Miao Sun

CONTACT INFORMATION

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RESEARCH INTERESTS

Computer vision with special interests in object detection, image classification, and activity analysis; Machine learning with special interests in local learning and transfer learning.

EDUCATION

University of Missouri, Columbia, MO USA

Ph.D. Candidate in Electrical and Computer Engineering
GPA: 4.0/4.0

- Thesis Topic: "Adaptive Object Detection in Large Scale Database"
- Advisor: Prof. Tony X. Han

University of Science and Technology of China, Hefei China

Bachelor of Engineering, Dept. of Automation, July, 2011
Weighted score: 88.94/100

RESEARCH EXPERIENCE

University of Missouri, Columbia, MO USA

Research Assistant of Professor Tony X. Han **Aug. 2011 - present**

- **Object Detection for PASCAL VOC Challenge**
  Under the direction of Professor Tony X. Han, I was the key personnel of the MU object detection team for the PASCAL VOC challenge. We ranked 7th worldwide. In our team, I was in charge of:
  1.HOG-LBP feature extraction;
  2.Deformable model training using latent SVM;
  3.Post-processing through context re-scoring to boost the final performance.
- **Action Recognition Using Bag of HOG Variations**
  We developed a mid-level feature, Histogram of Oriented Gradient Variations(HOGV), for action recognition with the bag-of-visual-words model. The HOGV feature is the temporal variation of the stable HOG feature, which is not only stable due to its cell-block structure, but is also capable of capturing the static and dynamic characteristics of human actions. This work has been submitted to the International Conference on Image Processing 2012(ICIP 2012).
- **The Implementation of Convolutional Neural Network(CNN)**
  I implemented a Convolutional Neural Network for object recognition based on the paper: *Gradient-Based Learning Applied to Document Recognition.* I tested the CNN on the UMIST Database, which contains 574 images of 20 individuals. We achieved a testing accuracy of 99.13%. This component has been used for the face localization demo of our lab.
  Now, I am focusing on learning hierarchical models which simultaneously represent multiple levels including pixel intensities, edges, object parts, objects, and beyond. Geoffrey E. Hinton's work about using a Restricted Boltzmann Machine to model each new layer of higher level features and Andrew Y. Ng's work about Convolutional Deep Belief Networks, which designs a generative version of the pooling / subsampling units, inspires me to apply a modified Convolutional Neural Network on Deep Architectures. Work will be submitted to the Conference on Computer Vision and Pattern Recognition 2013(CVPR2013)
- **Investigating the Possibility of Combining AdaBoost with Sparse Linear SVM**
  I wrote a Linux C++ version of RealBoost based on the paper: *Additive Logistic Regression: a*

Statistical View of Boosting. I am currently investigating the learning scheme of using RealBoost to select features and combine with sparse linear SVM to improve the performance.

University of Science and Technology of China, Hefei China

Research Assistant of Professor Zhigang Zheng. **Oct. 2009 - Apr. 2011**

- **Automatic Number Plate Recognition System**
  I developed an automatic plate recognition System. The basic steps were as follows:
  1.Locate license plate using the shape feature;
  2.Orientation and scale normalization;
  3.Character segmentation using adaptive histogram-based method;
  4.Shape feature extraction to recognize the license plate.
- **Robo-game Competition** **Jun. 2009 - Sep. 2009**
  I took part in the robo-game competition in 2009. We were asked to manufacture a biped robot as a boxer. The biped robot was required to have human-like shape and to walk as human beings. The whole process of making such a robot and car can be divided into three parts: mechanical structure, circuit design and programming. I was in charge of the programming part; I developed the control program on the Single-Chip Microcomputer to control the whole system including walking, communication between operators and robots.

Publications

Xutao Lv **Miao Sun**, Tony X. Han, Zhihai He and Shihong Lao, "Action recognition using bag of HOG variations", submitted to **ICIP2012**.

Computer Skills

Languages & Software: C/C++, Python, and Matlab.
Platform: Windows, Linux, Hadoop-based map-reduced clusters.
Software package: OpenCV, STL, LTI-LIB.

Awards

- *Outstanding Student Scholarship (Grade 1), USTC, China, 2010*
- *Shanghai Institute of Microsystem and Information Scholarship, USTC, China, 2009*
- *Outstanding Student Scholarship (Grade 1), USTC, China, 2008*

Reference

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