Ting Liu

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Objective To find a permanent position in research labs, research-oriented companies, or financial corporations.

Research Interests My research interest lies in machine learning and data mining, with focus on nonparametric statistics, memory-based learning and kernel-based learning. I am currently interested in designing high-performance algorithms that solve fundamental tasks (such as k nearest neighbor and support vector machine) on massive and high-dimensional data sets. I am also interested in solving real-world problems, such as content-based vedio segmentation, image retrieval, biological problems and financial modeling problems.

Education

- **Carnegie Mellon University** Pittsburgh, PA, USA
  Ph.D. candidate in Computer Science.
  Adviser: Andrew W. Moore.
- **Tsinghua University** Beijing, China
  B.E. in Computer Science and Technology, June 2001.

List of Publications (thesis related)

1. *T. Liu*, A. W. Moore, A. Gray.
   New Algorithms for Efficient High-Dimensional Nonparametric Classification.
   Accepted to *Journal of Machine Learning Research*.
2. *T. Liu*, A. W. Moore, A. Gray.
   New Algorithms for Efficient High-Dimensional Nonparametric Classification.
   To appear in Chapter 4, *Nearest-Neighbor Methods in Learning and Vision*.
3. J. Adcock, A. Girgensohn, M. Cooper, *T. Liu*, E. Rieffel, L. Wilcox.
   FXPAL Experimentx for TRECVID 2004.
   Appeared in Proceedings of TRECVID 2004, March 1, 2005.
4. *T. Liu*, A. W. Moore, A. Gray, Ke Yang.
   An Investigation of Practical Approximate Nearest Neighbor Algorithms.
   Appeared in Proceedings of Neural Information Processing Systems, (**NIPS2004**)
5. *T. Liu*, Ke Yang, A. W. Moore.
   The IOC algorithm: Efficient Many-Class Non-parametric Classification for High-Dimensional Data
   Appeared in Proceedings of the Tenth ACM SIGKDD, (**SIGKDD2004**).
6. *T. Liu*, A.Gray,P.Komarek,T.Liu,A.W.Moore.
   Probabilistic Classification in High Dimensions,With Application to Drug Discovery
   COMPSTAT 2004, 16th Symposium of IASC, Prague, 2004.
7. *T. Liu*, A. W. Moore, A. Gray.
   Efficient Exact k-NN and Nonparametric Classification in High Dimensions.
   Appeared in Proceedings of Neural Information Processing Systems, (**NIPS2003**).
8. Y. Qi, A. Hauptman, *T. Liu*.
   Supervised Classification for Video Shot Segmentation
   Appeared in IEEE International Conference on Multimedia & Expo, (**ICME2003**).

List of Papers (something else I did for fun)

1. C. Lin, Z. Shan, *T. Liu*, Y. Qu, F Ren.
   Modeling and Inference of Extended Interval Temporal Logic for Nondeterministic Intervals
   Appeared in *IEEE Transactions On Systems, Man, and Cybernetics*, 2005, 35(5):682-696

2. *T. Liu*, C. Lin, W. Liu.
   Linear temporal inference of workflow management system based on timed Petri net models.
   Appeared in *Acta Electronica Sinica*, Feb. 2002, 30(2): 245-248.

3. *T. Liu*, C. Lin, W. Liu.
   The inference engine of extended interval temporal logic.
   Appeared in *Chinese Journal of Computers*, 2002, 25(6):637-644.

4. C. Lin, *T. Liu*, Y. Qu.
   Extended interval temporal logic for undetermined Interval:modeling and linear inference using time Petri nets.
   Appeared in *Chinese Journal of Computers*,2001, 24(12):1299-1309.

Professional Experiences

- **Summer Intern** June 2005 – Oct. 2005
  Google Inc. Mountain View, CA
  My work in Google mainly focused on near-duplicate image search problem. By extending a previous research project, we developed very efficient and scalable algorithm capable of finding approximates nearest neighbors and clustering more than 1 billion images.
  References: Dr. Henry Rowley, Dr. Chuck Rosenberg

- **Summer Intern** June 2004 – Sept. 2004
  Fuji Xerox Palo Alto Laboratory Palo Alto, CA
  My work in FXPAL mainly focused on building a simple general framework for automatic Video Shot Segmentation, and we submit our result to TRECVID04 evaluation, and ranks 2nd among 35 submissions from world-wide participants.
  References: Dr. Matthew Cooper, Dr. Eleanor Rieffel

- **Technical Consultant** Sept. 2004 – Sept. 2005
  Fuji Xerox Palo Alto Laboratory Palo Alto, CA
  We extend our work of shot segmentation to story based segmentation.
  References: Dr. Matthew Cooper, Dr. Eleanor Rieffel

Patents

Matthew Cooper, *T. Liu*, and Eleanor Rieffel
Media Segmentation Combining Similarity Analysis and Classification, Filed 11/12/2004.

Research Experiences

- **Image Retrieval (On going)**
  We are working on detecting whether an image is a near duplicate or a sub image of a database of images
  References: Prof. Martial Hebert, Ke Yan

- **3-D models for Computer Vision**
  One popular approach to recognizing objects in 3D data is to use semi-local shape signatures to find similarly-shaped regions between a scene and objects from a model database, conventional algorithm is slow, we are investigating the application of our new data-structure to further enhance recognition speed.
  References: Prof. Martial Hebert, Dr. Daniel Huber

- **Efficient Nonparametric Classification in High Dimensions**
  We designed new ball tree algorithms to achieve non-approximate acceleration of high dimensional nonparametric operations such as k nearest neighbor classifiers and the prediction phase of Support Vector Machine classifiers.
  References: Prof. Andrew W.Moore, Prof. Alexander Gray.
- **Pfizer Global Research and Development**
  Computational chemistry and proteomics for drug design. High-throughput screening (metric learning, classification).
  References: Prof. Andrew W. Moore, Prof. Alexander Gray.

Awards and Honors

- Carnegie Mellon University Doctorate Fellowship, 2001 – 2004.
- Graduated with Honor from Tsinghua University, 2001.
- *Tsinghua-ISS Scholarship* for outstanding students, 2000.
- Beijing outstanding college student of the year, 1999.
- *Tsinghua-Sony Scholarship* for outstanding students, 1998.
- First Prize in National Mathematics Contest (China), 1995.

Teaching Experiences

- **Teaching Assistant** Jan. 2005 – May. 2005
  Computer Science Department, Carnegie Mellon University Pittsburgh, PA
  "15-381, Artificial Intelligence"
  Reference: Prof. Andrew W. Moore, Prof. Martial Hebert
- **Teaching Assistant** Jan. 2004 – May. 2004
  Computer Science Department, Carnegie Mellon University Pittsburgh, PA
  "15-780/16-731, Anvanced AI concepts / Fundamentals of AI for Robotics"
  Reference: Prof. Chris Atkeson.

References

- **Prof. Andrew W. Moore**
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  `awm@cs.cmu.edu`
- **Prof. Martial Hebert**
  Computer Science Department, Carnegie Mellon University.
  5000 Forbes Ave. Pittsburgh, PA 15213, USA. (412) 268-2585
  `awm@cs.cmu.edu`
- **Dr. Jeff Schneider**
  Robotics Institute, Carnegie Mellon University.
  5000 Forbes Ave. Pittsburgh, PA 15213, USA. (412) 268-2339
  `Jeff.Schneider@cs.cmu.edu`
- **Dr. Matthew Cooper**
  Fuji Xerox Palo Alto Laboratory, Inc.
  3400 Hillview Ave. Palo Alto, CA 94304, USA. (650) 813-7765
  `cooper@fxpal.com`