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Sathvik G Murthy

https://sathvik23.github.io/
US Citizen

Education

University of Minnesota — Minneapolis, MN
MS in Electrical and Computer Engineering ; Graduate Minor:Applied Mathematics — *Sept 2025 – ongoing*

- **Coursework**: Probability & Stochastic Processes, Intro to Data Mining, Statistical Learning & Inference

College of Engineering Guindy, Anna University — Chennai, TN
B.E in Electronics and Communication Engineering, CGPA: 8.81/10 — *Oct 2021 – June 2025*

- **Concentrations**: Image Processing, Computer Vision & Machine Learning
- **Coursework**: Cryptography & Network Security, Wireless Communication, Digital Communication, Artificial Intelligence & Machine Learning, Communication Networks, Digital Signal Processing, Digital VLSI

Research Experience

Undergraduate Researcher
Research Area: HCI + AI-based Technology Probes — *Jan 2024 – Dec 2025*

- Worked on *Technology Probes for Understanding Acceleration of Operational Processes in Medical Facilities in India* under the guidance of **Dr.Varun Chandrasekaran** from the **University of Illinois Urbana-Champaign**
- Conducted Research on the human factors involved in Indian health Care
- Built a GPT Technology Probe to overcome medical professionals' workflow barriers and optimize medical processes

Computer Vision Laboratory — Chennai, TN
Research Area: Security & Privacy, Computer Vision — *Jun 2024 – Apr 2025*

- **Research Project I**: *A Novel Authentication and Tamper Detection Scheme using a Machine Learning based Watermarking Technique*
  - Implemented an Integer Wavelet Transform (IWT) based watermarking technique to ensure authenticity, ownership proof, and integrity in digital multimedia.
  - Developed Convolutional Neural Network models to extract watermarks thereby ensuring security of the transmitted data.
  - Applied Lempel-Ziv-Welch compression and hash functions to incorporate tamper detection and reversal in digital images.
- **Research Project II**: *Hybrid Authentication of Generative AI Models and User Attribution using Latent Space Watermarking*
  - Implemented a dual-key framework based on the cryptographically hard Continuous Learning with Errors (CLWE) distributions to watermark diffusion models in latent space.
  - Developed a scheme to incorporate model level authentication and user attribution for Generative AI content.

Projects

- **Building an Elliptic Curve Cryptography System**: Implemented Elliptic Curve Cryptography algoroithms (and variations) in MATLAB from scratch. Allowed users to visualize how encryption and decryption takes place
- **Machine Learning based Parkinson's detection**: Developed SVM & Random Forest models to detect Parkinson's based on signal characteristics with 90 percent accuracy. Incorporated novel signal extraction models to obtain parameters for the machine learning model
- **Communication Systems Laboratory - Software Defined Radio using GNU software**: Developed baseband algorithms using embedded python on linux-based GNU radio for transmission and reception of audio signals. Helped develop documentation of this software for future use in the curriculum/course-work

Skills

Languages: MATLAB, Python, SQL, PyTorch, Scikit
Technologies: LTSpice, Cadence, Verilog HDL, CISCO Network Essentials