Zhenyu Guo

Signal and Information Lab
Dept. of Electrical and Computer Engineering
The University of British Columbia

Phone: (778) 918-7696
Email: zhenyug@ece.ubc.ca
Homepage: http://www.ece.ubc.ca/~zhenyug

Education

The University of British Columbia, Canada, 2009-2013(expected).

- Ph.D. Candidate, Electrical and Computer Engineering.
- Supervisor: Dr. Z. Jane Wang

Zhejiang University, China, 2005-2009.

- B.E., Excellent Bachelor Thesis, Automation.

Hong Kong University of Sci & Tech, Hong Kong, 2007.

- Exchange Student, Deans List, ECE.

Publication

Journal

1. Zhenyu Guo, Z. Jane Wang, and Ali Kashani, **Home Appliance Load Modeling from Aggregated Smart Meter Data**, under revision, IEEE Transactions on Power Systems, Sep. 2013.
2. Zhenyu Guo and Z. Jane Wang, **Cross-Domain Object Recognition via Input-Output Kernel Analysis**, IEEE Transactions on Image Processing, Vol. 22, Issue 8, Aug. 2013.
3. Zhenyu Guo and Z. Jane Wang, **An Unsupervised Hierarchical Feature Learning Framework for One-Shot Image Recognition**, IEEE Transactions on Multimedia, Vol. 15, Issue 3, Apr. 2013.

Conference

1. Zhenyu Guo and Z. Jane Wang, **Physiological Parameter Monitoring for Drivers Based on Video and Independent Vector Analysis**, submitted, ICASSP, 2014.
2. Zhenyu Guo and Z. Jane Wang, **An Adaptive Descriptor Design for Object Recognition in the Wild**, IEEE International Conference on Computer Vision (ICCV), accepted, 2013.
3. Zhenyu Guo and Z. Jane Wang, **Metric Based Gaussian Kernel Learning for Classification**, ICASSP, 2013.
4. Zhenyu Guo and Z. Jane Wang, **Cross-Domain Object Recognition by Output Kernel Learning**, IEEE International Workshop on Multimedia Signal Processing(MMSP), 2012.
5. Zhenyu Guo and Z. Jane Wang, **One-shot Recognition Using Unsupervised Attribute-Learning**, Pacific-Rim Symposium on Image and Video Technology(PSIVT), 2010.

Patent

1. Keith Edmonds, Ali Kashani, Zhenyu Guo and Janice Cheam, "Demand Response Optimization" Patent No. US 61/811670, filed in April, 2013.
2. Ali Kashani, Janice Cheam, Jonathan Hallam, and Zhenyu Guo, "Method and System for Forecasting Power Requirements Using Granular Metrics," Patent No. US 61/564839, filed on November 29, 2012.

Experience and Projects

Computer Vision Scientist, **Pantoscope Media Inc.**, Vancouver, June 2013 to present.

I designed and implemented an object recognition system on iOS with all the computation on the client side. I also optimized the code with LAPACK, CBLAS and other scientific computing packages to make it efficient on iOS devices. The system involves local **Image Descriptors**, **Vector Quantization**, **Sparse Coding**, **Spatial Pyramid**, **Kernel Mapping**, **Linear SVM**, **Kernel SVM**, and **Struct-SVM**.

Data Scientist, **Energy Aware Technology Inc.**, Vancouver, April 2012 to present.
Parts of the work are archived in [Journal 1], [Patent 1], and [Patent 2].

Load Disaggregation: I invented an algorithm called **Explicit Duration HMM with Differential Observations**, to detect and estimate power signals generated by specific devices from aggregated power signals. The load disaggregation system also involves **Additive Factorial HMM**, **Template Matching**, **Dynamic Time Warping**, **Spectral Clustering** based on **Normalized Cut**, and etc.

Load Forecasting: I designed an algorithm based on **Additive Kernel Gaussian Process** to capture the periodic and smooth properties of the total power demand of a region.

AC Identification: I designed an specific algorithm based on **Latent-SVM** to classify houses with air conditioners using the hourly aggregated power data.

Visiting Researcher, **Max-Plank-Institut for Informatik**, Saarbrucken, Germany, 2011

I worked on an object detecting algorithm based on **struct-SVM** with **branch and bounding** mechanism, and utilizing multiple image features.

Research Assistant, **University of British Columbia**, Vancouver, September 2009 to present.

Adaptive Descriptor Design: I formulated the relationship between photo editing functions (pixel mapping) and the gradient based image descriptors, and adopted **Multiple Kernel Learning** method to learn an optimal editing function that can improve the performance of the object classification [Conference 2].

Domain Adaptation: I introduce the output kernel space analysis to the area of domain adaptation, and designed a **Input-Output Kernel Learning** method that can overcome the domain shift in both input and output kernel space through learning optimal kernels in both spaces [Journal 2].

One-shot Recognition: I designed a **deep structure** based on **Hierarchical Dirichlet Process (HDP)** to learn multiple layers of features for one-shot recognition.[Journal 3].

Physiological Parameters Monitoring Based on Video Data I designed an algorithm adopting facial landmark estimation and **Independent Vector Analysis (IVA)** to abstract Blood Volume Pulse(BVP) signals from facial video data [Conference 1].

Skills

C++, MATLAB.

Scientific Community Service

Reviewer for *IEEE Transactions on Image Processing*, *IEEE Transactions on Multimedia*, *IEEE Transactions on Signal Processing*, *IEEE Transactions on Information Forensics and Security*, *IEEE Signal Processing Letter*, *IEEE Transactions on Smart Grid*.