

Dr. Sashank Santhanam

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Education

University of North Carolina – Charlotte

Charlotte, NC

Ph.D. in Computer Science

May 2021

- Research area: Dialogue Systems, Human Behavior Modeling
- Advisors: Dr. Samira Shaikh
- Committee: Dr. Wlodek Zadrozny, Dr. Minwoo Jake Lee, Dr. Nicholas Davis

University of North Carolina – Charlotte

Charlotte, NC

MS in Computer Science

Dec 2015

- Research area: Social Media Analysis
- Advisors: Dr. Shaoting Zhang

Anna University

Tamil Nadu, India

BE in Computer Science and Engineering

May 2014

- Research area: Bayesian Networks

Work Experience

Apple

Seattle, WA

ML Researcher/Engineer

Apr 2022 - Present

- Developing LLMs and doing cool stuff in the generative AI space.
- Improved Natural language understanding (NLU) models used in the SIRI, Spotlight, and Safari.
- Developed state-of-the-art machine learning models for improving search relevance, and ranking.

JP Morgan & Chase

Seattle, WA

Senior Applied AI/ML Researcher

July 2021 - April 2022

- Lead the efforts to develop NLU models for various conversational agents used at JP Morgan
- Developed data augmentation library to ensure the integrity and robustness of the NLU models.

University of North Carolina – Charlotte

Charlotte, NC

Research Assistant

Jan 2017 - May 2021

- **Conversational Agents for Cybersecurity Defense**
 - Understanding the importance of relationships between speakers in dialogue generation and modeling relationships across social networks.
 - Generated personalized messages through conversational agents and engaging countermeasures strategies for social engineering and phishing attacks.
- **Understanding Decision Making**
 - Evaluating the impact of anchoring and confirmation bias on decision-making through visual interfaces for tasks on identifying and interpreting misinformation.
 - Evaluating the impact of cognitive biases and experiment design towards conversational dialogue output evaluation.
- **Human Behavior Modeling**
 - Analysis of Twitter and Gab.com to understand how the online community comes together to express messages of solidarity through text and emojis

- o Cross-platform analysis on Twitter and Gab.com for abusive language through various crisis events.

Amazon

Remote

Applied Research Intern

Sept 2020 - Dec 2020

- Worked on developing approaches to make conversational agents more factually consistent with regard to external knowledge
- Created a new large factual detection dataset called "Conv-FEVER" (~350K)
- Built a fact detector that improves the SOTA performance from 72.9% to 85.4%
- Integrated multiple retrievers: DPR and KNN-LM into the GPT2-based response generation pipeline
- Evaluated the impact of different decoding strategies Beam Search, Nucleus Sampling, and Delayed Beam Search to produce factual consistent responses
- Mentors: Behnam Hedayatnia, Spandana Gella, Dilek Hakkani-Tur

Nvidia

Remote

Research Intern

May 2020 - Sept 2020

- Worked on incorporating external knowledge into conversational agents
- Collected a new large-scale dataset (50M) for incorporating external knowledge to conversational agents from the Reddit social media
- Trained large conversational agents (8.3B) by combining KNN-based retrieval search to provide more accurate knowledge to the conversational agents.
- Mentors: Wei Ping, Raul Puri, Mohammad Shoeybi, and Mostofa Patwary

Walmart, Global Shared Service

Charlotte, NC

Data Analyst

Mar 2016 – Nov 2016

- Developed software to help the associates at Walmart to process invoices and other receipts.
- Reduced workload of the associates by auto-matching invoices and receipts.
- Developed workflows in alteryx and dashboards using Tableau to help in tracking the backlogs.

Indian Institute of Technology, Madras

Tamil Nadu, India

Intern

Jun 2013 – Dec 2013

- Implemented a scoring algorithm in R to analyze the emotional variation in Twitter data during sporting events
- Advisor: Dr. Saji K. Matthew

Conference Publications

- 1) Sharma S., Joshi A., Zhao Y., Mukihja N., Bhathena H., Singh P., **Santhanam S.**, "When and how to paraphrase for named entity recognition", in 61st Association of Computational Linguistics (ACL), 2023.
- 2) Sharma S., Joshi A., Mukihja N., Zhao Y., Bhathena H., Singh P., **Santhanam S.**, Biswas P., "Systematic review of effect of data augmentation using paraphrasing on named entity recognition", in Workshop on Synthetic Data for Empowering ML Research, Neurips, 2022.
- 3) Mahajan K., **Santhanam S.**, Shaikh S., "Towards Evaluation of Multi-party Dialogue Systems", in 15th International Conference of Natural Language Generation, Maine, 2022.
- 4) **Santhanam S.**, Hedayatnia B., Gella S., Padmakumar A., Kim S., Liu Y., Hakkani-Tur D., "Rome was built in 1776: A Case Study on Factual Correctness in Knowledge-Grounded Response Generation", in 3rd Workshop on Natural Language Processing for Conversational AI, EMNLP, 2021.

- 5) Gehrmann S. et al., "The GEM Benchmark: Natural Language Generation, its Evaluation and Metrics", in 1st Workshop on Natural Language Generation, Evaluation, and Metrics, ACL, 2021
- 6) **Santhanam S.**, Ping W., Puri R., Shoeybi M., Patwary M., Catanzaro B., "Local Knowledge Powered Conversational Agents", in 3rd Workshop on Natural Language Processing for Conversational AI, EMNLP, 2021.
- 7) **Santhanam S.**, Cheng Z., Brodie M., Dorr BJ., Bhatia A., Hebenstreit B., Zemel A., Dalton A., Strzalkowski T., Shaikh S., "Learning to Plan and Realize Separately for Open-Ended Dialogue Systems", in Findings of Empirical Methods in Natural Language Processing, 2020.
- 8) Howcroft DM., Belz A., Clinciu M., Gkatzia D., Hasan SA., Mahamood S., Mille S., Rieser V., **Santhanam S.**, van-Miltenburg E., "Twenty Years of Confusion in Human Evaluation: NLG needs evaluation sheets and standardised definitions", in 13th International Natural Language Generation Conference, 2020.
- 9) Bhatia A., Dalton A., Brodie M., **Santhanam S.**, Shaikh S., Zemel A., Strzalkowski T., Dorr BJ., "Adaptation of a Lexical Organization for Social Engineering Detection and Response Generation", in Social Threats in Online Conversations, LREC, 2020.
- 10) Dalton A., Aghaei E., Al-Shaer E., Bhatia A., Castillo E., Cheng Z., Dhaduvai S., Duan Q., Hebenstreit B., Islam M., Karimi Y., Masoumzadeh A., Mather B., **Santhanam S.**, Shaikh S., Zemel A., Strzalkowski T., Dorr BJ., "Active Defense Against Social Engineering: The Case for Human Language Technology", in Social Threats in Online Conversations, LREC, 2020.
- 11) **Santhanam S.**, Shaikh S., "Modeling Conversation Context by Adapting Cognitive Architectures", in Bridging AI and Cognitive Science, ICLR, 2020.
- 12) **Santhanam S.**, Karduni A., Shaikh S., "Studying the effects of Cognitive Biases in Evaluation of Conversational Agents", in ACM CHI 2020, Hawaii [**Best Paper Honorable Mention**].
- 13) Dorr B., Bhatia A., Dalton A., Mather B., Hebenstreit B., **Santhanam S.**, Cheng Z., Shaikh S., Zemel A., Strzalkowski T., "Detecting Asks in Social Engineering Attacks: Impact of Linguistic and Structural Knowledge", in the 34th AAAI Conference on Artificial Intelligence, New York, USA.
- 14) **Santhanam S.**, Shaikh S., "Modeling Conversation Context by Adapting Cognitive Architectures", in 1st Workshop on Discourse Structure in Neural NLG 2019, Tokyo, Japan [Non-Archival].
- 15) **Santhanam S.**, Shaikh S., "Emotional Neural Language Generation Grounded in Situational Contexts", in 4th Workshop on Computer Creativity in Natural Language Generation 2019, Tokyo, Japan.
- 16) **Santhanam S.**, Shaikh, S., "Towards Best Experiment Design in Evaluating Dialogue System Output", in 12th International Natural Language Generation Conference 2019, Tokyo, Japan.
- 17) Wesslen R., **Santhanam, S.**, Karduni A., Cho I., Shaikh S., Dou W., "Investigating Effects of Visual Anchors on Decision-Making about Misinformation", in 21st International IEEE Conference on Visualization (EuroVis) 2019, Porto, Portugal.
- 18) Karduni A., Cho I. Wesslen R., **Santhanam S.**, Volkova S., Arendt D., Shaikh S., Dou W., "Vulnerable to Misinformation? Verifi!", in 24th ACM Conference on Intelligent User Interfaces, Los Angeles, USA, Mar. 16-20 2019.
- 19) Karduni A., Wesslen R., **Santhanam S.**, Cho I., Volkova S., Arendt D., Shaikh S., Dou W., "Can You Verifi This? Studying Uncertainty and Decision-Making about Misinformation in Visual Analytics", in 12th International AAAI Conference on Web and Social Media, Stanford, USA, Jun. 25-28 2018, (**Acceptance Rate: 16%**).

20) **Santhanam S.**, Srinivasan V., Glass S., Shaikh S., "I Stand With You: Using Emojis to Study Solidarity in Crisis Events", in Proceedings of 1st International Workshop on Emoji Understanding and Applications in Social Media (ICWSM), Stanford, USA, Jun. 25-28 2018, published by AAAI.

21) **Santhanam S.**, Shaikh S., "I Stand With You: Detecting and Characterizing Expressions of Solidarity in Social Media", in 4th International Conference on Computational Social Science (IC2S2), Chicago, USA, July. 12-15 2018.

22) Cho I., Wesslen R., Karduni A., **Santhanam S.**, Shaikh, S., Dou, W., "The Anchoring Effect in Decision-Making with Visual Analytics", in 12th International IEEE Conference Visual Analytics Science and Technology, Phoenix, Arizona, Oct. 1-6 2017 (**Acceptance Rate**: 22% - 25%).

Journal Publications

1) Srinivasan V., **Santhanam S.**, Shaikh S., "Using Reinforcement Learning with External Rewards for Open-Domain Natural Language Generation", in Journal of Intelligent Information Systems, DOI: 10.1007/s10844-020-00626-5.

2) **Santhanam. S.**, Shaikh. S., "A Survey of Natural Language Generation Techniques with a Focus on Dialogue Systems - Past, Present and Future Directions", Arxiv 1906.00500.

Poster Presentations

1) **Santhanam S.**, Shaikh, S., "Salient Context Identification from Memory for Neural Dialog Systems", in 2nd Southern Data Science Conference, Atlanta, USA, Apr. 13-14 2019.

2) Dalton, A., Zema, A., Masoumzadeh, A., Bhatia, A., Dorr, B., Mather, B., Hebenstreit, B., Al-Shaer, E., Khoja, E., Castillo, E.J., Bunch, L., Vlahovic, M., Liu, P., Pirollo, P., Shah, R., Cartacio, S., Shaikh, S., **Santhanam S.**, Dhaduvai, S., Strzalkowski, T., Karimi, Y., "Modeling Social Engineering Risk using Attitudes, Actions, and Intentions Reflected in Language Use", in 32nd International FLAIRS Conference, Florida, USA, May. 19-22 2019. [Alphabetical Ordering].

3) **Santhanam S.**, Shaikh, S., "Propaganda or Clickbait? Understanding and Classifying Types of Misinformation using Recurrent Neural Networks", in 1st Southern Data Science Conference, Atlanta, USA, Apr. 13-14 2018.

Press Coverage

1) **Santhanam S.**, Shaikh, S., "[Understanding the emoji of solidarity](#)", in The Conversation, July 16, 2018.

Awards/Scholarships

Deep Mind, Facebook, Center for Brains, Minds, and Machines at MIT [ICLR] Conference Registration Support	Virtual 2020
Visual Dialog - Best Project Award Conversational International Summer School	Lowell, MA 2019
Association for Advancement of Artificial Intelligence Graduate Travel Support	Stanford, CA 2017
University of North Carolina – Charlotte Graduate Assistant Support Plan (GASP)	Charlotte, NC 2017 – 2021

Professional Activities

1) Reviewing Service

- **Emoji Conference 2019, 2020, 2021, 2022**
- **NAACL 2021, 2022**
- **ACL 2021, 2022, 2023**
- **ACM CHI 2019, 2023**
- **WiNLP 2019, 2020, 2021, 2022, 2023**
- **AAAI 2020, 2021, 2022, 2023, 2024**
- **ICML 2020, 2022**
- **EMNLP 2019, 2020, 2021, 2023**
- **EACL 2021**
- **ICLR 2021, 2022, 2023, 2024**
- **Neurips 2020, 2021, 2022**
- **LREC 2022, 2023**
- **DSTC 2021, 2022**
- **ACL Rolling Review 2021, 2022**
- **Novel Ideas in Learning-to-Learn through Interaction 2021**
- **NAACL System demo 2021, 2022**
- **NAACL SRW 2022**
- **INLG 2021, 2023**
- **ACL System Demo 2022**
- **Neural Conversational AI 2021**
- **EACL Demo 2021**
- **STOC 2020**
- **Human in the Loop Dialog System 2020**
- **Insights Workshop 2021**
- **CONLL 2022, 2023.**
- **EMNLP Industrial Track 2022, 2023**
- **ACL Demos 2023**
- **EACL Demos 2023, 2024**
- **ACL SRW 2023**
- **COLING 2023**

2) Organizer

- Workshop on evaluating NLG evaluation at INLG 2020.
- Human Evaluation subcommittee of GEM benchmark.

3) Invited Lectures/Talks

- **The World of Conversational AI** - JP Morgan and Chase
- **Natural Language Processing** - Neural Networks for Natural Language Generation
- **Natural Language Processing** - Machine Translation
- **Computation Human Behavior Modeling (ITCS 8050/6050, PSYC-6099)** – Survey of Natural Language Generation Techniques
- **Applied Machine Learning** - Introduction to Reinforcement Learning
- **Towards Building More Factually Consistent Responses in Conversational AI** - University of California, Santa Barbara
- **Towards Building More Factually Consistent Responses in Conversational AI** - McGill University

Skills

Technical: Natural Language Processing, Deep Learning, Machine Learning, Social media analysis, Cognitive Biases, Human Behavior Modeling

Programming Languages: Python, Java, C/C++, R

Framework: PyTorch, Tensorflow, scikit-learn, NLTK, Transformers

Data Analysis Software: Tableau, Alteryx, Pandas, Spacy, d3.js

Cloud Computing: AWS

Language: English, Tamil (native)

References

1) Dr. Samira Shaikh

Assistant Professor,
Department of Computer Science,
University of North Carolina at Charlotte,
9201 University City Blvd, Charlotte, NC- 28262,
Phone: (704) 687-7022,
Email: sshaikh2@uncc.edu

2) Dr. Bonnie J Dorr

Associate Director and Senior Research Scientist, IHMC
Professor of Computer Science, West Florida (faculty associate)
Professor, University of Maryland College Park (emerita)
Professor, University of Florida (courtesy)
Email: bdorr@ihmc.org

3) Dr. Tomek Strzalkowski

Professor, Cognitive Science,
Rensselaer Polytechnic Institute,
Email: tomek@rpi.edu

4) Dr. Minwoo Lee

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Department of Computer Science,
University of North Carolina at Charlotte,
9201 University City Blvd, Charlotte, NC- 28262,
Phone: (704) 687-8188,
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5) Dr. Wlodek Zadrozny

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University of North Carolina at Charlotte,
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Email: wzadrozn@uncc.edu