

Anjali Singh

Curriculum Vitae

✉ singhanj@umich.edu
📄 sites.google.com/view/singhanj13

Education

- 2019–Present **Ph.D. in Information**, *School of Information*,
University of Michigan.
- 2012–2017 **Integrated Master of Technology (Dual Degree)**, *Mathematics and Computing*,
Indian Institute of Technology, Delhi.

Professional Experience

- Jan'22–July'22 Research Intern, MICROSOFT - PROSE Team
- Jul'17–May'19 Research Software Engineer, IBM RESEARCH, Bangalore, India

Awards and Fellowships

- 2022–2024 **Awarded funding for doctoral research**, *Microsoft PROSE Team*.
- 2021 **Best Paper Award**, *ACM Learning@Scale'21*.
- 2020 **Rackham Graduate Student Research Grant**, *University of Michigan*.
- 2014 **Summer Undergraduate Research Award**, *Indian Institute of Technology Delhi*.
- 2012 **Gold Medal, Indian Physics Olympiad (InPHO)**, *Indian Association of Physics Teachers*.
Awarded to Top 35 high school students in India on the basis of InPHO examination.

Publications

- SIGCSE 2024 **Investigating Student Mistakes in Introductory Data Science Programming**
Anjali Singh, Anna Fariha, Christopher Brooks, Gustavo Soares, Austin Henley, Ashish Tiwari, Chethan Mahadevaswamy, Heeryung Choi, Sumit Gulwani. To appear in Proceedings of 55th ACM Technical Symposium on Computer Science Education. 2024.
- L@S 2022 **Learnersourcing in Theory and Practice: Synthesizing the Literature and Charting the Future**
Anjali Singh, Christopher Brooks, Shayan Doroudi. Proceedings of the Ninth ACM Conference on Learning@Scale. L@S, 2022.
- SIGCSE 2022 **Design Recommendations for Using Textual Aids in Data-Science Programming Courses**
Heeryung Choi, Caitlin Mills, Christopher Brooks, Stephen Doherty, **Anjali Singh**. Proceedings of the 53rd ACM Technical Symposium on Computer Science Education. 2022.
- L@S 2021 **What's In It for the Learners? Evidence from a Randomized Field Experiment on Learner-sourcing Questions in a MOOC**
Anjali Singh, Christopher Brooks, Yiwen Lin, Warren Li. Proceedings of the Eighth ACM Conference on Learning@Scale. L@S, 2021.
Received Best Paper Award
- ICER 2020 **Investigating the Benefits of Student Question Generation in Data Science MOOC Assessments**
Anjali Singh. Proceedings of the 2020 International Computing Education Research Conference. ICER, 2020.
- WWW 2019 **Adversarial Adaptation of Scene Graph Models for Understanding Civic Issues**
Shanu Kumar, Shubham Atreja, **Anjali Singh** and Mohit Jain. Proceedings of The Web Conference. WWW, 2019.
- AAAI 2019 **Automatic Generation of Leveled Visual Assessments for Young Learners**
Anjali Singh, Ruhi Sharma Mittal, Shubham Atreja, Mourvi Sharma, Seema Nagar, Prasenjit Dey and Mohit Jain. Proceedings of the AAAI Conference on Artificial Intelligence. 2019.

UIST 2015 **Investigating the “Wisdom of Crowds” at Scale**
Alok Shankar Mysore et al. Adjunct Proceedings of the 28th Annual ACM Symposium on User Interface Software & Technology. 2015.

Papers Under Review

Bridging Learnersourcing and AI: Exploring the Dynamics of Student-AI Collaborative Feedback Generation

Organized Workshops

AIED 2023 **Empowering Education with LLMs - the Next-Gen Interface and Content Generation**
Workshop held at the Artificial Intelligence in Education Conference, 2023

LAK 2023 **Partnerships for Cocreating Educational Content**
Workshop held at the Learning Analytics and Knowledge Conference, 2023

Posters

Educational Data Science 2020 **Understanding Students’ Behavioral Patterns in Interactive E-books using Doc2vec Embeddings**

Poster presented at the AERA Satellite Conference on Educational Data Science, 2020

ICTD X 2019 **Citicafe – An Interactive Interface for Enhancing Civic Engagement**
Demo presented at the tenth international conference on Information and Communication Technologies and Development (ICTD), 2019.

CODS-COMAD 2017 **Entity Extraction on Real Estate Twitter Data**
ACM India Joint International Conference on Data Science and Management of Data, 2017.

Invited Talks

2023 **7th Summer School on Computational Interaction, University of Michigan**
Automatic Hint Generation in Emerging Educational Domains using Human-AI Collaboration

2021 **Microsoft**
Feedback Generation for Introductory Data Science Programming Exercises

Research Experience

Jan'20–Current **Research Assistant**, SCHOOL OF INFORMATION, University of Michigan.

- **Student-AI Collaborative Hint Generation**

- Conducted a randomized controlled experiment to assess the quality of hints written by learners with and without AI support
- Developing a peer-feedback system where students collaboratively work with an AI assistant and provide feedback to their peers

- **Understanding Effects of Learnersourcing Questions on Data Science MOOC Learners**

- Conducted a field experiment in a Data Science MOOC to understand how learners can help generate new questions and show greater depth of understanding of course material through *learnersourcing* (a pedagogically supported form of crowdsourcing)
- Studied the impact of creating multiple choice questions when it is required vs when it is voluntary, on students’ learning experience and quality of created questions
- Led team of 10 grad students to deploy experiment on Coursera and evaluate student-generated questions

- **Understanding Students’ Behavioral Patterns in E-books using Neural Embeddings**

- Modeled learners’ behavioral patterns of learning from interactive ebooks using neural embeddings (doc2vec)
- Clustered embeddings to obtain 3 distinct groups of learners, demonstrating the value of using doc2vec embeddings to understand students’ learning behavior

Jan'22–July'22 **Research Intern**, MICROSOFT, PROSE Team.

- **Feedback Generation on Introductory Data Science Programming Mistakes**

- Facilitated pilot deployment of human-AI collaborative feedback generation tool in University of Michigan's Master of Applied Data Science Program
- Identified core introductory data science competencies on which novices require support through analysis of students’ code and instructor interviews
- Provided design insights and guided the development of the feedback generation tool

- Jul'17–May'19 **Research Engineer**, IBM RESEARCH, Bangalore, India.
- **Automatic Generation of Visual Multiple Choice Questions (MCQs) for Young Learners**
In collaboration with Sesame Workshop
 - Interviewed primary school teachers to understand assessment development process for young learners
 - Developed algorithm to curate multiple choice questions with images as options at multiple difficulty levels
 - Used information extraction and image captioning methods to measure image semantic similarity
 - **Understanding Civic Issues from Images**
 - Interviewed citizens and civic authorities to understand usability of image, text, audio and video modalities for reporting civic issues
 - Mined large-scale dataset of civic issue-related images with their descriptions for unsupervised adversarial training of deep learning model to annotate images
 - **Extraction of Early Warning Signal (EWS) for Credit Risk from News Articles**
 - Built pipeline to extract EWS from unstructured news data and visualized EWS on a dashboard
 - Performed keyword extraction and sentiment mining for collating EWS from multiple data sources

Teaching Experience

- Sept'20–Apr'21 **Graduate Student Instructor**, *University of Michigan School of Information*.
- Led weekly labs for undergraduate level courses **Data Oriented Programming** and **Data Manipulation**
 - Conducted weekly office hours to answer students' questions and helped clear conceptual doubts
 - Created and evaluated programming assignments, course projects, and summative assessments
- May'20–Dec'20 **Teaching Assistant**, *University of Michigan and Coursera*.
- Developed and evaluated quizzes for the MOOC **Introduction to Data Science in Python** on Coursera
- Jul'16–May'17 **Teaching Assistant**, *Indian Institute of Technology Delhi*.
- Led weekly tutorials for courses **Analysis & Design of Algorithms** and **Probability & Stochastic Processes**
 - Created and evaluated exams and quizzes for a class of 100+ students

Service

- 2023 Reviewer, **CHI'24**
- 2023 Reviewer, **Journal of Learning Analytics**
- 2023 Reviewer, **SIGCSE'24**
- 2022 Reviewer, **CHI'23**
- 2022 Reviewer, **SIGCSE'23**
- 2021 Mentored 2 teams in Educational Data Mining Track, **LearnLab, Carnegie Mellon University**
- 2021 Reviewer, **Computers & Education Journal**
- 2021 Reviewer, **Educational Data Mining Conference**
- 2020 Reviewer, **Learning Sciences Graduate Student Conference**

Mentoring

- May'22–Present Mai Xu, Computer Science and Engineering, University of Michigan (Undergraduate Student)
- July'22–Sep'22 Bhavya Chopra, Microsoft (Research Fellow)
- May'20–Aug'22 Chethan Mahadevaswamy, Microsoft (Research Fellow)
- May'20–Aug'20 Anshul Aggarwal, University of Michigan (Masters Student)
- May'18–Jul'18 Anannya Uberoi, IBM Research (Research Intern)

Extra Curricular Activities

- 2018 Organising team member for **Hackathon on AI for Social Good** at IBM Research Labs India
- 2018 Volunteered at NGO Sparsha Trust for teaching children from underserved communities