

# Kundan Krishna

PhD student, Language Technologies Institute, CMU

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## Basic Information

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## Research Interests

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- **General:** Machine learning, Natural language processing, Interactive ML systems, Deep learning
- **Focus areas:** Ensuring factual correctness of LLM-generated text, Text summarization, Data-efficient pretraining, Human-in-the-loop based learning
- **Thesis:** Improving the reliability of summarization models (Thesis committee: [Zachary Lipton](#), [Jeffrey Bigham](#), [Sherry Wu](#), [Byron Wallace](#), [Alexander Rush](#))

## Education

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### PhD in Language and Information Technologies

CARNEGIE MELLON UNIVERSITY

*August 2018 - present*

*Pittsburgh, Pennsylvania*

- Advisors: Professor Zachary C. Lipton and Professor Jeffrey P. Bigham
- CGPA: 3.96/4.0

### B.Tech. in Computer Science and Engineering

INDIAN INSTITUTE OF TECHNOLOGY KANPUR

*July 2012 - June 2016*

*Kanpur, India*

- CPI: 9.9/10

## Professional Experience

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### Research Intern

ABRIDGE AI

*May 2023 - Sep 2023*

- Designed an interactive system to help doctors to easily augment LLM-generated summaries of patient visits.

### Research Intern

GOOGLE BRAIN

*June 2022 - Aug 2022*

- Worked on improving robustness of summarization models to the presence of noise in the input.
- Designed an algorithm to detect and remove arbitrary noise types without prior knowledge of its characteristics.

### Applied Scientist Intern

AMAZON ALEXA AI

*May 2020 - Aug 2020*

- Worked on improving entity linking for video entities requested via Alexa.
- Implemented and improved a vector search based method delivering over 20% improvement in accuracy.

### Research Engineer

ADOBE RESEARCH, INDIA

*June 2016 - July 2018*

- Identified potential applications of machine learning in Adobe's products.
- Designed models and algorithms and implemented research prototypes.

## Selected Works

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- **Evidence Inspector: a tool for reference grounded fact-checking of LLMs.** Kundan Krishna, Prakhar Gupta, Jeffrey P Bigham, Zachary C Lipton. *Project Website:* <https://evinspector.site> (ongoing work)
- **Filling in the Blanks: Helping Clinicians Add Missing Content to Documentation.** Kundan Krishna, Anna von Reden, Davis Liang, Elisa Ferracane, Nathan Price, Zachary C Lipton. (under review)

- **USB: A Unified Summarization Benchmark Across Tasks and Domains.** Kundan Krishna, Prakhar Gupta, Sanjana Ramprasad, Byron C Wallace, Jeffrey P Bigham, Zachary C Lipton. *Conference on Empirical Methods in Natural Language Processing (EMNLP): Findings, 2023*
- **Downstream Datasets Make Surprisingly Good Pretraining Corpora.** Kundan Krishna, Saurabh Garg, Jeffrey Bigham, Zachary Lipton. *Annual Meeting of the Association for Computational Linguistics (ACL)*, 2023
- **Improving the Robustness of Conditional Language Models by Detecting and Removing Input Noise.** Kundan Krishna, Yao Zhao, Jie Ren, Balaji Lakshminarayanan, Jiaming Luo, Mohammad Saleh, Peter J Liu. *Conference on Empirical Methods in Natural Language Processing (EMNLP): Findings, 2023*
- **Out-of-Distribution Detection and Selective Generation for Conditional Language Models.** Jie Ren, Jiaming Luo, Yao Zhao, Kundan Krishna, Mohammad Saleh, Balaji Lakshminarayanan, Peter J Liu. *International Conference on Learning Representations (ICLR)*, 2023
- **Does Pretraining for Summarization Require Knowledge Transfer?.** Kundan Krishna, Jeffrey Bigham, Zachary Lipton. *Conference on Empirical Methods in Natural Language Processing (EMNLP): Findings, 2021*
- **Generating SOAP Notes from Doctor-Patient Conversations Using Modular Summarization Techniques.** Kundan Krishna, Sopan Khosla, Jeffrey Bigham, Zachary Lipton. *Annual Meeting of the Association for Computational Linguistics (ACL)*, 2021
- **Extracting Structured Data from Physician-Patient Conversations By Predicting Noteworthy Utterances.** Kundan Krishna, Amy Pavel, Benjamin Schloss, Jeffrey Bigham, Zachary Lipton. *International Workshop on Health Intelligence at AAAI 2020*
- **Generating topic-oriented summaries using neural attention.** Kundan Krishna, Balaji V. Srinivasan. *Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*, 2018
- **Vocabulary Tailored Summary Generation.** Kundan Krishna, Aniket Murhekar, Saumitra Sharma, Balaji V. Srinivasan. *International Conference on Computational Linguistics (COLING)*, 2018
- **An LSTM based method for prediction of human activities with durations.** Kundan Krishna\*, Deepali Jain\*, Sanket Mehta, Sunav Choudhary. *UbiComp 2018*

## Patents

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- **Generating a topic-based summary of textual content.** *US Patent 10685050*
- **Bundling online content fragments for presentation based on content-specific metrics and inter-content constraints.** *US Patent 10891667*
- **Constructing content based on multi-sentence compression of source content.** *US Patent 10949452*
- **Visualizing natural language through 3D scenes in augmented reality.** *US Patent 10665030*
- **Generating a Targeted Summary of Textual Content Tuned to a Target Audience Vocabulary.** *US Patent 10534854*
- **Methods of automatically generating formatted annotations of doctor-patient conversations.** *US Patent App. 17736624*

## Honors & Awards

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2014-2016	<b>Academic Excellence Award</b> for 3 consecutive years for outstanding academic performance	IIT Kanpur
2014	<b>Dr. Elizabeth and Varkey Cherian Award for best research project</b> in the Summer Undergraduate Research Grant for Excellence(SURGE) program (jointly awarded to 2 out of 43 total research projects)	IIT Kanpur

## Relevant Courses

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|---------------------------|--------------------------------|-------------------------------|
| • Algorithms for NLP      | • Convex Optimization          | • Machine Learning Techniques |
| • Intermediate Statistics | • Computational Ethics for NLP | • Deep Learning               |
| • Grammars and Lexicons   | • Computational Semantics      | • Speech Recognition          |