

Kwokleung Chan

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Objective

Staff scientist position in application and development of machine learning and statistical techniques in advanced data analysis.

Education

Doctor of Philosophy, Physics, University of California, San Diego, Jun 2002

Dissertation: Bayesian Learning in Classification and Density Estimation

Adviser: Terrence J. Sejnowski

Master of Science, Physics, University of California, San Diego, 1996

Bachelor of Science, Physics, (First Honor degree), The Hong Kong University of Science and Technology, 1994

Qualification Highlights

- Extensive knowledge in theories of machine learning, probability and information processing such as statistical pattern recognition, unsupervised classification, Bayesian method, graphical models and information entropy.
- In-depth knowledge of various machine learning algorithms and theories, for example, multilayer perceptron, support vector machines, hidden Markov model, dynamics programming, belief network, classification tree, feature extraction and bootstrapping.
- Proven abilities to apply and develop the above concepts for bio-medical and speech data analysis.
- Rich experience in communicating with domain experts to exchange ideas and convey mathematical concepts in non-technical language.
- Excellent analytical skills, fast learner and strong problem solver.

Skills

- Computer skills: Matlab, C, Fortran and Java, C++, SQL, Perl, R and S-plus, SAS, Labview, Unix, Windows and MS office.
- Fluent in English and Chinese.

Work Experience

- Postgraduate Researcher (2002-now):
Application of machine learning techniques in emotion recognition from speech and in classification of glaucoma.
- Collaboration with UCSD Shiley Eye Center glaucoma diagnosis and treatment group (2000–2002):
Successful applications of various machine learning techniques in analyzing glaucoma SAP, SWAP and HRT data. Development of classifiers that detect glaucoma conversion using SAP 3–4 years earlier than traditional methods. Identification of SAP and HRT variables essential to glaucoma prediction.
- Research Assistant, Institute for Neural Computation, UCSD (2000-2002):
Research and development of machine learning algorithms such as Bayesian network for pattern recog-

nition and speech feature extraction.

- Research Assistant, Computational Neurobiology Laboratory, The Salk Institute (1997-2002): Development and implementation of advance techniques such as independent component analysis and Bayesian method for use in data mining and studying neural information processing.
 - Teaching Assistant, Department of Physics, University of California, San Diego (1995-2000): Leading tutorial, discussion and laboratory sessions.
- † References available upon request.

Professional Activities

Reviewer for journals: *Neural Computation* and *Journal of Machine Learning Research*

Member of Society for Neuroscience

Talks

1. 9th Joint Symposium on Neural Computation, Caltech: Handling Missing Data with Variational Bayesian Estimation of ICA, (2002)
2. 3rd International Conference on Independent Component Analysis and Blind Signal Separation: Variational Learning of Clusters of Undercomplete Nonsymmetric Independent Components, (2001)
3. UCSD Institute for Neural Computation: Comparison of Machine Learning and Traditional Classifiers in Glaucoma Diagnosis, (2000)

Selected Publications

1. Kwokleung Chan, Te-Won Lee, and Terrence J. Sejnowski. Handling missing data with variational Bayesian learning of ICA. In Suzanna Becker, Sebastian Thrun, and Klaus Obermayer, editors, *Advances in Neural Information Processing Systems 15*. MIT Press, 2003. (accepted).
2. Kwokleung Chan, Te-Won Lee, and Terrence J. Sejnowski. Variational learning of clusters of undercomplete nonsymmetric independent components. *Journal of Machine Learning Research*, 3:99–114, 2002.
3. Kwokleung Chan, Te-Won Lee, Pamela A. Sample, Michael Goldbaum, Robert N. Weinreb, and Terrence J. Sejnowski. Comparison of machine learning and traditional classifier in glaucoma diagnosis. *IEEE Transactions on Biomedical Engineering*, 49(9):963–974, Sep 2002.
4. Oh-Wook Kwon, Kwokleung Chan, and Te-Won Lee. Speech feature analysis using variational Bayesian PCA. *IEEE Signal Processing Letters*, 10(4), Apr 2003.
5. Pamela A. Sample, Kwokleung Chan, Catherine Boden, Te-Won Lee, Robert N. Weinreb, Terrence J. Sejnowski, and Michael Goldbaum. Mixture of factor analysis of standard visual fields. In *International Perimetric Society Meeting*, Startford-upon-Avon, England, June 26-30 2002.
6. Pamela A. Sample, Michael H. Goldbaum, Kwokleung Chan, Catherine Boden, Te-Won Lee, Christiana Vasile, Andreas G. Boehm, Terrence Sejnowski, Chris A. Johnson, and Robert N. Weinreb. Using machine learning classifiers to identify glaucomatous change earlier in standard visual fields. *Investigative Ophthalmology & Visual Science*, 43(8):2660–65, 2002.
7. Michael H. Goldbaum, Pamela A. Sample, Kwokleung Chan, Te-Won Lee, D. McGuire, Terrence J. Sejnowski, and Robert N. Weinreb. Analysis of glaucomatous visual field patterns found with unsupervised learning using independent component analysis and principal component analysis. In *Annual Meeting of the Association of Research in Vision and Ophthalmology*, Fort Lauderdale, Florida, May 5-10, 2002.