

# AKHOURY SHAURYAM

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## ABOUT

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I am a Grad Student at Chennai Mathematical Institute, pursuing my Master's in Computer Science. I am highly motivated and have a passion for Machine Learning and Formal Software Verification. With a strong aptitude for problem-solving, I am constantly seeking out new challenges to enhance my skills.

## EDUCATION

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**M.Sc Computer Science**, Chennai Mathematical Institute 2023- 2025

Grade: TBA

*Relevant Coursework:* Quantum Algorithmic Thinking, Advanced Machine Learning, Online Convex Optimization, Financial Modelling Using Python, Stochastic Processes, Mathematical Logic

**B.Sc Mathematics and Computer Science**, Chennai Mathematical Institute 2020-2023

Grade: 8.08 CGPA

*Relevant Coursework:* Natural Language Processing, Computer Vision, Reinforcement Learning, Foundations of Machine Learning, Constraint Solving and Deep Learning (SMT), Software Verification and Analysis, Text Analytics, Theory of Computation, Complexity Theory, Design and Analysis of Algorithms.

## EXPERIENCE

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**Computer Vision Intern** February 2023 - June 2023  
Trumpf Metamotion *Chennai, Tamil Nadu*

- Fine tuned robot precision using Image Processing for edge detection of metal sheets using MATLAB and OpenCV2, wrote code for Raspberry Pi to guide the robot to pick the sheets from the correct position and orientation
- Wrote code to find qr-like marks on a metal sheet to find height and its bend angle.

**ML Intern** December 2022 - February 2023  
AlgoLabs *Chennai, Tamil Nadu*

- Implemented OpenAI's Whisper model to make a Video ASR to transcribe Video captioning. Also made pipelines for it to auto-test it's accuracy on pre-captioned videos online.
- Created a model for Invoice Image to Data with labels using PyTesseract and LayoutLMV3.

**Julia Dev Intern** August 2022 - November 2022  
XKDR Forum *Chennai, Tamil Nadu*

- Contributed to the package NISTTests.jl which calculates how precise a Linear Regression Model is.
- Made functions in R and Julia to calculate the given model's output and compare them with certified data. Wrote Source Code, Documentation and Test cases for the package.

**Summer Intern** June 2022 - August 2022  
Galaxy Project: Nordic Earth System

- Created a visualization tool using Python, XML, Planemo.
- Analyzed monthly data from satellites, such as MEERA GLDAS to make Time series plots, CSV files and create animated cartographic projections, and analyzed Landsat-8 data to calculate NDVI over a region.

## PROJECTS

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**Exploiting Almost-Linear Substructures in DNNs for Abstraction-Refinement** M. K. Srivas and K. Madhukar

- Working on a new tool for safety verification of ReLU activated DNNs.
- Testing a novel method for Abstraction-Refinement in Neural Network for property verification.

**AttentionGAN: Unpaired Image-to-Image Translation** Kavita Sutar

- Read the paper on AttentionGAN and Implemented the code for Multi-Domain Image-to-Image translation on various different tasks.
- Created report and presentations along with working code

**Verification of Deep Neural Networks** M. K. Srivas

- Verified ACAS XU Neural Network using ReLUpex. Abstracted the ReLU network using Inc/Dec classifications.
- Implemented Marabou to find coarse bounds and verified ACAS XU's properties

## OTHER PROJECTS

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- **Property Ownership on the Blockchain** Worked on a custom contract for maintenance of property database in Solidity to test it on a live server using Ganache and Truffle
- **Project Val Recolor** Built a video editing tool in Python using OpenCV and PIL that selects preferred parts of a video by color and recolors it according to input ([Example and Code](#))
- **Snake RL vs GA** Training models to play Snakes through 2 methods, Reinforcement Learning and Genetic Algorithm, then running a simulation between the best candidates. (Ongoing)
- **T-Minus-X** Designed and Developed a game based on the theme 'Out of Control'. All resources were built by scratch. Ranked 1034 out of 6000+ entries [Link](#)
- **Nanashi** An Android game I designed and developed where I aimed to make an arcade endless runner, revolving around a mechanic that would work with one input hand.

## SKILLS

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Languages	Python, C++, Julia, Haskell, OCaml, Java, R, MATLAB, $\LaTeX$
Libraries	TensorFlow, OpenCV, PyTorch, Z3, numpy, pandas, nltk, Qiskit
Tools	Git, Jupyter Notebook, Google Colab, VS Code, WSL

## ACHIEVEMENTS

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- JEE Advanced (2020) Mathematics 130/132
- Qualified for ICPC Regionals Chennai (2024)
- Simon Marais Mathematics Competition [SMMC] (2023) - 4th All India Rank
- [Specialist](#) on Codeforces
- Madhava Mathematics Competition [MMC] (2023) - 6th All India Rank
- Regional Mathematical Olympiad [RMO] (2018, 2019)
- Awarded Shriram Scholarship with full tuition fee waiver and stipend (2020, 2023)
- KVPY-SA (2020) Stage-1
- AMC 12A and 12B Honor Roll of Distinction and 3rd Rank in India (2020)
- SAT (2019) Mathematics 800/800

## POSITIONS

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<b>Teaching Assistant</b>	August 2023 - November 2023
Topics in Formal Methods and Machine Learning	<i>CMI</i>
<ul style="list-style-type: none"><li>• Taught verification of Toy Neural Networks.</li><li>• Gave tutorials on training FCNNs and CNNs.</li><li>• Conducted extra classes, help sessions and grading papers.</li></ul>	

## PRESENTATIONS AND TALKS

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- A Generalized Online Mirror Descent with Applications to Regression [Slides](#)
- Verifying Safety Properties in Deep Reinforcement Learning. [Slides](#)
- Explained Nisheeth Vishnoi's Gradient Descent derivation and utilization on different types of Convex Functions.
- Wrote and Presented Non-Trivial contracts written in Solidity for English Auction and Crowd Funding [Slides](#)
- AttentionGAN for Multi-Domain Image-to-Image translation [Slides](#)

## CERTIFICATIONS

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- Introduction to Financial Engineering and Risk Management @ Coursera [Certificate](#)