-Aided Engineering.
4. J. Ghosh, **A. Acharya**. **Cluster Ensembles**, WIREs Data Mining and Knowledge Discovery: 1(4), July/Aug 2011, pp. 305-315.

- **Conference**

1. **A. Acharya**, R. J. Mooney, and J. Ghosh. **Active Multitask Learning Using Both Latent and Supervised Shared Topics**. SDM 2014.
2. S. Gunasekar, **A. Acharya**, N. Gaur, and J. Ghosh, **Noisy Matrix Completion Using Alternating Minimization**, ECML PKDD, Part II, LNAI 8189, pp.194-209, 2013.
3. **A. Acharya**, A. Rawal, R. J. Mooney, and E. R. Hruschka. **Using Both Latent and Supervised Shared Topics for Multitask Learning**. ECML PKDD, Part II, LNAI 8189, pp.369-384, 2013.
4. **A. Acharya**, E. R. Hruschka, J. Ghosh, B. Sarwar, and J.D. Ruvini, **Probabilistic Combination of Classifier and Cluster Ensembles for Non-transductive Learning** SDM, pp. 288-296, 2013.
5. L. F. Coletta, E. R. Hruschka, **A. Acharya**, and J. Ghosh, Towards the Use of Metaheuristics for Optimizing the Combination of Classifier and Cluster Ensembles, 1st BRICS Countries Congress on Computational Intelligence, pp.1-6, 2013.
6. **A. Acharya**, J. Lee, A. Chen, **Real Time Car Detection and Tracking in Mobile Devices**, ICCVE 2013.
7. **A. Acharya**, E. R. Hruschka and J. Ghosh, **A Privacy-Aware Bayesian Approach for Combining Classifier and Cluster Ensembles**. In Proceedings of 3rd IEEE International Conference on Information Privacy, Security, Risk and Trust, MIT, Boston, USA, 2011.

- **Workshop**

1. **A. Acharya**, R. J. Mooney, and J. Ghosh. **Active Multitask Learning with Doubly Supervised Latent Dirichlet Allocation**. In NIPS 2013 Workshop on Topic Models.
2. **A. Acharya**, E. R. Hruschka, J. Ghosh, and S. Acharyya. **Transfer Learning with Cluster Ensembles**. In proceedings of ICML 2011 Workshop on Unsupervised and Transfer Learning, pp. 123–132, 2012.
3. **A. Acharya**, E. R. Hruschka, J. Ghosh, and S. Acharyya. **C^{3}E: A Framework for Combining Ensembles of Classifiers and Clusterers**. In 10th International Workshop on Multiple Classifier System, 2011, LNCS 6713, pp. 269–278. Springer, Heidelberg.

- **Book Chapter**

1. **A. Acharya** and R.J. Mooney and J. Ghosh. Active Multitask Learning Using Both Supervised and Shared Latent Topics. Appearing in Pattern Recognition: from Classical to Modern Approaches, 2015, edited by: S.K. Pal and A. Pal.
2. J. Ghosh and **A. Acharya**. Cluster Ensembles: Theory and Applications. Data Clustering: Algorithms and Applications, edited by: Charu C. Aggarwal and Chandan K. Reddy.
3. J. Ghosh and **A. Acharya**. A Survey of Consensus Clustering. Appearing in Handbook of Cluster Analysis, edited by: C. Hennig, M. Meila, F. Murtagh, and R. Rocci.

References

- Dr. Joydeep Ghosh, Department of ECE, UT Austin, Email: ghosh@ece.utexas.edu.
- Dr. Raymond J. Mooney, Department of CS, UT Austin, Email: mooney@cs.utexas.edu.
- Dr. Mingyuan Zhou, McCombs School of Business, UT Austin, Email: mingyuan.zhou@mccombs.utexas.edu.
- Dr. Eduardo Raul Hruschka, Computer Science Department (SCC/ICMC), University of São Paulo (USP) at São Carlos, Brazil, Email: erh@icmc.usp.br.