Zheng Rui

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About

I currently work as the Principal Research Scientist at Markable. I have a mixed background of physics and computer science. In 2012 I received PhD in physics through researching quantum phase transitions using Monte Carlo algorithms. In 2016 I got MPhil degree in computer science and my thesis is about building a customizable visual privacy protection system for photo sharing. After graduation, I joined Markable as a reserach scientist to develop commercial fashion recognition system. I have worked on several problems from quantum model simulation, network analysis, cloud computing to computer vision and deep learning. I enjoy implementing ideas and debugging systems.

Education

Hong Kong University of Science and Technology, Hong Kong   **2013 - 2016**
 Thesis: Context-aware visual privacy control
 M.Phil. in Computer Science and Engineering

Institute of Physics, Chinese Academy of Sciences, Beijing   **2006 - 2012**
 Thesis: Monte Carlo methods and applications on magnetic models
 Ph.D. in Computational Physics

Huazhong University of Science and Technology, Wuhan   **2002 - 2006**
 Thesis: Colossal magnetoresistance in Perovskite Oxide
 B.S. in Applied Physics

Work Experience

MARKABLE. Inc.   **New York**
Principal Research Scientist   *Nov 2017 - Present*
Senior Research Engineer   *Oct 2016 - Nov 2017*

 ✤ Research on learning discriminative feature represenstions for image search and recommendation of fashion items. Improve the top-2 recall on internal dataset from 12% to 71%. The training algorithms have achieved comparable performances on serveral open-sourced fashion datasets. The trained models are serving multiple clients on production. Write patents on image and video retrieval algorithms.

 ✤ Bridge research with deployment. Wrap inference pipelines as modules and dockerize them to ease the integration of research models and algorithms into production, which speeds up the catalog indexing stage significantly.

 ✤ Build the data stack. Participate in the full data loop, from writing specifications, data scraping to data cleaning, visualization and analysis. Write the database module that enables research team to easily pull clean training data.

 ✤ Guide research team to make progresses on several problems from detection, segmentation to tracking. Recruit for research and data team. Supervise interns to explore promising directions and algorithms.

 ✤ Skills: *PyTorch, Pandas, Python, Javascript, Caffe, Dask, Flask, Node, React, Qt, D3.js, Docker, Kubernetes, etc.*

Hong Kong University of Science and Technology   **Hong Kong**
Research / Teaching Assistant   *Aug 2013 - Oct 2016*

 ✤ Lead development in multiple research projects, including *OCR on Google Glass*, *Mean First Passage Time and Cover Time of random walks on different graphs*, *Context-aware visual privacy control*. Deploy state-of-the-art deep learning models on mobile for tasks including scene classification, face recognition, gesture recognition.

- ❖ Develop multiple tools and libraries, including group discussion website, image annotation tool, mobile streaming multiplexing / demultiplexing tool, face alignment library on Android, Caffe mobile library on Android.

- ❖ Administration of lab servers. Provide consultancies for other projects on problems related to machine / deep learning, computer vision and Linux.

- ❖ Teaching assistant of Courses *Operating System*, *Python Bridging Course*, *Social Network Analysis*.

- ❖ Skills: *C++, Python, Java, Android, Bash, Linux, Caffe, Torch7, Matlab, Flask, TEX.*

Beijing Zhong Ruan Co.	**Beijing**
Back End Developer	*Apr 2013 - Aug 2013*

- ❖ Develop a web based monitoring system for nuclear power plants in Shandong province.

- ❖ Set up development environment for the team and lead back end development.

- ❖ Skills: *Spring, Struts, Hibernate, JSP, Javascript, Html, CSS.*

ENIN Tech. Inc.	**Beijing**
R&D Engineer	*Aug 2012 - Oct 2012*

- ❖ Design data reconciliation and flow optimization algorithms.

- ❖ Skills: *GAMS, linear optimization.*

Institute of Physics, Chinese Academy of Sciences	**Beijing**
Research Assistant	*Sep 2006 - Jun 2012*

- ❖ Design and implement algorithms for the study of phase transitions in both classical and quantum magnetic models. Focused on Monte Carlo methods and density matrix renormalization group based methods.

- ❖ First principle calculations of band structure and magnetic properties of half-metal materials.

- ❖ Skills: *Fortran, C++, Matlab, Python, ALPS, TEX, Linux.*

PUBLICATIONS

- ❖ Jiayu Shu, Sokol Kosta, Rui Zheng and Pan Hui, *Talk2Me: A Framework for Device-to-Device Augmented Reality Social Network*, PerCom 2018 full paper and best demo award.

- ❖ Dimitris Chatzopoulos, Carlos Bermejo, Zhanpeng Huang, Arailym Butabayeva, Rui Zheng, Morteza Golkarifard and Pan Hui, *Hyperion: A Wearable Augmented Reality System for Text Extraction and Manipulation in the Air*, Proceedings of the 8th ACM on Multimedia Systems Conference, 284-295 (2017).

- ❖ Tongfeng Weng, Jie Zhang, Michael Small, Rui zheng, and Pan Hui, *Memory and betweenness preference in temporal networks induced from time series*, Scientific Reports 7, 41951 (2017).

- ❖ Jiayu Shu, Rui Zheng and Pan Hui, *Your Privacy Is in Your Hand: Interactive Visual Privacy Control with Tags and Gestures*, International Conference on Communication Systems and Networks, 24-43 (2017).

- ❖ Suren Kumar and Rui Zheng, *Hierarchical Category Detector for Clothing Recognition From Visual Data*, Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (Workshop), 2306-2312 (2017).

- ❖ Tongfeng Weng, Jie Zhang, Moein Khajehnejad, Michael Small, Rui zheng, and Pan Hui, *Navigation by anomalous random walks on complex networks*, Scientific Reports 6, 37547 (2017).

- ❖ Jiayu Shu, Rui Zheng and Pan Hui, *Cardea: Context-Aware Visual Privacy Protection from Pervasive Cameras*, arXiv: 1610.00889.

- ❖ Jiayu Shu, Rui Zheng and Pan Hui, *Interactive Visual Privacy Control with Gestures*, Proceedings of the 14th Annual International Conference on Mobile Systems, Applications, and Services Companion (Demo), 120-120 (2016).

- ❖ Carlos Bermejo, Rui Zheng and Pan Hui, *An empirical study of human altruistic behaviors in opportunistic networks*, Proceedings of the 7th International Workshop on Hot Topics in Planet-scale mObile computing and online Social neTworking, 43-48 (2015).

- ❖ Zheng Rui and Liu Bang-Gui, *Stable two-dimensional ferromagnets made of regular single-layered lattices of single-molecule nanomagnets with perpendicular anisotropy*, J. Appl. Phys. 106, 054316 (2009).

✤ Zheng Rui and Liu Bang-Gui, *Quantum Monte Carlo study of the phase transition for a generalized Two-Dimensional Staggered Dimerized Heisenberg Model*, Chin. Phys. B. <u>21</u>, 116401 (2012).

Computer Skills

OS	Ubuntu, OSX, CentOS, Android
Languages	C++, Python, Bash, Javascript, Java, Matlab, Lua, Fortran, SQL
Tools	TEX, Vim, WingIDE, Android Studio, Xcode, Inkscape, Omnigraffle
Libs	OpenCV, PyTorch, Caffe, Torch7, TensorFlow
Frameworks	Flask, React, Node