

# Zhuo Chen

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## EDUCATION

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<i>Ph.D. in Computer Science Department, Carnegie Mellon University, Pittsburgh, U.S.A</i>	<b>Sept. 2012 –</b>
Advisor: <a href="#">Prof. Mahadev Satyanarayanan</a>	
<i>B.E in Electronic Engineering, Tsinghua University, Beijing, China</i>	<b>Sept. 2008 – July 2012</b>
<i>Exchange Student, University of Wisconsin Madison, Madison, U.S.A</i>	<b>Sept. 2010 – Dec. 2010</b>

## RESEARCH INTEREST

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My research interest lies in mobile computing, distributed systems and applied computer vision. Specifically, I explore how effortless video capture of smart glasses, such as Google Glass, can benefit people with the [cloudlet](#) infrastructure.

## RESEARCH PROJECTS

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**School of Computer Science, Carnegie Mellon University** **Sept. 2012 –**

*Graduate Research* Advisor: Prof. Mahadev Satyanarayanan

### Project **Gabriel**

- I built *wearable cognitive assistance* applications that help users to complete daily tasks, such as cooking, assembling, or exercising. The system captures a user's actions using sensors from wearable devices such as Google Glass, interprets the user's state using computer vision in real-time, and gives appropriate feedback.
  - Video demos can be found at <http://goo.gl/02m0nL>.
- I designed and implemented Gabriel, a software platform that simplifies the creation of such applications. It offloads heavy computation to cloudlets for faster processing. An application level flow control mechanism is used to reduce end-to-end latency. Gabriel is capable of exploiting coarse grain parallelism on cloudlets to improve system performance, and conserving energy on mobile devices based on user context.
  - Open-sourced code base at <https://github.com/cmusatyalab/gabriel>.
- The client side of Gabriel runs on Google Glass, Vuzix M100, ODG R7, and HoloLens (hologram feedback).

### Project **QuiltView**

- In QuiltView, I built a near-real-time social network leveraging Glass's near effortless capture of first-person video. Users can pose queries to Glass users in a geographic area and receive prompt video responses. This provides much detail and context to the requester, while consuming little attention from the responder. It uses result caching, geolocation and query similarity detection to shield users from being overwhelmed by queries.

### Project **GigaSight**

- We built a scalable Internet system for continuous collection of crowd-sourced video from Glass devices. The system incorporates automatic private data removal, indexing, and content based searching at large scale.

**Wireless and Networking Group, Microsoft Research in Asia**

**Sept. 2011 – Mar. 2012**

*Research Intern* Advisor: Dr. Guobin (Jacky) Shen

### Project **Walkie-Markie**

- I built a crowdsourcing indoor mapping and localization system based on IMU sensors and WiFi infrastructure. Walkie-Markie is able to reconstruct internal pathway maps of buildings without any a-priori knowledge about the building, such as the floor plan or access point locations. The tipping points of WiFi signal strength are used as landmarks to fuse crowd-sourced user trajectories obtained from inertial sensors on users' mobile phones.

**Project Network Coordinate Optimization**

- I proposed a new Network Coordinate model “Tarantula” that divides the network space into clusters and subspaces to mitigate the negative effect of Triangle Inequality Violations (TIVs). I also proposed and verified a new iteration step size adaptation algorithm that significantly improves the prediction accuracy of short links.

**WORKING EXPERIENCE****Nod Labs**

June 2015 – August 2015

Engineering Intern

Mentor: Anush Elangovan &amp; Harsh Menon

- I implemented an Android library for 6DoF tracking of virtual reality (VR) devices (e.g. Google Cardboard) with an on-device RGB camera and IMU sensors. I proposed a new algorithm to combine IMU data and image features that outperformed other SLAM approaches. The tracking algorithm could benefit from QR code markers, but can seamlessly transit to general feature tracking when QR code is unavailable.

**SELECTED PUBLICATIONS**

- [1] Zhuo Chen, Wenlu Hu, Junjue Wang, et al. “An Empirical Study of Latency in an Emerging Class of Edge Computing Applications for Wearable Cognitive Assistance”. In *SEC*, ACM, 2017.
- [2] Zhuo Chen, Lu Jiang, Wenlu Hu, Kiryong Ha, et al. “Early Implementation Experience with Wearable Cognitive Assistance Applications”. In *WearSys*, ACM, 2015.
- [3] Kiryong Ha, Zhuo Chen, Wenlu Hu, Wolfgang Richter, Padmanabhan Pillai, and Mahadev Satyanarayanan. “Towards Wearable Cognitive Assistance”. In *MobiSys*, ACM, 2014.
- [4] Zhuo Chen, et al, “QuiltView: a Crowd-Sourced Video Response System”. In *HotMobile*, ACM, 2014.
- [5] Pieter Simoons, Yu Xiao, Padmanabhan Pillai, Zhuo Chen, Kiryong Ha, Mahadev Satyanarayanan, “Scalable Crowd-Sourcing of Video from Mobile Devices”. In *MobiSys*, ACM, 2013.
- [6] Guobin Shen, Zhuo Chen, Peichao Zhang, Thomas Moscibroda, and Yongguang Zhang. “Walkie-Markie: Indoor Pathway Mapping Made Easy”. In *NSDI*, USENIX, 2013.
- [7] Zhuo Chen, Yang Chen, Yibo Zhu, Cong Ding, Beixing Deng, Xing Li. “Tarantula: Towards an Accurate Network Coordinate System by Handling Major Portion of TIVs”. In *GLOBECOM*, IEEE, 2011.

**HONORS & AWARDS**

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|---|-------------------|
| • ACM Symposium on Edge Computing Travel Grant          | <b>Sept. 2017</b> |
| • Best Demo Award at HotMobile 2014                     | <b>Feb. 2014</b>  |
| • Excellent Graduate from Tsinghua University (top 10%) | <b>June 2012</b>  |
| • National Scholarship (top 3%)                         | <b>Oct. 2009</b>  |

**SKILLS**

- Programming:** Proficient in Python, C, Java, MATLAB; Familiar with C++, C#, MySQL, HTML
- Platform & Framework:** Proficient in Linux, Android, OpenCV;  
Familiar with Windows, Caffe, OpenStack, TinyOS, Django
- Language:** Proficient in English, Native in Mandarin

**REFERENCES**[Mahadev Satyanarayanan](#)

Professor @ Carnegie Mellon University  
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[Anush Elangovan](#)

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