

GUANGHAN NING

573-825-8230
gnxr9@mail.missouri.edu
2294 Pinard St,
Milpitas, CA, 95035

EDUCATION

- Ph.D. Student, Electrical and Computer Engineering, University of Missouri, 2012-present
Columbia, MO, Supervisor: Prof. Zhihai He (GPA: 3.7/4.0)
- B.S., Communication Engineering, School of Electronic and Information Engineering, Beijing Jiaotong University, Beijing, China 2008-2011

RESEARCH and DEVELOPMENT EXPERIENCE

Internship, TCL Research America, San Jose, CA, Dec '2014 - present

(1) Advanced Driver Assistance System, 1/2016 – 4/2016

- Wrote a US patent. Incorporate real-time objection recognition technology with lane detection and distance prediction.
- Developed a system with Tensorflow for Object Tracking via Temporal-Spatial Analysis.

(2) Real-time Object Recognition in Videos on Embedded Systems, 11/2015 – 1/2016

- Realized real-time object recognition on NVIDIA Jetson TX1 development kit. The chip is expected to be used in smart vehicles.
- Trained various traffic signs for street environment comprehension, using deep learning methods. It works for both camera input and video input.

(3) Violence Scene Detection in Videos, 10/2015-11/2015

- Developed a system to detect violent scenes in videos.

(4) Scene Classification and Object Recognition in Still Images, 3/2015 - 9/2015

- Used CNN to do scene classification and fast RCNN for object recognition.
- Wrote scripts to train and test using Caffe.
- Trained scenes with own data and classes.
- Set up a server to process image comprehension request.

(5) AutoEncoder for Fast Near-duplicate Image Retrieval, 2/2015-3/2015

- Used Autoencoder to extract visual features for near-duplicate image retrieval, in a TV channel retrieval project.

- Experimented using autoencoder to extract semantic features for general image retrieval.

(6) Image Retrieval using Multi-frame Cues, 1/2015- 2/2015

- Experimented various fingerprinting for the VOD (Video on Demand) project.
- Improved precision by evaluating multi-frame results.

(7) Camera Take Detection, 12/2014- 1/2015

- Camera Take is a series of camera shots within a movie taken by one camera set but cut by movie editor into discontinuous shots.
- Improved the camera take detection quality by motion estimation and SIFT matching.

Graduate Research Assistant, University of Missouri, Columbia, MO, Aug '2012 - present

Research areas: action recognition and motion analysis, license plate detection and recognition, scene text detection, camera calibration, HEVC video coding. Major research projects include:

(1) Object Search, 9/2014- 12/2014

- Built a baseline for object search with OpenSURF, using SURF as key points descriptor and k-means to build a histogram for each image as its feature, for further similarity computation.

(2) Scene Text Detection, 10/2013- 12/2014

- Developed text detection in natural scenes using a combination of SWT, MSER, Adaptive Binarization and Connected Components, with an SVM classifier with LBP and HOG features.
- Achieved state-of-the-art performance on the ICDAR2003 and ICDAR 2011 dataset.
- Published a conference paper in ICIP 2015.

(3) Facial landmark detection and localization and face alignment, 10/2013 – 12/2013

- Developed eye-alignment using an optimization method whose fitness function is of color information.

(4) Calibration and Distance Measurement Tool, 05/2013 – 5/2014

- Developed a tool to calibrate the scene with board images and stick images, as a collaboration research with biologists researching in wild life animals.
- Developed a tool to measure the distances with the calibrated scene, to help researchers learn the body length and strides of the animals.

(5) License Plate Detection and Recognition, 01/2013 – 10/2013

- Developed a system for license plate detection and recognition, using HOG features and the SVM (support vector machine) as classifier with a bag-of-words model.
- Using a global alignment method to well align the license plate.

(6) HEVC coding, 08/2012 – 12/2012

- Developed advanced adaptive in-loop filters to improve the encoder efficiency;
- Experimented to predict potential high PSNR increase region, in order to apply adaptive in-loop filter accordingly.

(7) 3D Deform-able Vehicle model, 01/2012 – 5/2012

- Implemented the 3D Deformable Vehicle model paper from Zhaoxiang Zhang using computational intelligence method to optimize the fitness function of a 3D deformable vehicle model, recognizing the type of the vehicle.

COURSE PROJECTS

(1) 3D Fighting Game Development, 1/2014- 5/2014

- Developed a 3D fighting game using Unity3D and using a fighting game engine, UFE.
- Built a MU campus stage using Autodesk 123D and Maya.
- Built character Rigs and animations with Autodesk MotionBuilder.
- Won the best project award in Computer Graphics class.

(2) Big Data Analytics Project, 8/2013- 12/2013

- Developed a Nutch-based Search Engine Running on a Hadoop Cluster with Web Interface, together with one teammate.

(3) Android Game Development, 8/2011- 12/2011

- Developed an Android Multi-player game using WIFI in ad-hoc mode, together with one teammate.

PUBLICATIONS

Conference

1. **Guanghan Ning**, Tony Han, Zhihai (Henry) He. "Scene Text Detection Based on Component-level Fusion and Region-level Verification" *IEEE International Conference on Image Processing (ICIP)*. 2015.

Journal

2. **Guanghan Ning**, Zhi Zhang, Xiaobo Ren, Haohong Wang, Zhihai (Henry) He, “Joint Audio-Video Fingerprint Media Retrieval Using Rate-Coverage Optimization” (*submitted to TCSVT*)
3. Zhihai He¹, Roland Kays², Zhi Zhang¹, **Guanghan Ning**¹, Chen Huang¹, Tony Han¹, Josh Millsbaugh³, Tavis Forrester⁴, and William McShea⁴, “Visual Informatics Tools for Supporting Large-Scale Collaborative Wildlife Monitoring with Citizen Scientists”, *IEEE circuits and systems magazine* (2015).

U.S. Patent

4. **Guanghan Ning**, Zhi Zhang, Haohong Wang, “Method And System For Content Retrieval Based On Rate-Coverage Optimization”, 00155.0048.00US, Sep 2015
5. Zhi Zhang, **Guanghan Ning**, Haohong Wang, “Mobile Search-Ready Smart Display Technology Utilizing Optimized Content Fingerprint Coding and Delivery”, 00155.0057.00US, Dec 2015
6. **Guanghan Ning**, Haohong Wang, Wenqiang Bo, Xiaobo Ren, “Deep Learning-Based Road Situation Analysis”, Mar 2016

Thesis

7. **Guanghan Ning**, “License Plate Detection and Recognition”, M.S. thesis, Dept. ECE, University of Missouri, 2013.

RELEVANT COURSEWORK

Computer Graphics (A); Cognitive Computer Vision (A); Digital Image Processing (A); Computational Intelligence (A); Supervised Learning (A-); Big Data Analytics (A); VHDL and Programmable Logic Devices (A); Algorithms (A).

PROGRAMMING SKILLS

I have extensive experience in programming and software development:

- C/C++ (60+ months)
- MATLAB (48+ months)
- Java (24+ months)
- Hardware Programming Languages: VHDL(12+ months)
- Hadoop Configuration, Pig, Hive, HBase(6+ months)
- Objective C(5+ months)

- HTML, CSS, JQuery(3+ months)

OTHER COMPUTER SKILLS

- Embedded Computing(6+ months)
- Packages: OpenCV(30+ months)
- Others: glut, OpenGL, FLTK, STL(6+ months)

REFERENCE

Available upon request.