

Somak Aditya

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EDUCATION

Doctor of Philosophy, Computer Science

ARIZONA STATE UNIVERSITY

Dissertation Title: Knowledge and Reasoning for Image Understanding

Advisor(s): Prof. Chitta Baral, Prof. Yezhou Yang, GPA 4.0 (out of 4.0)

AZ, USA | 2014 – 2018

Master of Engineering, Computer Science

INDIAN INSTITUTE OF SCIENCE

Dissertation Title: Generic Incremental K-Means Clustering

Advisor(s): Prof. M. Narasimha Murty, GPA 7.3 (out of 8.0), 2nd in Class

KA, India | 2009 – 2011

Bachelor of Engineering, Computer Science

JADAVPUR UNIVERSITY

CGPA: 8.87 (out of 10), 7th in Class

WB, India | 2005 – 2009

PROFESSIONAL EXPERIENCE

Nov 2021 – Present	Assistant Professor, IIT Kharagpur Computer Science (Level 12)
Feb 2020 – Nov 2021	Postdoctoral Researcher, Microsoft Research India
Sep 2018 – Feb 2020	Research Scientist, Adobe Research India
May 2017 – Aug 2017	Research Intern, Verisk Analytics, New Jersey
May 2015 – Aug 2015	Research Intern, IBM Research Lab, India
Dec 2011 – Jul 2014	Specialist Software III, Strand Life Sciences Pvt. Ltd., India
Jul 2011 – Nov 2011	Senior Software Engineer, Yahoo R&D India

FELLOWSHIPS & ACADEMIC ACHIEVEMENTS

S.No	Name of Award	Awarding Agency	Year
1	University Graduate Fellowship (USD 4k)	Arizona State University	2018
2	University Graduate Fellowship (USD 2.5k)	Arizona State University	2017
3	University Graduate Fellowship (USD 2k)	Arizona State University	2016
4	CIDSE Doctoral Fellowship (USD 15k)	Arizona State University	2014
6	GATE CS All India Rank 15 (out of 44k students)**	GATE 2009	2009
7	WBJEE Engg Rank 105 (out of 50k students) [†]	WBJEE 2005	2005

[†] WBJEE: West Bengal (State-wide) Joint Entrance Examination for Engineering. ** GATE: India-Wide Graduate Aptitude Test in Engineering for Masters Admissions in IITs, IISc

TEACHING EXPERIENCE

Courses Taught, Department of Computer Science, IIT Kharagpur

2021 - Present

- Autumn 2023: **CS60050** Machine Learning (156 students; with Prof. Sudeshna Sarkar), **CS19003** PDS Lab
- Spring 2023: **CS60092** Information Retrieval (72 students), **CS19003** PDS Lab
- Autumn 2022: **CS10003** Programming and Data Structures Theory (**196** students), **CS19003** PDS Lab (99 Students)
- Spring 2022: **CS60092** Information Retrieval (70 students), **CS19003** PDS Lab (92 Students), **CS60010** Deep Learning (PGDBA) (with Prof. Sudeshna Sarkar)

Teaching Assistant, Department of Computer Science, Arizona State University

2014 – 2016

- Fall 2015 and 2016: CSE-576 Natural Language Processing (100 students)
- Spring 2016: CSE-471 Introduction To Artificial Intelligence (100 students)
- Spring 2015: CSE-310 Data Structures and Algorithms (150 students)

RESEARCH GRANTS

- Learning from Rules and Data for Image Analytics - SERB SRG (Code: LRD, INR 26.5L, [Sep '22](#))
- The Role of Feedback in Vision-Language enabled Embodied Agents towards Application to Disaster Management - IIT KGP FSRG (INR 25L, Approved [Jan 2023](#), Sanctioned [Mar 2023](#))
- Microsoft Accelerate Foundations Model Academic Research Grant USD 30000, (Co-PI - Prof. Animesh Mukherjee) [2023](#), Extended Twice [Apr 23](#) – [Mar 24](#)
- Toloka AI USD 300 Annotation grant, [Jan 2023](#)

PATENTS

1. Somak Aditya and Atanu Sinha, **Creating a knowledge graph based on text-based knowledge corpora**, 2022 (Filed 2019, Granted USPTO 16656163)
2. Somak Aditya, Kushal Chawla, Sharmila Reddy Nangi, Abhinav Mishra, Bhavy Khatri and Pranil Joshi, **Predicting joint intent-slot structure**, 2022 (Filed 2019, Granted USPTO 11475220)

SELECTED PUBLICATIONS

Summary. 32 Articles (Conferences & workshops: 23, Patents: 2, Journals: 2, Thesis: 1, Non-peer-Reviewed: 4), h-index: 13, Citations: 546

- [1] Deepanway Ghosal, Somak Aditya, and Monojit Choudhury. "Generating Intermediate Steps for NLI with Next-Step Supervision". In: AACL-IJCNLP (Long Paper), 2023. doi: 10.48550/ARXIV.2208.14641. url: <https://arxiv.org/abs/2208.14641>.
- [2] Pengfei Hong, Rishabh Bhardwaj, Navonil Majumdar, Somak Aditya, and Soujanya Poria. "ReMask: A Robust Information-Masking Approach for Domain Counterfactual Generation". In: ACL (Long Paper), 2023. arXiv: 2305.02858 [cs.CL].
- [3] Atharva Naik, Soumitra Das, Jyothi Vedurada, and Somak Aditya. "SYNC: Efficient Neural Code Search Through Structurally Guided Hard Negative Curricula". In: AACL-IJCNLP (Long Paper), 2023.
- [4] Ishan Tarunesh, Somak Aditya, and Monojit Choudhury. "LoNLI: An Extensible Framework for Testing Diverse Logical Reasoning Capabilities for NLI". In: Language Resources and Evaluation (2023). doi: 10.1007/s10579-023-09691-y. url: <https://doi.org/10.1007/s10579-023-09691-y>.
- [5] Deepanway Ghosal, Somak Aditya, Sandipan Dandapat, and Monojit Choudhary. "Vector Space Interpolation for Query Expansion". In: AACL-IJCNLP (Short Paper). 2022.
- [6] Karthikeyan K, Shaily Bhatt, Pankaj Singh, Somak Aditya, Sandipan Dandapat, Sunayana Sitaram, and Monojit Choudhary. "Multilingual CheckList: Generation and Evaluation". In: AACL-IJCNLP Findings (Long Paper). 2022. doi: 10.48550/ARXIV.2203.12865.
- [7] Anirudh Srinivasan, Gauri Kholkar, Rahul Kejriwal, Tanuja Ganu, Sandipan Dandapat, Sunayana Sitaram, Balakrishnan Santhanam, Somak Aditya, Kalika Bali, and Monojit Choudhury. "LITMUS Predictor: An AI Assistant for Building Reliable, High-Performing and Fair Multilingual NLP Systems". In: AACL Demonstrations 2022. AACL. 2022.
- [8] Vishesh Agarwal, Somak Aditya, and Navin Goyal. "Analyzing the Nuances of Transformers' Polynomial Simplification Abilities". In: MATH-AI Workshop. ICLR. May 2021.
- [9] Pratik Joshi*, Somak Aditya*, Aalok Sathe*, and Monojit Choudhury. "TaxiNLI: Taking a Ride up the NLU Hill". In: CoNLL. Nov. 2020, pp. 41-55.
- [10] Somak Aditya, Yezhou Yang, and Chitta Baral. "Integrating Knowledge and Reasoning in Image Understanding". In: IJCAI, 2019, 2019.
- [11] Somak Aditya, Yezhou Yang, and Chitta Baral. "Explicit Reasoning over End-to-End Neural Architectures for Visual Question Answering". In: AACL 2018. 2018.
- [12] Somak Aditya, Yezhou Yang, Chitta Baral, and Yiannis Aloimonos. "Combining knowledge and reasoning through probabilistic soft logic for image puzzle solving". In: UAI 2018. 2018, pp. 238-248.
- [13] Somak Aditya. "Explainable Image Understanding Using Vision and Reasoning". In: AACL 2017 Doctoral Consortium. AACL Press, 2017, pp. 5028-5029.
- [14] Somak Aditya, Yezhou Yang, Chitta Baral, Yiannis Aloimonos, and Cornelia Fermüller. "Image Understanding using Vision and Reasoning through Scene Description Graph". In: Computer Vision and Image Understanding (CVIU) (2017). issn: 1077-3142. doi: <https://doi.org/10.1016/j.cviu.2017.12.004>.

- [15] Somak Aditya, Yezhou Yang, Chitta Baral, Cornelia Fermuller, and Yiannis Aloimonos. “Visual Commonsense for Scene Understanding Using Perception, Semantic Parsing and Reasoning”. In: *2015 AAAI Spring Symposium Series*. 2015.
- [16] Arpit Sharma, Nguyen Vo, Somak Aditya, and Chitta Baral. “Identifying various kinds of event mentions in k-parser output”. In: *EVENTS Workshop, NAACL*. 2015, pp. 82–88.
- [17] Arpit Sharma, Nguyen H Vo, Somak Aditya, and Chitta Baral. “Towards addressing the winograd schema challenge: building and using a semantic parser and a knowledge hunting module”. In: *IJCAI*. AAAI Press. 2015, pp. 1319–1325.

PROFESSIONAL SERVICES

- Organizer
 - IndoML 2021 & 2022: Second and Third Edition of Indian Symposium on Machine Learning (with colleagues from IIT Gandhinagar, IIT KGP, Google Research, Univ. Warwick; <http://indoml.in/>).
 - CVPR 2022: Open-Domain Retrieval Under a Multi-Modal Setting. (with colleagues from Arizona State University, FAIR, DeepMind, Microsoft Azure, IDIAP; asu-apg.github.io/odrum/archive_2022.html)
 - CIKM 2021: Knowledge Injection in Neural Networks (with colleagues from Intel Labs, University of College London, Arizona State University; <https://sites.google.com/view/kinn2021/>)
 - IJCAI 2021: Is Neuro-symbolic SOTA still a myth for Natural Language Inferencing (with colleagues from IBM Research, KU Leuven, MSR India, UT Austin; <https://nsnli.github.io/>)
 - KR 2018: Integrating learning of Representations and models with deductive Reasoning that leverages Knowledge (<https://sites.google.com/view/r2k2018/home>)
- Area Chair: CoLM 2024, EMNLP 2023
- Senior PC Member: AAAI (2023, 2024)
- Panelist: IJCAI 2019 Doctoral Consortium Career Panel
- PC Member: ECAI (2024), ICLR, ECAI, IJCAI, ACL, EAACL (2023), ARR, EMNLP, ACL, AAAI, IJCAI (2020, 2021, 2022); NAACL, EAACL (2021); MathAI4ED NeurIPS 2021, MathAI ICLR 2021, LANTERN-COLING (2020, 2021), Cognitive Vision 2019 (ACS)
- Journal Reviewer: IEEE TIP, AIJ, CVIU, The Visual Computer, Robotics and Autonomous Systems (RAS), Pattern Recognition, Neurocomputing

EXTERNAL ONGOING COLLABORATIONS

- A Counterfactual Perturbation Ontology and Robustness Evaluation of GPT4 - *with Prof. Soujanya Poria, SUTD*
- Towards LogiGLUE: A Brief Survey and A Benchmark for Analyzing Logical Reasoning Capabilities of Language Models - *with Prof. Chitta Baral, ASU*
- Causal and Counterfactual Video QA - *with Prof. Chitta Baral, ASU*
- MathSensei: A Tool-Augmented Large Language Model for Mathematical Reasoning - *with Dr. Ashish Kulkarni, Rakuten under review, NAACL '24*
- Understanding Numerical Reasoning Abilities of Language Models - *with Prof. Vikas Garg, Aalto University, Finland*
- The *what* and *why* of Jailbreaking LLMs - *with Prof. Monojit Choudhury, MBZUAI*
- Conditional QA and Effectiveness of Code LLMs - *with Prof. Iryna Gurevych, TU Darmstadt*

THESIS STUDENTS

- **PhD:** Sachin Vashishtha, Large Language Models, Reasoning and Jailbreaks, 2022 – Present, Prime Minister Research Fellowship (PMRF) Fellow (INR 70k per month)
- **PhD:** Ishan Sahu (Jointly with Prof. Soumyajit Dey), Adversarial Attack and Prevention for NeuroSymbolic Cyber-Physical Systems, 2022 – Present

- **Masters:** Debrup Das, Benchmarking Numeric Abilities of Library-Augmented Large Language Models, 2023 – Present (*Sponsored by Rakuten*)
- **Masters:** Vivek Karde, Title: *Analyzing the Effects of Augmenting Single-step Entailments on Zero-shot Cross-Lingual NLI Performance*, 2022–23, Submitted
- **BTech Students:** Aditya Soni Bharatbhai (Adversarial Attacks on LLMs), Shreyas Jena (Counterfactual Video QA), Swarup Padhi (Numeric Reasoning Abilities of Language Models), Daivik Agarwal (Spatial Reasoning in 3D point Clouds), 2022– Present

I also work with PhD Students from Arizona State University, Singapore University of Technology and Design, and TU Darmstadt.

REFERENCES

Prof. Chitta Baral
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Microsoft Research India
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