# GU, XIUYE

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## Research Interests

- **Machine Learning:** to understand deep learning better. Also interested in approximate nearest neighbor search.
- **Computer Vision:** to solve higher level vision tasks. Particularly interested in image representation and retrieval, scene understanding.

## Education Background

**Zhejiang University**, Zhejiang, P.R. China
*Bachelor of Engineering in Computer Science expected in June 2017* *Sept. 2013 – Present*

- GPA: 93/100 (3.97/4.0), the third year GPA: 94/100 (4.0/4.0); **Rank 1/189**.

**University of California, Davis**, CA
*Global Research Experience in Advanced Technologies Program* *July 2016 – Sept. 2016*

- GPA: A (five letter grades).

## Publications

- **Xiuye Gu** and Chaoqi Wang, Cong Fu, Deng Cai. *A Revisit on Binary Code Learning for Large-scale Content Based Image Retrieval.* The $30^{th}$ IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017. Under review.
- Maheen Rashid, **Xiuye Gu**, Yong Jae Lee. *Interspecies Knowledge Transfer for Facial Keypoint Detection.* The $30^{th}$ IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017. Under review.

## Research Experience

**Research Intern – University of California, Davis**
*Advisor: Prof. Yong Jae Lee*

**Interspecies Knowledge Transfer for Facial Keypoint Detection** *July 2016 – Nov. 2016*

- Proposed a novel deep learning method for localizing animal facial landmarks via K nearest neighbor (kNN) search, thin plate spline warping network and finetuning; achieved significant improvement especially when training data are scarce.
- Implemented the holistic system in Torch and Python; obtained reasonable baseline results.
- Built a dataset with 3900 horse facial images and keypoint annotations; developed a landmark annotation tool.

**Undergraduate Member – State Key Lab of CAD & CG, Zhejiang University**
*Advisor: Prof. Deng Cai*

**A Revisit on Binary Code Learning for Large-scale Content Based Image Retrieval (CBIR)** *May 2016 – Present*

- Identified and empirically proved common insufficiencies in experimental settings of state-of-the-art deep hashing methods.

- Proposed a revised experimental setting for better evaluating hashing methods for CBIR tasks and made the setting public as a new benchmark.
- Conducted experiments under the revised setting to compare these hashing methods with traditional hashing and approximate nearest neighbor search algorithms.
- Verified and analyzed the inferiority of these deep hashing methods.

**EFANNA : An Extremely Fast Approximate Nearest Neighbor Search Algorithm Based on kNN Graph** *Feb. 2016 – June 2016*

- Contributed to the EFANNA open source C++ library and conducted comparison experiments.
- Adopted the Lanczos algorithm, the Boost and CLAPACK library to implement *Anchor Graph Hashing* and *Fast kNN Graph Construction with Locality Sensitive Hashing*; achieved high computational efficiency.
- Implemented multi-threading via OpenMP API for the EFANNA library.
- Developed the binary code search algorithm for the EFANNA library.

**License Plate Recognition System** *Sept. 2015 – Feb. 2016*

- Proposed a robust iterative license plate segmentation algorithm.
- Designed and implemented a license plate segmentation system through combining my algorithm with traditional vision algorithms; achieved the error rate of 4% on low resolution images.
- Built a license detection system with robust skew and slant correction to provide better source images for segmentation.
- Wrote three literature reviews on license plate detection, segmentation and character recognition.

## Selected Projects

**Curriculum Design Projects, Zhejiang University**
*Team leader* *June 2014 – June 2015*

- **Connect Them:** Built a novel news search engine in Python based on extensive research under the instruction of *Prof. Michael R. Lyu*, which supports searching by key words & by article, and connects semantically relevant articles; the connection is displayed by charts.
- **MiniSQL:** Designed and implemented a single-user database system in C++, comprising Buffer Manager, Record Manager, Index Manager, Catalog Manager, API, and Interpreter.
- **ZCC:** Developed an ANSI C compiler in Python, which features compiler optimizations and error handling & recovery; made it generate X86 assembly (runnable on real computers; no need for virtual machines).

**Student Research and Training Program (SRTP), Zhejiang University**
*Co-developer; Advisor: Prof. Xiaogang Jin* *March 2015 – Nov 2016*

- Developed Influx, an Android application, which features a self-defined subscription function, allowing users to select and add any list-like sections on web pages to their home-made news library.

**Computer Hardware Interest Group, Zhejiang University**
*Member; Instructor: Prof. Qingsong Shi* *March 2014 – Sept. 2015*

- **Mine Sweeper on FPGA board**: Utilized logical circuit design to develop a salute to the classic mine sweeper game in Verilog HDL, using VGA display.

- **Single-cycle and Multi-cycle CPU on FPGA board**: Designed and implemented a single-cycle and a multi-cycle CPU with 23 basic MIPS instructions through schematic design and Verilog HDL.
- **5-stage pipelined CPU on FPGA board**: Designed and implemented forwarding paths, branch 'predict-not-taken', and interrupts in my pipelined CPU with 18 MIPS instructions.

## Selected Honors And Awards

- National Scholarship in China (**1.5%**) 2015, 2016
- First-Class Scholarship for Outstanding Students (**3%**) 2015, 2016
- First-Class Scholarship for Outstanding Merits (**3%**) 2015, 2016
- Second-Class Scholarship for Outstanding Students (**8%**) 2014
- Second-Class Scholarship for Outstanding Merits (**8%**) 2014
- Honorable Mention, Interdisciplinary Contest in Modeling Contest 2016
- $2^{nd}$ Prize, Collegiate Advanced Higher Mathematics Contest of Zhejiang Province 2014
- Excellent Student Awards, Zhejiang University 2014

## Skills & Hobbies

- **Technical Skills:** Caffe, Torch, OpenCV, Python, C/C++, MATLAB, Lua, Shell Script, Java, Android development, Javascript/HTML/CSS, SQL, LaTeX.
- **Test Scores:** TOEFL - 110, GRE - **Verbal 166**, Quantitative 168, Analytical Writing 4.0.
- **Hobbies:** Programming, Mathematics, Literature, Traveling, Ping Pong, Painting, Piano.

## Extra-Cirrucular

- **Debate Team of School of Medicine:** Participated in the Newborn Cup Debate Competition and the Qizhen Cup Debate Competition.
- **Investigation on the National Intangible Cultural Inheritance–Northeast Errenzhuan:** Conducted field study of Errenzhuan and proposed new ways for its inheritance and promotion.
- **Member of Student Association of Science and Technology:** Managed the online GEEK station, GEEK*ZJU.