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DANIEL WONG

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EDUCATION

Carnegie Mellon University *Pittsburgh, PA, USA* 2017 – Present

- Ph.D. student, Computer Science Dept. Advisor: **Greg Ganger**.
- Area: Software Systems for Machine Learning.
- Project: Mainstream: Dynamic Stem-Sharing for Multi-Tenant Video Processing (optimizing sharing of pre-trained deep neural networks for multiple real-time video processing applications).

University of Cambridge *United Kingdom* 2013 – 2016

- B.A. (2.i) in the **Computer Science** Tripos, at Churchill College.
  - Yr 1: Computer Science (CS), Mathematics, Physiology of Organisms.
  - Yr 2: CS. Best technical group project: *real-time multiplayer VR game on Oculus Rift without game engines*.
  - Yr 3: CS. **'Highly commended**' dissertation (88%): *compartmentalization of cryptographic components*.

SOFTWARE ENGINEERING EXPERIENCE

Dropbox, Software Engineer Intern – Vacuuming team. Jun 2015 – Sep 2015

- **Distributed systems**. Rewrote vacuuming system in Go to implement a robust and efficient streaming pipelined design (for petabyte-scale garbage collection of deleted Dropbox files). Implemented a distributed jobs service running across hundreds of dedicated machines.
- Removed tight coupling and reduced operational overhead by ensuring automatic failover during MySQL promotions. Decreased storage overhead by increasing system reliability, allowing it to run continuously without intervention, enabling significant cost savings and a lower storage margin (less data awaiting vacuuming) essential for BASE Jump (AWS to internal Magic Pocket migration).

Facebook, Software Engineer Intern – Core Data Cache Client team. Jul 2014 – Sep 2014

- **Distributed storage**. Improved cache consistency in widely distributed storage systems (Memcache backed by MySQL DBs, thousands of machines spread across multiple continents).
- Resolved race condition in cache invalidation mechanism that caused read-after-write inconsistencies in geographical regions with multiple MySQL database replicas.
- Worked with different parts of stack to diagnose and implement fix, ranging from: cache invalidation, Memcache PHP client, Wormhole (publish-subscribe framework), TAO (distributed graph data store), MySQL, Ads Infra. Coded in PHP/Hack and C++.

SELECTED PUBLICATIONS

- **In submission.** Angela Jiang, Daniel Wong, Christopher Canel, Ishan Misra, Michael Kaminsky, Michael Kozuch, Padmanabhan Pillai, David Andersen, Gregory Ganger, "Mainstream: Dynamic Stem-Sharing for Multi-Tenant Video Processing", USENIX ATC'18.
- **Poster.** Angela Jiang, Christopher Canel, Daniel Wong, Michael Kaminsky, Michael Kozuch, Padmanabhan Pillai, David Andersen, Gregory Ganger. "Dynamic Stem-Sharing for Multi-Tenant Video Processing" SysML'18.
- Daniel Lin-Kit Wong, Xiao-Li Li, Min Wu, Jie Zheng and See-Kiong Ng, "PLW: Probabilistic Local Walks for detecting protein complexes from protein interaction networks", BMC Genomics 2013 / InCoB 2013

RESEARCH EXPERIENCE

School of Computing, National University of Singapore. Jul 2016 – Jul 2017

- *Advisor*: Prof. Ben Leong. **Sensor systems** research investigating small slot sizes. Built a high-fidelity simulator, formulated a theoretical model and developed stochastic broadcasting patterns to improve discovery latency.

AI Group, Institute of High Performance Computing, A*STAR, Singapore Oct 2016 – Jul 2017

- *Advisors*: Dr. Rick Goh, Dr. Liu Yong. **Deep learning** research. Leveraged deep **reinforcement learning**, policy gradients and LSTMs to automate deep neural network design and conduct hyperparameter optimization. Contributed to ModStore, a data science experiment platform which I previously built a scheduler for.

Data Analytics Dept., Institute for Infocomm Research (I^2R), A*STAR, Singapore Jan 2013 – Sep 2013

- *Advisors*: Dr. Xiao-Li Li & Dr. See-Kiong Ng. **Machine learning** research. Devised a stochastic graph **clustering** algorithm that outperformed state-of-the-art methods on protein interaction network data.
- **First-authored** a paper in BMC Genomics 2013 (Impact Factor: 4.4) and received an Asia Pacific Bioinformatics Network **travel award** for an oral presentation at 12th International Conference on Bioinformatics.

School of Computing, National University of Singapore Nov 2009 – Mar 2010

- *Advisor*: Prof. Hon Wai Leong**. Algorithms** research. Improved branch & bound clique algorithm. Devised new visualization for clustering recall & precision. Bronze at Intel ISEF-affiliated S'pore Science & Engineering Fair.

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SELECTED MACHINE LEARNING & ALGORITHMS EXPERIENCE

Recommendation Systems: The Hut Challenge 2014, 2015

- **4th** (team). Ensembled random forests, random walks (PLW), and collaborative filtering to achieve a 56% improvement over baseline on a 1.8M-purchase dataset. Built a Jenkins-based ML pipeline.

Code on Github: https://github.com/wonglkd/HutChallenge13

Machine Learning: Quora ML Codesprint Jul 2013

- **Top 25%**. Performed feature engineering and utilized ensemble learning methods (e.g., random forests and gradient boosting machines) and sparse linear models using scikit-learn to do classification and regression.

Code on Github: https://github.com/wonglkd/QuoraMLCodeSprint13

Machine Learning: ACM SIGKDD Cup Apr – Jun 2013

- **Top 25%**. Competed against top researchers in ACM SIGKDD's signature competition with Microsoft Research and Kaggle. Used text mining and relational mining of 2.5M Microsoft Academic Search publications to generate pair-wise confidence scores, then applied hierarchical clustering to de-duplicate 250K authors.
- Gained experience in **SQL query plan optimization** and built a reusable ML framework using scikit-learn.

Code on Github: https://github.com/wonglkd/KDDCup13Track2

Algorithms: International Olympiad in Informatics (IOI) *Hosted by Canada in* 2010

- **Bronze** medal. 1 of 4 selected to represent Singapore in the most prestigious individual programming contest for high school students (equivalent of ACM ICPC for pre-university).
- **Silver** in Asia-Pacific Informatics Olympiad ('10) and **Gold** ('09, '10) in National Olympiad in Informatics.

SELECTED SECURITY EXPERIENCE

Cybersecurity Challenge Singapore Jul 2017

- **Winner** in cybersecurity competition organized by the Singapore Cyber Security Agency and BAE Systems.
- Represented Singapore at Cybersecurity Challenge UK **Masterclass** in London.

MIT CSAIL-Cambridge C2C Capture The Flag (CTF) Feb – Mar 2016

- **2nd** (team) in the Live Fire CTF. Leveraged security skills including binary exploitation (buffer overflows, return-oriented programming), remote code execution, fuzzing, password-cracking, and lock-picking.

Facebook-Cambridge Ethical Hacking Capture the Flag (CTF) Mar 2015

- **1st** (team) in a UK-wide CTF jointly organized by Cambridge and Facebook's security team.

SERVICE AND TEACHING

- Co-reviewer for ASE/IEEE BigData 2013 and IEEE ICDM 2013.
- Coach for Informatics Olympiad trainings. Delivered lectures on algorithms & data structures, conducting lab practical sessions and organizing mock competitions and training camps.
- Chairman of Organizing Committee for See², National Infocomm Conference for Young Leaders. Gathered 70 leaders of high school IT societies to brainstorm ways to improve their training programs and encourage interest in IT. Led a 15-student team to devise the event concept, plan logistics and publicize the event.
- Chairman of Infocomm Society, Hwa Chong Institution.

LANGUAGES & TECHNOLOGIES

- Languages: Python, C, C++, Go, PHP/Hack, Java, SQL, R, Standard ML, Prolog, HTML/CSS/JavaScript
- Frameworks: TensorFlow, Keras, scikit-learn, Protocol Buffers, Memcache, Redis, MongoDB, D-Bus (libdbus)
- Tools: GDB, DTrace, Git/Mercurial, Jenkins, Phabricator, SAP CUA/R3/BI
- Written & spoken languages: English (as 1st language), Chinese (Mandarin)

MILITARY EXPERIENCE

Singapore Armed Forces Combat Service Support Command Apr 2011 – Dec 2012

- *SAP Authorization Administrator*. Built a license tracking and CRM application to process 1,500 yearly user requests. This enabled existing assets to support 40% more users ($XX,000 in cost avoidance). Bridged gap b/w business process owners & SAP consultants to develop access control solutions to enhance business productivity. Streamlined processes, cutting turnaround time from 2 weeks to 2 days. Recognized with promotion to Corporal First Class (< 15% of cohort.)

Full testimonial: http://wonglkd.fi-de.net/military/testimonial.pdf

SELECTED PROJECTS

- **InnovateIT** competition (2009). Conceptualized a real-time ridesharing app (Uber-before-Uber), and designed an iOS web app mockup for a business pitch in a business tech case challenge. *Awarded*: **Most Creative Presentation**.
- **StrITwise** competition (2008, 2007). Designed **autonomous agents** on the **Robocode** platform using Java.
- **Spiderportal** (2007). Developed a web portal in PHP & MySQL to provide students with tools for holistic self-evaluation. *Awarded*: **Top 3** at **National Infocomm Club Awards** by Infocomm Development Authority (iDA).
- **BrainDrive** (2006). Created a driving game in **C#** & **OpenGL** controlled by EEG signals ("brain waves"). *Awarded*: **Merit** at national Singapore Youth Science Conference.