


# Aniket Vashishtha

Research Fellow, Microsoft Research


@ aniketbbx@gmail.com  github.com/AniketVashishtha  Google Scholar

 Microsoft Research, #9 VIGYAN, Lavelle Road, Bangalore, KA, India 560001

## EDUCATION


Aug 2022 | **Guru Gobind Singh Indraprastha University** New Delhi, India  
Aug 2018 | B.Tech., Information Technology (CGPA : 8.5/10)


## EXPERIENCE


**Present** | **Microsoft Research**  **Bangalore, India**  
**Aug 2022** | *Pre-Doctoral Research Fellow - Advisors: Dr. Amit Sharma, Prof. Vineeth Balasubramanian*  
Optimized Large Language Models through various novel techniques to refine causal graph discovery, ensuring precise causal order estimation for reliable downstream inference.

**Jan 2019** | *Research Intern - Advisors: Dr. Sunayana Sitaram, Dr. Monojit Choudhury*  
> Led a collaboration with Microsoft Turing on Responsible AI, assessing biases in LLMs for Text Prediction. Created custom checklists to assess text prediction model biases across demographics.  
> Proposed bias evaluation metrics for Multilingual Language Models, addressing embedding-based limitations. Introduced non-western language-focused debiasing methods for broader inclusivity.

**Mar 2021** | **Inria** **Remote/Paris, France**  
**Jan 2022** | *Research Intern - Advisor: Dr. Adrien Coulet, Dr. Joel Legrand*  
Worked on the identification of discontinuous entities using segmental hypergraph and dependency graphs on Pharmacogenomics corpora.





**Jun 2018** | **IIIT Delhi - TavLab Research Group**  **New Delhi, India**  
**May 2018** | *Research Intern - Advisors: Prof. Tavpritesh Sethi*  
Optimized vaccine allocation in India using Reinforcement Learning and Agent-based modeling. Focused on COVID-19 challenges like vaccine hesitancy and misinformation on social media.

**Aug 2018** | **Umgraumeio (formerly Sintecsys)**  **Remote/Sau Paulo, Brazil**  
**May 2018** | *Data Science Intern - Mentor: Antonio Leblanc*  
Enhanced fire detection in Brazilian forests using computer vision, satellite imagery and live on-on ground image analysis, surveilling over 8 million hectares.

**Aug 2017** | **Piltover Technologies**  **Remote/Rajasthan, India**  
**May 2017** | *Machine Learning Intern*  
Developed ML pipelines for gesture detection using EMG signals, for affordable prosthetics for disadvantaged communities.

## PUBLICATIONS

S = IN SUBMISSION, C=CONFERENCE, J=JOURNAL (\* = EQUAL CONTRIBUTION)

- [S.1] **Causal Inference Using LLM-Guided Discovery**   
Aniket Vashishtha, Abbavaram Gowtham Reddy, Abhinav Kumar, Saketh Bachu, Vineeth N. Balasubramanian, Amit Sharma  
*Under Submission in ICLR*
- [C.2] **On Evaluating and Mitigating Gender Biases in Multilingual Settings**   
Aniket Vashishtha\*, Kabir Ahuja\*, Sunayana Sitaram  
*Annual Conference of the Association for Computational Linguistics* [ACL'23 Findings]
- [C.1] **Performance and Risk Trade-offs for Multi-word Text Prediction at Scale**   
Aniket Vashishtha, S Sai Krishna Prasad, Payal Bajaj, Vishrav Chaudhary, Kate Cook, Sandipan Dandapat, Sunayana Sitaram, Monojit Choudhury  
*European Chapter of the Association for Computational Linguistics* [EACL'23 Findings]
- [J.2] **Mining Trends of COVID-19 Vaccine Beliefs on Twitter With Lexical Embeddings: Longitudinal Observational Study**   
Aniket Vashishtha\*, Harshita Chopra\*, Ridam Pal, Ashima, Ananya Tyagi, Tavpritesh Sethi  
*Journal of Medical Internet Research Infodemiology* [JMIR Infodemiology'23]

- [J.1] **VacSIM: Learning effective strategies for COVID-19 vaccine distribution using reinforcement learning** [📄]  
Raghav Awasthi, Keerat Kaur Guliani, Saif Ahmad Khan, Aniket Vashishtha, Mehrab Singh Gill, Arshita Bhatt, Aditya Nagori, Aniket Gupta, Ponnurangam Kumaraguru, Tavpritesh Sethi  
*Intelligence Based Medicine Journal* [IBM'22]

## SELECT RESEARCH PROJECTS

---

### **Causal Inference Using LLM-Guided Discovery** APR'23 - PRESENT

*Advisors: Dr. Amit Sharma, Prof. Vineeth Balasubramanian*

- > Created pipelines for using LLMs as pseudo domain experts to identify causal relationships among real-world entities. Specifically showed the importance of causal order for downstream causal inference tasks, and how LLMs can assist with accurate causal order prediction.
- > Employed novel prompting strategies for precise causal order estimation, surpassing limitations of heavily used pairwise prompting. Integrated In-Context Learning and Chain-of-Thought for enhanced causal reasoning.
- > Leveraged LLM outputs as priors to enhance diverse discovery algorithms like constraint based and score based methods. Our LLM pipelines yielded substantial improvements in causal order inference compared to baselines.

### **On Evaluating and Mitigating Gender Biases in Multilingual Settings** AUG'22 - JAN'23

*Advisor: Dr. Sunayana Sitaram*

- > Examined bias evaluation and mitigation in Multilingual models, focusing on non-western context. Addressed social bias challenges in diverse languages, offering resources and techniques for improved scalability.
- > Developed a benchmark to assess gender biases in pre-trained masked language models across various Indian languages, utilizing human annotations to address limitations of existing embedding-based metrics.
- > Observed that debiasing methods designed for English do not apply well to other languages, especially non-Western ones. For instance, Self-debias, while effective in English, often exacerbates bias in multilingual settings.
- > Work accepted at **ACL'23 Findings**

### **Performance and Risk Trade-offs for Multi-word Text Prediction at Scale** JAN'22 - OCT'22

*Advisor: Dr. Monojit Choudhury, Dr. Sunayana Sitaram*

- > Worked on assessing toxicity detection methods using a custom CheckList for Text Prediction, targeting various harm levels across different demographic groups.
- > Created a diverse checklist dataset encompassing various dimensions (Sexual Orientation, Nationality, etc.) to evaluate LM's performance in predicting toxic content, and assessing prediction severity based on context.
- > Current toxicity classifiers show higher leakage than desired. Our work uncovers bias in LLM-based predictors towards certain groups, which can be mitigated with hate classifiers, though this results in more cautious systems.
- > Work accepted at **EACL'23 Findings**

### **Zen: Mental Health Application for Workplace** AUG'22 - APR'22

*Advisor: Sameer Segal*

- > Led an interdisciplinary team in building a Mental Health App for the workplace, combining HCI research, software development, design, and psychology.
- > Developed interactive user interfaces using Flutter and GraphQL, working closely with designers and developers to ensure seamless interactions and boost user engagement.
- > Conducted multiple user studies and collaborated with psychologists to optimize the app's content structure for mental health support. Currently deployed and being used by 100+ Microsoft Research India employees. Future plans include scaling to over 20k+ Microsoft India employees.

### **Developing COVID-19 Solutions: RL-Driven Vaccination Strategy and Public Perception Analysis** AUG'22 - JAN'23

*Advisor: Dr. Tavpritesh Sethi*

- > Worked on a research study to assess the temporal trends of emotions related to COVID-19 vaccines, like hesitancy. Explored tweets from leading vaccine-distributing countries, investigating influencing factors through lexical categories. Work accepted at **JMIR Infodemiology Journal**
- > Worked on a COVID-19 vaccine allocation system leveraging Deep Reinforcement Learning (ACKTR, Deep Q Network Model) and Contextual Bandits taking into account dynamic features such as Death Rate, population density, etc. The pipeline significantly surpasses a basic proportion-based allocation method, demonstrating significant effectiveness in containing the virus's spread. Work accepted at **Intelligence Based Medicine**

## TALKS

---

**“Unlocking the Potential of Language Models: Empowering Education, Enhancing Experiences and Beyond”** [🌐] September 2023

- › Conducted a 2-day workshop in Kerela, directed towards explaining potential of LLMs and imparting practical strategies for its effective use in rural education.
- › Target audience contained enthusiasts with non-technical background, specifically professors and students from diverse academic fields like Botany, Physics, etc.

**“On Evaluating and Mitigating Gender Biases in Multilingual Settings”** June 2023

- › Conducted a talk on my ACL’23 paper in Reading group of Speech & NLP Group, MSR India

**“Performance and Risk Trade-offs for Multi-word Text Prediction at Scale”** September 2022

- › Conducted a talk on my EACL’23 paper in Reading group of Speech & NLP group, MSR India

**“How To Break Into Data Science and AI Research”**[🌐] March 2022

- › Conducted a talk on how to pickup Data Science and Research in AI to Undergraduate students pursuing Bachelors in Technology at Guru Gobind Singh Indraprastha University

## HONOURS AND AWARDS

---

**Winner of Turing’s Large Scale Models for Inclusion Hackathon Challenge, 2022** [🌐]

Implemented Inclusivity Toolkit to diagnose the biases of language models across various dimensions by bringing together numerous bias detection methods in the literature

**Spotlight Presentation at MIT’s Conference ‘Vaccines for All’, 2020** [🌐] [📺]

Research work got featured as a part of the Spotlight presentation for work on building Reinforcement Learning based pipelines for equitable allocation for COVID-19 vaccines

**High Commendation Award for Trinity Challenge, 2021**

Part of the High Commendation prize-winning team for Trinity Challenge 2021 out of 350+ global entries

## VOLUNTEERING ROLES

---

**PathCheck Foundation (MIT)** *Data Science Researcher* FEB’21 - MAY’21

- › Worked on COVID-19 solutions at PathCheck Foundation (MIT spinoff) focusing on producing impactful solutions for dealing with the mitigation of COVID-19.

**Red Dot Foundation - Safecity** *Data Analytics Volunteer* APR’20 - DEC’20

- › Using data-driven awareness through crowdsourced crime reporting to combat harassment against women and support the LGBTQ+ community in Indian cities.
- › Part of the IAMCOMINGOUT project with the aim to build a public platform for Queer(LGBTQ+) people to seek assistance from.
- › Created LGBTQ+ First Responder module for enhanced inclusivity, focusing on Empathy and Allyship.
- › Studied national coursework to create an inclusive sex education curriculum, enhancing student awareness. Utilized Google Data Studio for informative dashboards to identify necessary educational reforms.

**IEEE MSIT** *Technical Events Coordinator* JUN’20 - MAR’20

- › Started a reading club to increase awareness about research amongst students. Also conducted workshops and hackathons.

**Project Sunshine** *Education Support Volunteer* JUN’19 - AUG’19

- › Math, Science and Python to underprivileged girls and provided academic mentorship.
- › Also taught Beatboxing as a part of extra-curricular activities to children

## REFERENCES

---

- › Dr. Amit Sharma ..... *Principal Researcher, Microsoft Research, India* [🌐]
- › Dr. Sunayana Sitaram ..... *Principal Researcher, Microsoft Research, India* [🌐]
- › Dr. Monojit Choudhury ..... *Principal Data and Applied Scientist, Microsoft Turing, India* [🌐]