

Zhongtian (Falcon) Dai

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Education

Toyota Technological Institute at Chicago, Chicago, IL

Ph.D. in Computer Science (expected in fall 2022), Ph.D. candidate. September 2015 – present.

M.S. within Ph.D. in Computer Science. Granted in September 2017.

- Advised by Professor [Matthew R. Walter](#).
- Thesis committee: Matthew R. Walter, [David McAllester](#), [Avrim Blum](#).
- Thesis title: On Reward Structures in Markov Decision Processes.
- Select courses: learning theory, natural language processing, computer vision, dynamical systems.

The University of Chicago, Chicago, IL

B.S. with Honors in Mathematics and B.A. with Honors in Physics. September 2008 – June 2012.

Cumulative GPA: 3.76/4.00.

- Student Marshal of Class 2012 (top University distinction).
- James Franck Institute Summer Undergraduate Research Fellowship, 2011.
- Advanced courses: mathematical logic, graduate quantum mechanics, graduate general relativity.

Selected Publications

- -, Walter MR. [Loop Estimator for Discounted Values in Markov Reward Processes](#). Association for the Advancement of Artificial Intelligence conference (AAAI), 2021.
- -, Walter MR. [Maximum Expected Hitting Cost of a Markov Decision Process and Informativeness of Rewards](#). Neural Information Processing Systems conference (NeurIPS), 2019.
- -, Cai Z. [Towards Near-imperceptible Steganographic Text](#). Association for Computational Linguistics conference (ACL), 2019. [[oral presentation](#), [nominated for best paper awards](#)]
- Gehrmann S, -, Elder H, Rush AM. [End-to-End Content and Plan Selection for Natural Language Generation](#). International Conference on Natural Language Generation conference (INLG), 2018.
- -*, Cai Z*. [Glyph-aware Embedding of Chinese Characters](#). Subword and Character level models in NLP workshop at Empirical Methods in Natural Language Processing conference (EMNLP), 2017.
- Brang D, -, Zhang W, Towle VL. [Registering Imaged ECoG Electrodes to Human Cortex: A Geometry-based Technique](#). Journal of Neuroscience Methods, 64-73. 2016.

Selected Presentations

- -, Walter MR. Finite Time Analysis of Potential-based Reward Shaping. Reinforcement Learning and Decision Making conference (RLDM), 2019. [**Student travel fellowship**]
- Vasiljevic I, Kolkin N, Luo R, Wang H, -, Daniele AF, Mostajabi M, Basart S, Walter MR, Shakhnarovich G. [DIODE: A Dense Indoor and Outdoor DEpth Dataset](#). 3D Scene Understanding for Vision, Graphics, and Robotics workshop at Computer Vision and Pattern Recognition (CVPR), 2019.

- - and others at RIPL @ TTIC. Rubik's cube solving robot. National robotics week special exhibit at the Museum of Science and Industry, 2019.
- - and others at RIPL @ TTIC. Checkers-playing robot. National robotics week special exhibit at the Museum of Science and Industry, 2018.
- Schaff C*, -*, Walter MR. [Towards Active Imitation Learning](#). Learning from Demonstrations in High-Dimensional Feature Spaces workshop at Robotics: Science and Systems conference (RSS), 2017. [Student travel grant award]
- -, Nettsheim G. Simulation and Modeling of the Anode of the Proposed Large-Area Picosecond Photo-Detector. Chicago Area Undergraduate Research Symposium, 2011.

Working papers

- -, Walter MR. Towards Reset-efficient Reinforcement Learning. 2022.
- -. [Word2vec Conjecture and A Limitative Result](#). In submission, 2019.
- Vasiljevic I, Kolkin N, Zhang S, Luo R, Wang H, -, Daniele AF, Mostajabi M, Basart S, Walter MR, Shakhnarovich G. [DIODE: A Dense Indoor and Outdoor DEpth Dataset](#). In submission, 2019.

Service to the community

- Primary reviewer. ICML, NeurIPS, ACL, AAAI, ICLR, EMNLP, RSS, IJCAI, NAACL, EACL.

Selected Experience

Technical Consulting, Waymark Inc, Detroit, MI

Consultant, January 2018 - February 2018

- Prototyped and advised the CEO on an abstractive summarization system.

Teaching assistant to [Duckietown](#), Toyota Technological Institute at Chicago, Chicago, IL

Teaching assistant (to Professor Matthew Walter), October 2017 - December 2017

- Created material for the hands-on self-driving robotics course.

Research in Abstractive Summarization, Harvard University, Cambridge, MA

Visiting Research Intern (hosted by [Professor Alexander Rush](#)), July 2017 - September 2017

- Re-implemented and trained state-of-the-art methods in paragraph-to-sentence summarization.
- Maintained the open-sourced [OpenNMT-py](#) repository.

Data Science and Analytics, [Strikingly Inc](#) (a YC-funded startup), Shanghai, China

Data Scientist, February 2015 - August 2015

- Recruited and managed a data engineer.
- Analyzed user behaviors, user acquisition campaigns, user referral programs.
- Defined business growth/health metrics and implemented monitoring dashboards.

Neurological Research, Towle Lab, University of Chicago, Chicago, IL

Research Assistant (to [Professor Vernon L. Towle](#)), November 2012 – December 2014

- Developed novel methods for registering intracranial electrodes.
- Implemented state-of-the-art medical image analysis and visualization software.

Social Science Research, Knowledge Lab, University of Chicago, Chicago, IL

Research Assistant (to [Professor James Evans](#)), October 2012 – December 2013

- Built an ML pipeline to predict sociological attributes from Google StreetView images.
- Built a web application for collecting graph-structured information from users.
- Analyzed author networks induced by co-authorship and citations.

TwIthinks, a startup project, Chicago, IL and Cambridge, MA

Co-founder, April 2011 - January, 2014

- Won web track in MIT-CHIEF Business Plan Contest at Massachusetts Institute of Technology
- Built a prototype to visualize the Twitter users' reactions to 2012 presidential election.
- Initiated and completed #ivoted map on election day which received 20K pageviews in six hours.
- Featured on [MIT-CSAIL news](#) and a Swiss national news outlet Tages-Anzeiger.

Summer Research Experience in Physics, University of Chicago, IL

Technical Support for *Quantum Computing* (Professor [David Schuster](#)) and *Photon Detector* (Professor [Henry Frisch](#)), June 2009 - September 2009, June 2010 - September 2010, June 2011 - September 2011

- Modeled the secondary electron emission process, implemented simulation programs, and analyzed experiment signal data.
- built a custom spectrum analyzer and coded a custom GUI program.

Honors

- [Best paper award finalist](#) at Association for Computational Linguistics conference (ACL), 2019.
- Best app award at an invited hackathon in Shanghai, for a social chat app prototype, 2015.
- 2nd place in [BattleHack hackathon](#), for a facial recognition-assisted social payment app, 2014.
- Ranked 164th on [Kaggle](#), 2013.
- 23rd team (out of 138 teams) at International Collegiate Programming Contest (ICPC) regional, 2010.

Skills

- Programming languages: python, javascript, C, C++, CUDA, Java, prolog, SQL.
- Machine learning: pyTorch, TensorFlow, OpenAI gym, numpy, OpenNMT-py.
- Robotics: ROS, Baxter robot, MoveIt.
- "Big data" software stack: Scikit-Learn, Slurm, Spark, Hadoop, Pandas, Jupyter.
- Web development: React, D3js, WebGL, HTML5, CSS3, Node.js, PostgreSQL, MongoDB.
- Software: Atom editor, Tmux, Docker, Eclipse IDE, Git, Mathematica, Octave/Matlab, LaTeX, Bash.
- Web API's: Amazon Web Services, DigitalOcean, Google Cloud Platform, Twitter, WeChat, Firebase.
- Fluent in Mandarin and Cantonese.