Anmol Singhal

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Research Statement

My research focuses on developing AI systems that reliably capture, preserve, and evaluate design intent across long-horizon software engineering tasks. I investigate these challenges through requirements engineering, human-AI collaboration, and empirical studies of agentic software development.

Education

Carnegie Mellon University, Software and Societal Systems Department — August 2024 – Present
Ph.D. in Software Engineering; Advised by: Travis Breaux — *Pittsburgh, PA*

Carnegie Mellon University, Software and Societal Systems Department — August 2024 – Present
Masters in Software Engineering; Cumulative GPA: 4.2/4.0 — *Pittsburgh, PA*

Indraprastha Institute of Information Technology, Delhi — August 2017 – June 2021
B.Tech - Computer Science Engineering; CGPA: 9.10/10.00 — *New Delhi, India*

Research Experience

Requirements Engineering Lab (RELab) at CMU — August 2024 – Present
Graduate Research Assistant — *Pittsburgh, PA*

- Designing AI-assisted systems to support requirements elicitation, facilitating shared understanding, and reducing miscommunication between stakeholders during early-stage software design.
- Developing agentic frameworks for real-time conversational support in elicitation interviews.
- Conducting mixed-methods research studies on spec-driven development to investigate how reliably coding agents preserve design intent in long-horizon tasks.

TCS Research — September 2021 – July 2024
Researcher, Data and Decision Sciences Area — *New Delhi, India*

- Led development of AI systems for legal text understanding and contract analysis, reducing interpretation barriers between legal professionals and non-expert stakeholders through AI-assisted reasoning.
- Designed semi-supervised learning and retrieval-augmented prompting frameworks for ambiguity resolution in contracts, achieving **+20%** accuracy over open-source baselines.
- Conducted user studies with domain experts to evaluate system usability in decision-making workflows.

Multimodal Digital Media Analysis Lab (MIDAS) — January 2020 – June 2021
Undergraduate Researcher — *New Delhi, India*

- Developed a hybrid rule-based and Transformer-based approach for English grammar error correction (GEC).
- Deployed the solution as a GEC tool for i-Saksham NGO, supporting the education of approximately **2000** underprivileged children in Bihar, India.
- Proposed a synthetic data generation method and built a data-agnostic evaluation framework for Hindi GEC, focusing on linguistic error types.

Indraprastha Institute of Information Technology, Delhi — August 2019 – May 2020
Undergraduate Researcher — *New Delhi, India*

- Investigated Human Activity Recognition (HAR) in IoT-enabled smart environments, identifying limitations of probabilistic models (e.g., Bayesian networks) in capturing complex feature dependencies.
- Conducted statistical analysis of feature relationships and developed a novel Transformer-based model to improve activity recognition and intent inference.

Selected Publications

Refereed Conference Papers

- **Legal Requirements Translation from Law**
  Anmol Singhal, Travis Breaux
  IEEE International Requirements Engineering Conference (RE) 2025 **(Paper) (Code)**
- **Requirements Elicitation Follow-up Question Generation**
  Yuchen Shen, **Anmol Singhal**, Travis Breaux
  IEEE International Requirements Engineering Conference (RE) 2025 **(Paper) (Code)**
- **From Legal Text to Tech Specs: Generative AIs Interpretation of Consent in Privacy Law**
  Aniket Kesari, Travis Breaux, Sarah Santos, Tom Norton, **Anmol Singhal**
  Proceedings of the Twentieth International Conference on Artificial Intelligence and Law (ICAIL) 2025 **(Paper)**
- **Optimized Domain-Specific Text Processing with Keyword Knowledge Distillation (KKD)**
  Momojit Biswas, **Anmol Singhal**, Preethu Rose Anish
  International Joint Conference on Neural Networks (IJCNN), 2025 **(Paper)**
- **Generating Clarification Questions for Disambiguating Contracts**
  Anmol Singhal, Preethu Anish, Chirag Jain, Arkajyoti Chakraborty, Smita Ghaisas
  Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING) 2024 **(Paper) (Code)**
- **Data is about Detail- An Empirical Investigation for Software Systems with NLP at Core**
  Anmol Singhal, Preethu Anish, Pratik Sonar and Smita Ghaisas
  IEEE/ACM International Conference on AI Engineering (CAIN) 2022 **(Paper)**

Refereed Journal Papers and Book Chapters

- Code Generation for Legal Metadata Extraction: a Decomposition-based In-context Learning Approach
  Anmol Singhal, Travis Breaux
  Requirements Engineering Journal 2026
- Advancing AI and the Future of Requirements Engineering
  Travis Breaux, **Anmol Singhal**
  Requirements Engineering Journal 30th Anniversary Special Issue 2026
- **Dealing with Data for RE: Mitigating Challenges while using NLP and Generative AI**
  Smita Ghaisas, **Anmol Singhal**
  Handbook on Natural Language Processing for Requirements Engineering, Springer-Verlag 2025 **(Chapter)**

Refereed Workshop Papers

** denotes equal contribution*

- Emergent Role Differentiation in AI-Assisted Requirements Elicitation: A Wizard-of-Oz Pilot Study
  Anmol Singhal*, Jiwoo Bae*, Rose Kimu
  Cultivating Effective Human-LLM Collaboration for Collaborative Data Processing Workshop (Co-Data) at CHI 2026
- **Towards Mitigating Unfairness in Contracts from a Non-legal Stakeholder's Perspective**
  Anmol Singhal, Preethu Anish, Shirish Karande, Smita Ghaisas
  Proceedings of the Natural Legal Language Processing Workshop (NLLP) at EMNLP 2023 **(Paper)**

Preprints

** denotes equal contribution*

- AI-assisted Script Management for Requirements Elicitation Interviews **(Paper)**
  Anmol Singhal, Paulo Carvalho, Travis Breaux
- Spec-Driven Development as Prescribed and as Practiced **(Paper)**
  Anmol Singhal*, Shyam Agarwal*, Andrew Macvean, Bogdan Vasilescu, Travis Breaux

Awards and Honors

- **S3D Presidential Fellowship** 2026-2027
- **Best Artifact Award**, RE 2025 Legal Requirements Translation from Law [RE'25]
- **Best Paper Runner-Up**, CAIN 2022 Data Requirements in NLP-Centric Software [CAIN'22]
- **Deans Award for Academic Excellence**, IIIT-Delhi, 2019–2021

Teaching Experience

17626 Requirements in Information Systems — Carnegie Mellon University
Teaching Assistant for a class of 70 graduate students — *August 2025 – December 2025*

CSE343 Machine Learning — IIIT Delhi
Teaching Assistant for a class of 150 senior undergraduate students — *August 2020 – December 2020*

CSE508 Information Retrieval — IIIT Delhi
Teaching Assistant for a class of 190 senior undergraduate and graduate students — *January 2021 – May 2021*

Service

Mentorship

- *REU Mentor, Summer 2025*: Supervised undergraduate research on LLM-assisted requirements tools.
- *Student Mentor (2024, 2025)*: CMU Graduate Application Support Program
- *Project Lead at TCS Research*: Supervised two interns and one full-time associate
- *Student Mentor at IIIT Delhi*: Responsible for mentoring 6 freshman students to help them navigate college life

Professional Service

- *Student Volunteer*: *RE 2026, RE 2025, and NSF DASS Workshop 2024* – Assisted in session organization.
- *Reviewer*: Information & Software Technology Journal (2025), Springer NLP4RE Book.
- *Invited talk at ICON 2022*: Gave a talk on data-related challenges encountered in industry-scale AI projects

University Service

- *Curriculum Representative*: CMU S3D SE PhD Program 2026-27
- *Student Representative*: CMU S3D Ph.D. Admissions Committee (2026)
- *Student Representative*: CMU REUSE Admissions Committee (2025)
- *Member, Cultural Committee, IIIT Delhi*: Organized events to bolster student life in campus
- *Member, Event Organizing Team, IIIT Delhi*: Organized a flagship event for Odyssey, Cultural Fest of IIIT Delhi