

Abhijit Mishra

Assistant Professor of Practice,

School of Information,

University of Texas at Austin

Email: abhijitmishra@utexas.edu

URL: <https://abhijitmishra.github.io>

ABOUT ME

I am an Assistant Professor of Practice at the University of Texas School of Information. I teach courses such as Applied Machine Learning, Natural Language Processing (NLP), Deep Learning, and Introduction to Human-Centered Data Science. Before serving as a faculty, I was a research scientist at Apple inc., Seattle and IBM India Research Lab working on language understanding and generation components of Siri and IBM Watson. I have obtained Ph.D. in Computer Science and Engineering from the Indian Institute of Technology Bombay. My primary area of interest is Machine Learning for Natural Language Processing, and I am quite passionate about language generation, large language models, opinion mining, and cognition inspired NLP.

APPOINTMENTS

1. Assistant Professor of Practice (Dec 2022 -)

School of Information, University of Texas at Austin, Austin, USA

- Teaching: INF385T – Natural Language Processing and Applications, INF385T – Deep Learning and Multimodal Systems, I310D- Introduction to Human Centered Data Science, I320D – Applied Machine Learning with Python, I320D – Text Mining and NLP Essentials
- Research Themes: Secure and Factually Grounded Large Language Models, Cognitively inspired Natural Language Processing
- Service: Graduate Faculty Advisor

2. Machine Learning and Natural Language Processing Scientist (Feb 2020-Oct 2022)

Apple inc., Seattle, USA

- Divisions: Siri Understanding, Information Intelligence
- Area: Multilingual and Multimodal Dialog and Search for Siri

3. Research Scientist (March 2017- Jan 2020)

IBM Research, Bangalore, India

- Department: AI Technology
- Area: Natural Language Generation

4. Research Assistant (July 2011 – March 2017)

Indian Institute of Technology Bombay, Mumbai, India

- Department: Computer Science and Engineering
- Areas: Cognitive NLP using Eye-tracking, Indian Language Machine Translation, Crowdsourcing

5. Visiting Researcher (June 2012 – Aug 2012)

Copenhagen Business School, Copenhagen, Denmark

- Research Topic: Eye Tracking Applications in Translation Process Research

EDUCATION

Ph.D. Computer Science and Engineering (2011-2017)

Indian Institute of Technology Bombay, Mumbai, India

- **Thesis Title:** Harnessing Cognitive Information for Natural Language Processing: An Investigation based on Eye-tracking
- **Thesis Advisor:** Pushpak Bhattacharyya, Professor, Dept. of C.S.E, IIT Bombay

Bachelor of Technology in Computer Science and Engineering (2006-2010)

College of Engineering and Technology, Bhubaneswar, India

- CGPA: 9.03 (out of 10)

BOOK PUBLISHED (MONOGRAPH)

Abhijit Mishra and Pushpak Bhattacharyya, "Cognitively Inspired Natural Language Processing", Springer, Singapore. DOI: <https://doi.org/10.1007/978-981-13-1516-9> .

URL: <https://link.springer.com/book/10.1007/978-981-13-1516-9#about>

PUBLICATIONS

1. Abhijit Mishra, Mingda Li, Soham Deo. 2023. SentinelLMs: Encrypted Input Adaptation and Fine-tuning of Language Models for Private and Secure Inference (**AAAI 2024**). Vancouver, Canada, February 20-27, 2024.
2. Kishan Maharaj, Ashita Saxena, Raja Kumar, Abhijit Mishra, and Pushpak Bhattacharyya. 2023. Eyes Show the Way: Harnessing Gaze Features for Hallucination Detection. Findings of (**EMNLP 2023**), Singapore, Dec 6-10, 2023.
3. Jiwen Zhang, Abhijit Mishra, Siddharth Patwardhan and Sachin Agarwal. 2022. Can Open Domain Question Answering Systems Answer Visual Knowledge Questions? *arXiv preprint arXiv:2202.04306*.
4. Abhijit Mishra, Faisal M. Chowdhury, Sagar Manohar, Dan Gutfreund, and Karthik Sankaranarayanan. 2020. Template Controllable keywords-to-text Generation. *arXiv preprint arXiv:2011.03722*.
5. Sandeep Mathias, Rudra Murthy, Diptesh Kanojia, Abhijit Mishra, and Pushpak Bhattacharyya. 2020. Happy Are Those Who Grade without Seeing: A Multi-Task Learning Approach to Grade Essays Using Gaze Behaviour. In proceedings of the 1st Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics and the 10th

International Joint Conference on Natural Language Processing (**AAACL-IJCNLP 2020**), worldwide.

6. Sandeep Mathias, Diptesh Kanojia, Abhijit Mishra and Pushpak Bhattacharyya. 2020. A Survey on Using Gaze Behaviour for Natural Language Processing. In proceedings of the *29th International Joint Conference on Artificial Intelligence & the 17th Pacific Rim International Conference on Artificial Intelligence (IJCAI-PRICAI 2020)*, Yokohama, Japan.
7. Abhijit Mishra, Tarun Tater, Karthik Sankaranarayanan. 2019. A Modular Architecture for Unsupervised Sarcasm Generation, In proceedings of the *Empirical Methods for Natural Language Processing (EMNLP 2019)*, Hong Kong, China, 3rd Nov - 7th Nov, 2019
8. Anirban Laha, Parag Jain, Abhijit Mishra, Karthik Sankaranarayanan. 2019. Scalable Micro planned Generation of Discourse from Structured Data. **Computational Linguistics**, MIT Press.
9. Sai Surya, Abhijit Mishra, Anirban Laha, Parag Jain, Karthik Sankaranarayanan. 2019. Unsupervised Neural Text Simplification. In proceedings of the *57th Annual Conference of the Association for Computational Linguistics (ACL 2019)*, Florence, Italy, 28th July-2nd Aug, 2019.
10. Parag Jain, Abhijit Mishra, Amar P. Azad, Karthik Sankaranarayanan. 2019. Unsupervised Controllable Text Formalization. In proceedings of the *33rd Conference of the Association for the Advancement of Artificial Intelligence (AAAI 2019)*, Hawaii, USA, 27th Jan - 1st Feb, 2019
11. Sandeep Mathias, Diptesh Kanojia, Kevin Patel, Samarth Agrawal, Abhijit Mishra and Pushpak Bhattacharyya. 2018. Eyes are the Windows to the Soul: Predicting the Rating of Text Quality Using Gaze Behaviour. In proceedings of the *56th Annual Conference of the Association for Computational Linguistics (ACL 2018)*, Melbourne, Australia, 15-20 July, 2018.
12. Vitobha Munigala, Abhijit Mishra, Srikanth Govindaraj Tamilselvam, Shreya Khare, Riddhiman Dasgupta and Anush Sankaran. 2018. PersuaAIDE ! An Adaptive Persuasive Text Generation System for Fashion Domain. In proceedings of the *Web Conference (WWW 2018)*, Lyon, France, 23th April - 27th April, 2018
13. Abhijit Mishra, Srikanth Tamilselvam, Riddhiman Dasgupta, Seema Nagar and Kuntal Dey. 2018. Cognition-Cognizant Sentiment Analysis with Multitask Subjectivity Summarization based on Annotators' Gaze Behavior. In proceedings of the *32nd Conference of the Association for the Advancement of Artificial Intelligence (AAAI 2018)*, New Orleans, USA, 2nd February - 7th February, 2018
14. Srikanth Tamilselvam, Seema Nagar, Abhijit Mishra and Kuntal Dey. 2017. Graph Based Sentiment Aggregation using ConceptNet Ontology. In proceedings of the *International*

Joint Conference on Natural Language Processing (IJCNLP 2017), Taipei, Taiwan, 27 November-1st December, 2017

15. Shweta Garg, Sudhanshu S Singh, Abhijit Mishra and Kuntal Dey. 2017. CVBed: Structuring CVs using Word Embeddings. In proceedings of the *International Joint Conference on Natural Language Processing (IJCNLP 2017)*, Taipei, Taiwan, 27 November-1st December, 2017
16. Joe Cheri Ross, Abhijit Mishra, Kaustuv Kanti Ganguli and Pushpak Bhattacharyya. 2017. Identifying Raga Similarity Through Embeddings Learned from Compositions' Notation. In proceedings of the *Annual Conference of the International Society for Music Information Retrieval (ISMIR 2017)*, Suzhou, China, 23-28 October, 2017
17. Abhijit Mishra, Kuntal Dey and Pushpak Bhattacharyya. 2017. Learning Cognitive Features from Gaze Data for Sentiment and Sarcasm Classification using Convolutional Neural Network. In proceedings of the *55th Annual Conference of the Association for Computational Linguistics (ACL 2017)*, Vancouver, Canada, 30 July-4 August, 2017
18. Abhijit Mishra, Diptesh Kanojia, Seema Nagar, Kuntal Dey, Pushpak Bhattacharyya. 2017. Scanpath Complexity: Modeling Reading Effort using Gaze Information. In proceedings of the *31st Conference of the Association for the Advancement of Artificial Intelligence (AAAI 2017)*, San Francisco, USA, 4-9 February, 2017
19. Abhijit Mishra, Diptesh Kanojia, Seema Nagar, Kuntal Dey and Pushpak Bhattacharyya. 2016. Harnessing Cognitive Features for Sarcasm Detection. In proceedings of the *54th Annual Conference of the Association for Computational Linguistics (ACL 2016)*, Berlin, Germany, 7-12 August, 2016
20. Abhijit Mishra, Diptesh Kanojia, Kuntal Dey, Seema Nagar and Pushpak Bhattacharyya. 2016. Leveraging Cognitive Features for Sentiment Analysis. In proceedings of the *SIGNLL Conference on Computational Natural Language Learning (CoNLL 2016)*, Berlin, Germany, August 11-12, 2016
21. Abhijit Mishra, Diptesh Kanojia and Pushpak Bhattacharyya. 2016. Predicting Readers' Sarcasm Understandability by Modelling Gaze Behaviour. In proceedings of the *30th Conference of the Association for the Advancement of Artificial Intelligence (AAAI 2016)*, Phoenix, USA, Feb 12-17, 2016
22. Aditya Joshi, Abhijit Mishra, Balamurali AR, Pushpak Bhattacharyya, Mark J Carman. 2015. A Computational Approach for Automatic Prediction of Drunk-texting. In proceedings of the *53rd Annual Conference of the Association for Computational Linguistics (ACL 2015)*, Beijing, China, July 2015 (short-paper)
23. Aditya Joshi, Abhijit Mishra, Nivvedan Senthamilselvan and Pushpak Bhattacharyya. 2014. Measuring Sentiment Annotation Complexity of Text. In proceedings of the *52nd Annual*

Conference of the Association for Computational Linguistics (ACL 2014), Baltimore, USA, 23-25 June, 2014 (short-paper)

24. Anoop Kunchukuttan, Abhijit Mishra, Rajen Chatterjee, Ritesh Shah and Pushpak Bhattacharyya. 2014. Shata-Anuvadak: Tackling Multiway Translation of Indian Languages. In proceedings of the *Language Resources and Evaluation Conference (LREC 2014)*, Reykjavik, Iceland, 26-31 May, 2014
25. Abhijit Mishra and Pushpak Bhattacharyya. 2013. Automatically Predicting Sentence Translation Difficulty. In proceedings of the 51st *Annual Conference of the Association for Computational Linguistics (ACL 2013)*, Sofia, Bulgaria, 4-9 August, 2013 (short-paper)

Workshop and System Papers:

1. Parag Jain, Priyanka Agrawal, Abhijit Mishra, Mohak Sukhwani and Anirban Laha. 2017. Story Generation from Sequence of Independent Short Descriptions. **ML4Creativity**, SIGKDD Workshop, Halifax, Nova Scotia - Canada, 2017
2. Joe Cheri, Abhijit Mishra and Pushpak Bhattacharyya. 2016. Leveraging Annotators' Gaze Behaviour for Coreference Resolution. ACL 2016 Workshop on *Cognitive Aspects of Computational Language Learning (CogACLL 2016)* at ACL 2016, Berlin, Germany, August 11, 2016
3. Diptesh Kanojia, Shehzaad Dhuliawala, Abhijit Mishra, Naman Gupta and Pushpak Bhattacharyya. 2015. TransChat: Cross-Lingual Instant Messaging for Indian Languages. **ICON 2015**, December 2015
4. Abhijit Mishra, Aditya Joshi and Pushpak Bhattacharyya. 2014. A cognitive study of subjectivity extraction in sentiment annotation., 5th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis (**WASSA 2014**), Baltimore, USA, 27 June, 2014
5. Anoop Kunchukuttan, Ratish Pudupully, Rajen Chatterjee, Abhijit Mishra, Pushpak Bhattacharyya. 2014. The IIT Bombay SMT System for ICON 2014 Tools Contest. NLP Tools Contest at ICON 2014 (**ICON 2014**), Goa, India, Dec 2014
6. Piyush Dungarwal, Rajen Chatterjee, Abhijit Mishra, Anoop Kunchukuttan, Ritesh Shah and Pushpak Bhattacharyya. 2014. The IIT Bombay Hindi-English Translation System at WMT 2014. 9th Workshop on Statistical Machine Translation (**WMT14**), Baltimore, USA, 26-27 June, 2014
7. Anoop Kunchukuttan, Rajen Chatterjee, Shourya Roy, Abhijit Mishra and Pushpak Bhattacharyya. 2013. TransDoo: A Map-Reduce based Crowdsourced Translation for Complex Domain. **ACL 2013**, Sofia, Bulgaria, 4-9 August, 2013

8. Abhijit Mishra, Michael Carl and Pushpak Bhattacharyya. 2012. A Heuristic Based Approach for Systematic Error Correction of Gaze Data for Reading. First Workshop on Eye Tracking and NLP, part of COLING 2012. Mumbai, India, 15 Dec, 2012

FEDERAL FUNDING

- Cognitive Science Research Initiative Scheme (2013), Department of Science and Technology (Govt. of India), for research on Cognitive Natural Language Processing based on Eye-tracking and EEG (INR 4 million, PI - Prof. Pushpak Bhattacharyya)
- Research Infrastructure Funding Scheme, IIT Bombay (2014) for Cognitive NLP Lab Setup (INR 4.2 million, PI - Prof. Pushpak Bhattacharyya)

SELECTED PATENTS

1. Vinayak Sastri, Joydeep Mondal, Abhijit Mishra, Seema Nagar, Kuntal Dey. 2019. DYNAMIC CONTENT RATING ASSISTANT. 20210065043, US Patents and Trademarks Office (**USPTO**)
2. Abhijit Mishra, Enara C Vijil, Seema Nagar, Kuntal Dey. 2018. QUESTION ANSWERING SYSTEM INFLUENCED BY USER BEHAVIOR AND TEXT METADATA GENERATION. 20200302316, US Patents and Trademarks Office (**USPTO**)
3. Abhijit Mishra, Parag Jain, Anirban Laha, Karthik Sankaranarayanan. 2018. GENERATION OF VARIABLE NATURAL LANGUAGE DESCRIPTIONS FROM STRUCTURED DATA. 20200073944. US Patents and Trademarks Office (**USPTO**)
4. Parag Jain, Amar Azad, Abhit Mishra, Karthik Sankaranarayanan. 2018. UNSUPERVISED TUNABLE STYLIZED TEXT TRANSFORMATION. 20200034432, US Patents and Trademarks Office (**USPTO**)
5. Abhijit Mishra, Anirban Laha, Parag Jain, Karthik Sankaranarayanan. 2018. REAL-TIME ASSESSMENT OF TEXT CONSISTENCY. 2020030201, US Patents and Trademarks Office (**USPTO**)
6. Abhijit Mishra, Parag Jain, Amar Azad, Karthik Sankaranarayanan. 2018. CONTROLLABLE STYLE BASED TEXT TRANSFORMATION. 20200311195. US Patents and Trademarks Office (**USPTO**)

TUTORIALS AND INVITED TALKS

- (*Accepted and to be presented*) Nihar Sahoo, Ashita Saxena, Kishan Maharaj, Arif Ahmad, Abhijit Mishra and Pushpak Bhattacharyya. “Tutorial on Addressing Bias and Hallucination in Large Language Models”. **LREC-COLING 2024**. Torino, Italy. May 20-25, 2024.
- 4th January, 2021: Industry Keynote “Frontiers in Natural Language Understanding for Conversational Platforms”, **CODS-COMAD, 2021**, Worldwide https://cods-comad.in/distinguished_speakers.html#mishra
- 28 July, 2019: “Storytelling from Structured Data and Knowledge Graphs: An NLG Perspective”. Tutorial at the 57th Annual Conference of **ACL 2019**, Florence, Italy. URL: <https://sites.google.com/view/acl-19-nlg>

- 18 June, 2019: “Controllable Text Style Transfer”, AI Horizon Network Seminar Series, IBM (worldwide)
- 18 Jan, 2019: Tutorial on “Natural Language Generation and its Applications”, Indian Institute of Science, Bangalore, India
- 28 July, 2018: Invited talk at The FAER Faculty Development Workshop on AI&ML, M.S. Ramaiah University titled “Understanding how machines understand us: A perspective on Natural Language Processing”, M.S. Ramaiah University, Bangalore, India
- 26 Apr, 2018: Tutorial on “Cognitively Inspired Natural Language Understanding and Generation”, Dharmsinh Desai University, Gujarat, India
- 2 Feb, 2018: Talk on paper “Cognition-Cognizant Sentiment Analysis with Multitask Subjectivity Summarization based on Annotators' Gaze Behavior”, AAAI 2018 Conference, New Orleans, USA
- 20 Jan, 2018: Tutorial on “Natural Language Generation”, Indian Institute of Science, Bangalore, India
- 31 Jul, 2017: Talk on paper “Learning Cognitive Features from Gaze Data for Sentiment and Sarcasm Classification using Convolutional Neural Network”, ACL 2017 Conference, Vancouver, Canada
- 08 Aug, 2016: Presentation on “Harnessing Cognitive Features for Sarcasm Detection.”, ACL 2016 Conference, Berlin, Germany
- 20 June 2016: Tutorial on “Natural Language Processing and Machine Learning”, VIVA Institute of Technology, Mumbai, India
- 21 Jan, 2015: Talk on “Cognitive NLP”, IIT Bombay (Target Audience: Visiting Team, NIST, USA)
- 10 Jul, 2014 - 18 Jul, 2014: Tutorial on “Natural Language Processing”, Samsung Research Lab, Bangalore
- 28 Nov, 2013: Talk on “Eye Tracking Applications in Translation Process Research”, JSS Academy of Science, Noida, India
- 10 Aug, 2013: Talk on “Estimation of Text Translation Complexity”, Copenhagen Business School, Copenhagen, Denmark

AWARDS AND RECOGNITIONS

- Invited as an expert panelist to the Vaibhav Summit, a global summit of overseas and resident Indian scientists and academicians, held online in the month of Oct 2020. The summit is initiated by the Government of India, and the theme of discussion is ***NLP for Social Good***. Only 20 distinguished researchers in the field of NLP are invited to this event.
- Recipient of IBM Stock Award for 2018 for outstanding research achievement. This is an individual award which is given to a smaller number of people globally every year, chosen by the CEO of IBM.
- Recipient of *IBM Ph.D. Fellowship* award for the academic year of 2015-2016
- Recipient of institute level, department level conference travel grants and Microsoft and IBM Travel Grant to attend ACL (2013, 2016, 2017) and AAAI (2016, 2018) conference
- Received Regional Runner-Up Award for the region India and South-east Asia in the global Windows 7 Coding contest (Code 7 Contest, 2009) organized by Microsoft Corporation

for developing a gesture based interactive human computer interface that can run on any Windows based system with a low-cost web-camera

Media Coverage on Research

- *IBM India Engineers help make US Open Virtual, 2nd September, 2020, The Times of India.* <https://timesofindia.indiatimes.com/business/india-business/ibms-india-engineers-helped-make-us-open-virtual/articleshow/78018792.cms>
- *IIT-Bombay team creates program to detect drunk text message writers, The Indian Express, 21st August, 2015.* <https://indianexpress.com/article/cities/mumbai/iit-bombay-team-creates-program-to-detect-drunk-text-message-writers/>

ACADEMIC SERVICES

Senior Program Committee Member

1. Association for the Advancement of Artificial Intelligence (AAAI 2024)
2. Association for the Advancement of Artificial Intelligence (AAAI 2022)
3. Association for the Advancement of Artificial Intelligence (AAAI 2021)

Program Committee Member / Reviewer

1. Empirical Methods for Natural Language Processing (EMNLP 2023)
2. Association for Computational Linguistics (ACL 2023)
3. Association for the Advancement of Artificial Intelligence (AAAI 2023)
4. European Chapter of Association for Computational Linguistics (EACL 2023)
5. Empirical Methods for Natural Language Processing (EMNLP 2022)
6. Computational Linguistics Conference (COLING 2022)
7. Transactions of the Association for Computational Linguistics (TACL 2022)
8. International Joint Conference on Artificial Intelligence (IJCAI, 2022)
9. Association for Computational Linguistics (ACL 2022) – Rolling Reviews
10. North American chapter of Association for Computational Linguistics (NAACL 2022) - Rolling Reviews
11. Association for Computational Linguistics (ACL 2021) – Rolling Reviews
12. Empirical Methods for Natural Language Processing (EMNLP 2021)
13. European Chapter of Association for Computational Linguistics (EACL 2021)
14. Transactions of the Association for Computational Linguistics (TACL 2020)
15. Empirical Methods for Natural Language Processing (EMNLP 2020) [**Adjudged as outstanding reviewer**]
16. International Joint Conference on Artificial Intelligence (IJCAI-PRICAI, 2020)
17. ACM Computing Surveys (ACM-CSur, 2020)
18. Association for Computational Linguistics (ACL 2020)
19. Computational Linguistics Conference (COLING 2020)
20. Association for the Advancement of Artificial Intelligence (AAAI 2020)
21. Empirical Methods for Natural Language Processing (EMNLP 2019)
22. Association for Computational Linguistics (ACL 2019)
23. Empirical Methods for Natural Language Processing (EMNLP 2018)
24. Computational Linguistic Conference (COLING 2018)

25. Association for Computational Linguistics (ACL 2018) [**Adjudged as outstanding reviewer**]
26. Language Resources and Evaluation Conference (LREC 2018)
27. ACM Transactions on Asian and Low-Resource Language Information Processing (TALLIP 2018)
28. IEEE Transactions on Affective Computing (2018)
29. Association for Computational Linguistics (ACL 2017)
30. Conference on Machine Translation (WMT 2017)
31. Computational Linguistic Conference (COLING 2016)
32. North American chapter of Association for Computational Linguistics (NAACL 2016)
33. Conference on Machine Translation (WMT 2016)
34. Conference on Machine Translation (WMT 2015)

Organizing Committee member

1. Computational Linguistic Conference (COLING 2012), Mumbai, India

STUDENT GUIDANCE AND MENTORING

UT School of Information Students

1. Mingda Li (Informatics Capstone, 2023): Zero Shot Visual Question Answering (VQA) with Large Language Models
2. Carla Gonzalez (Informatics Capstone, 2023): Concept Guided Large Language Models for VQA
3. Sonali Hornick (Informatics, 2023): An Empirical Evaluation of Large Language Models for VQA

Co-supervising Outside of UT

1. Kishan Maharaj (MS Research, IIT Bombay): Cognitively Inspired NLP for Hallucination Detection in Generative NLP Models
2. Ashita Saxena (MS Research, IIT Bombay): Hallucination Detection and Mitigation in Generative NLP Models

Internships Mentored

1. Neha Hulkund (BS, MIT, 2021): Leveraging Scene Descriptions for Open Domain Visual Question Answering, at Apple inc., Summer 2021
2. Ivy Zhang (Rotation Engineer, Apple inc., 2021): Adapting T5 Closed Book QA for Knowledge Oriented Visual Queries at Apple inc., Summer 2021
3. Kevin Patel (Ph.D., IIT Bombay, 2019): Explaining Black-box NLP Models through Eye-tracking at IBM Research, Summer 2019
4. Sai Surya (B.Tech, IIT Kharagpur, 2018): Unsupervised Neural Text Simplification at IBM Research, Summer 2018
5. Krishna Guddipati (B.Tech, IIT Bombay, 2017): Scoring Grammaticality of NLG output at IBM Research, Summer 2017