Ashwin Paranjape

ashwinparanjape.github.io · ashwinp@cs.stanford.edu

INTERESTS **Natural Language Processing, Deep Learning, Conversational AI, Grounded Language Models**

EXPERIENCE

Founding AI Lead @ Samaya AI (Oct 22 - Ongoing)
- Responsible for defining and executing Samaya's AI strategy
- Tech lead for critical AI projects involving ML, engineering, design and product.
- Set up interviewing and onboarding processes for technical non-technical roles (100+ interviews).

EDUCATION

Stanford University, Stanford, CA (2016 - 22)
PhD in CS advised by **Prof. Christopher D. Manning**

Stanford University, Stanford, CA (2014 - 16)
Masters in CS with depth in AI advised by **Prof. Jure Leskovec** 3.76/4

Indian Institute of Technology, Bombay (IITB), Mumbai, India (2010 - 14)
Bachelors (with honors) in CS and Minor in EE advised by **Prof. Sunita Sarawagi**
9.69/10 (Ranked 2nd in CS)

RESEARCH OVERVIEW AND PUBLICATIONS

Neural Systems for Informative Conversations Advisor: Christopher Manning [2020 - 2022]
- We identify human strategies for informative conversations. For one of the strategies, acknowledgements, we improve chatbot utterances using conditional mutual information (**NAACL 2021**).
- For open-ended generation, we supervise a neural retriever and a generator with a posterior guide-retriever leading. After training the retriever has higher relevance and the generator is more grounded (with Omar Khattab, Matei Zaharia, Christopher Potts in **ICLR 2022**).
- How do large, pretrained language models fail when conversing with humans? We identify failure modes and quantify with robust crowdsourcing (ongoing with Stanford CRFM)

Increasing user initiative in social conversations Advisor: Christopher Manning [2021 - 2022]
- We define user initiative in the context of a social chatbot, propose automatic metrics that correlate with it and identify some strategies to improve it (with Amelia Hardy in **SIGDIAL 2021**).
- Abrupt and unnatural turn taking in voice assistants prevents quality social conversations. We define and implement a "speech manager" that replaces ASR & TTS and adds support for backchannel production and handling (ongoing with Siyan Li, under submission to **SIGDIAL 2022**)

Knowledge Base Population Advisor: *Christopher Manning* [2016-17]
- We built KBP systems as part of the winning team in in TAC-KBP shared task for 2016, 2017
- Proposed an importance-reweighted estimator for KBP evaluation and implemented a crowdsourced leaderboard (with Arun Chaganty & Percy Liang in **EMNLP 2017**)

Motifs in Temporal Networks Advisor: Jure Leskovec [2014-16]
- Devised new algorithms to count temporal motifs efficiently (on timestamped edges in a graph) and used them to find patterns in various communication datasets (with Austin Benson in **WSDM 2017**)

Automated Link Prediction Advisor: Jure Leskovec [2014-16]
- Predicted missing links between web pages by learning from human navigational patterns: actively collected paths (with Robert West; **WWW 2015**) and passively collected server logs (**WSDM 2016**)

LEADERSHIP

Co-led Stanford's Alexa Prize 2020 Team, Chirpy Cardinal [2019-20]
Led our team to create a social chatbot from scratch in 9 months. It was deployed to tens of thousands of users and was rated 3.6/5 on average with top-10% conversations lasting 12 minutes or more. We won 2nd place (and $100,000) against experienced teams and created a robust research program. We were one of the first teams to use neural models in practical settings and open-source the entire system.
Team: Recruited, onboarded and led a team of 10 students with complementary skills.
Planning: Scoped projects with concrete milestones on a year-long roadmap toward the vision.

Architecture: Designed a flexible and modular framework for high reliability and low latency.
Process: Set up weekly sprints, 1-1s, rotating on-calls, issue tracking and communication briefs.
Best practices: Implemented code-reviews, integration tests, style guidelines, code docs + wiki.
Tracking: Created metrics to indicate performance and dashboards for root-cause analysis.
Mentorship: Mentored junior students in tooling, implementation, analysis and research.

MENTORSHIP	**Stanford's Alexa Prize 2021 Team** [2020-21]

Mentored new team lead and new members to build upon the existing architecture, pipelines and best-practices, and developed research-based solutions. Won 2nd place (and $100,000) again.

CS Undergrad Research (CURIS) Mentor for 2 undergrad students: Jillian Tang and Avanika Narayan
MS CS Research Mentor for 2 students: Amelia Hardy and Siyan Li

ACHIEVEMENTS

- Our team came 2nd in **Alexa Prize Competition** twice (2020 & 2021) both with a $100,000 award.
- Received **Narotam Sekhsaria Postgraduate Scholarship 2014** *(12 out of 20,000 applicants)*
- **All India Rank 81** in IIT-Joint Entrance Examination (2010) from around 450,000 entrants
- Awarded **Gold Medal in Indian National Physics Olympiad** 2010 (top 35 from all over India) and attended **Orientation cum Selection Camp (OCSC) for International Physics Olympiad**.
- **All India Rank 3** in National Science (2008), **4** in Cyber (2010), **7** in Mathematics (2010) Olympiads

INVITED TALKS

Google's N2Formal Reading Group Sept 2021
Hindsight: Posterior-guided training of retrievers for improved open-ended generation
L3-AI: The Level 3 AI Assistant Conference June 2021
Neural Generation for Social Conversations
23rd International Conference on Text, Speech and Dialogue: Amazon Alexa Webinar Sept 2020
Behind the scenes of building a socialbot

GRANTS

- Wrote a research proposal for **Alexa Prize 2021** and was granted **$250,000** to support students.
- Wrote a research proposal for **Alexa Prize 2020** and was granted **$250,000** to support students.

INTERNSHIPS

Facebook Inc. | *Natural Language Understanding* Sonal Gupta [Summer '19]
Investigated label crowding for intent classification and methods to factorize label prediction
Microsoft Research, Redmond | *Deep Learning For Graphics* Brian Guenter [Summer '13]
Designed and implemented neural nets with convolution layer and domain specific objectives
IST Austria | *Formal Methods* Prof. K. Chatterjee [Summer '12]
Realizing Unrealizable specifications using edit distances

PROGRAMMING PROFICIENCY

Current: Python | PyTorch | Numpy & Scipy | Pandas | SQL | Flask | Javascript | HTML | LaTeX
Past: C++ | Rust | Java | C | C# | PHP | Django | Scrapy | Hadoop | Spark | Tensorflow | Keras | Boost

ADVANCED COURSES

Machine Learning | Probabilistic Graphical Models | Convex and Linear Optimization
Natural Language Processing | Deep Learning for NLP | Computer Vision | CNNs for Vision
Social, Information Networks | Experimental Robotics
Complexity Analysis | Randomized Algorithms | Neuromorphic Engineering

TEACHING

Stanford: **Head TA** for **Information Retrieval** (CS276) | **Natural Language Processing** (CS224N)
IIT Bombay: Operating Systems and Lab | Computer Networks | Modern Physics | Introductory CS

POSITIONS OF RESPONSIBILITY

Stanford NLP *Seminar Organizer* (organized 24 talks)	2021 - 22
Research mentor to Stanford's Alexa Prize Team	2020 - 21
Stanford NLP Dialogue *Reading Group Organizer*	2020 - 21
Co-Lead of Stanford's Alexa Prize Team	2019 - 20
Stanford NLP Group *Social Climate (DEI) Committee* member	2019 - 20

Institute *Student Mentor*, IIT Bombay   2013 - 14
Manager, Technovation (Student org. for technical innovation), IIT Bombay   2012 - 13
*Awarded **IIT Bombay Institute Organisational Color 2013** (awarded to 14 students out of 9000).*

SERVICE   Reviewer for TKDE 2018, AAAI 2018, ICML 2019, NeurIPS 2019, Repl4NLP 2020

CONFERENCE   **Hindsight: Posterior-guided training of retrievers for improved open-ended generation**
PUBLICATIONS   *Ashwin Paranjape*, Omar Khattab, Christopher Potts, Matei Zaharia
                 Christopher D. Manning   (ICLR 2022)
                 Effective Social Chatbot Strategies for Increasing User Initiative
                 Amelia Hardy, *Ashwin Paranjape* and Christopher D. Manning   (SIGDIAL 2021)
                 Human-like informative conversations via conditional mutual information
                 Ashwin Paranjape, Christopher D. Manning   (NAACL 2021)
                 Importance sampling for unbiased on-demand evaluation of knowledge base population
                 Arun Chaganty*, *Ashwin Paranjape**, Percy Liang and Christopher Manning   (EMNLP 2017)
                 Motifs in Temporal Networks
                 Ashwin Paranjape*, Austin Benson* and Jure Leskovec   (WSDM 2017)
                 Improving Website Hyperlink Structure Using Server Logs
                 Ashwin Paranjape*, Robert West*, Jure Leskovec and Leila Zia   (WSDM 2016)
                 Mining Missing Hyperlinks from Human Navigation Traces: A Case Study of Wikipedia
                 Robert West, *Ashwin Paranjape*, and Jure Leskovec: (WWW 2015)
                 Unsupervised Word Sense Disambiguation Using Markov Random Field and Dependency Parser
                 Devendra S. Chaplot, Pushpak Bhattacharya and *Ashwin Paranjape*   (AAAI 2015)
                                                                                        * Equal contribution

TECHNICAL   **Neural, Neural Everywhere: Controlled Generation Meets Scaffolded, Structured Dialogue**
REPORTS   Ethan A Chi, Caleb Chiam, Trenton Chang, Swee Kiat Lim, Chetanya Rastogi, Alexander Iya-
                 bor, Yutong He, Hari Sowrirajan, Avanika Narayan, Jillian Tang, Haojun Li, *Ashwin Paranjape*,
                 Christopher D. Manning   (Alexa Prize Proceedings 2021)
                 **Neural Generation Meets Real People: Towards Emotionally Engaging Mixed-Initiative Conver-
                 sations**
                 Ashwin Paranjape, Abigail See, Kathleen Kenealy, Haojun Li, Amelia Hardy, Peng Qi, Kaushik
                 Ram Sadagopan, Nguyet Minh Phu, Dilara Soylu, Christopher D. Manning
                                                                               (Alexa Prize Proceedings 2020)
                 Stanford at TAC KBP 2017: Building a Trilingual Relational Knowledge Graph
                 Arun Tejasvi Chaganty, *Ashwin Paranjape*, Jason Bolton, Matthew Lamm, Jinhao Lei, Abigail See,
                 Kevin Clark, Yuhao Zhang, Peng Qi, Christopher D. Manning   (TAC 2017)
                 Stanford at TAC KBP 2016: Sealing Pipeline Leaks and Understanding Chinese
                 Yuhao Zhang, Arun Tejasvi Chaganty, *Ashwin Paranjape*, Danqi Chen, Jason Bolton, Peng Qi,
                 Christopher D. Manning   (TAC 2016)