

# Shobhit Singh

## Curriculum Vitae

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### Education

- 2025–Present **Pre Doctoral Student**, *Ashoka University*  
*Area of Work: Probabilistic Methods, Formal representation of language models, Program Synthesis and verification*
- 2023–2025 **Master of Science in Computer Science**, *Chennai Mathematical Institute*  
*Relevant Courses: Software Verification, Formal Methods in Machine Learning, Natural Language Processing, Logic Automata Games, Algorithmic Game theory*
- 2022–2023 **Visitor**, *Institute of Mathematical Sciences, Chennai*  
*Relevant Courses: Mathematical Logic, Theory of Computation*
- 2019–2022 **Bachelor of Science in Mathematics, Minor in Development**, *Azim Premji University*  
*Relevant Courses: Real Analysis, Linear Algebra, Abstract Algebra, Discrete Mathematics, Nonlinear Dynamics, Nature of Mathematics, Academic Writing, Intro to Indian Economy*

### Publications

- 2025 Smayan Agarwal, Aslah Ahmad Faizi, Shobhit Singh, and Aalok Thakkar. *From Transformers to Weighted Automata: Towards the Verification of Large Language Models*. To appear in Proceedings of the *DataMod 2025 Workshop*.

### Projects and Presentations

- 2025 Talk on verification of consensus protocols at Karlsruhe Institute of Technology, Germany
- 2024 Thesis Report: Verification of Distributed Consensus Protocol under Prof Mandayam Srivas and Prof. Praveen, CMI
- 2025 Paper Presentation : Safe Reinforcement Learning via Shielding
- 2024 Paper Presentation : Using Polytopes to Find Mixed Nash Equilibrium for Bi-Matrix Games
- 2024 Paper Presentation: Synthesis of Inductive invariants using LLMs
- 2024 Paper Presentation : Alternating Finite Automata on  $\Omega$  Words
- 2024 Paper Presentation : Complementing Semi-Deterministic Buchi Automata
- 2024 Solving Wordle and Sudoku using Z3 SAT Solver
- 2023 Building word similarity models
- 2023 Building next word prediction and sentence generation models
- 2023 Reading project on Satisfiability of Word Equations under Prakash Saivasan, IMSc

2022 In Defence of Real Numbers: Against Finitism  
2022 Stability Analysis of SIR Model

## Work Experience

- Aug'23– **Game mathematician, Trippy Bug**  
Oct'23 Developed mathematical models and statistical simulations for slot machines and keno games.
- Jun'22– **Intern, IT For Change**  
Aug'22 Developed an Android app using the Ionic framework for the Telangana Gig and Platform Workers Union.
- Nov'21– **Freelance Technical Writer, Linux For Devices**  
Jun'22 Wrote Linux How to's, open source software reviews, installation guides, and explainers about Linux ecosystem.
- Jun'21– **Data Research Intern, Safe For India**  
Aug'21 I put together data regarding automotive hubs, original equipment manufacturers, automotive sales trends, and supply chains in India.
- Jun'17– **Curriculum Developer, Skillovate**  
Aug'17 Helped in designing and developing teaching methods for middle school students. Topics include Computational Thinking, Algorithms and Programming, and Digital Literacy.

## Skills

- Linux : Using Linux as a daily driver for 6 years. Contributed to various open source projects. Familiar with automation and shell scripting.
- Python : Used python in various machine learning and data analysis/visualisation projects. Worked with Tensorflow, Pytorch, Django and Flask frameworks.
- C++ :Worked with Qt and CMake.
- Tools : Uclid5, Z3 SAT Solver, Alloy, CBMC

## Areas of Interest

Primary interest: Automata, Formal methods, Computation. Also interested in science communication, free and open-source movement, labour issues, and philosophy of mathematics