

# VISHNU SHREERAM M.P.

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## Carrer Objective

Aspiring researcher looking with a background spanning Generative Models and Industrial optimization, I aim to join a research team where I can contribute strong engineering skills while investigating the fundamental mathematical challenges of next-generation machine learning.

## Education

**Indian Institute of Technology, Palakkad** Expected May 2026  
*Bachelor of Technology in Data Science (CGPA: 9.6 / 10)* Palakkad, Kerala

- Relevant Courseworks:** DSA, Optimisation, Artificial Intelligence, Database Systems, Probability & Statistics, Linear Algebra, Machine Learning, Data Mining, Deep Learning, **MLOps**, Big Data Lab, Natural Language Processing, AI Ethics, Information Retrieval, **Gen AI**, Probabilistic Graphical Models, Multi-Agent Systems, Computer Networks.

## Experience

**Laboratory of Statistical Artificial Intelligence and Machine Learning** May 2025 – July 2025  
*Research Intern* Palakkad, Kerala

- Collaborated on developing a hybrid training method for Probabilistic Circuits (PCs), more generalizable than EM and faster than SGD.
- Worked on a Hessian-based regularizer to reduce overfitting by guiding models toward flatter optima.
- Demonstrated that the Hessian trace, a sharpness proxy, is efficiently computable for PCs and enables closed-form updates.
- Trained neural networks and optimized hyperparameters on HPC infrastructure using distributed resources, validating the method across multiple probabilistic circuit benchmarks.
- Co-authored - "Tractable Sharpness-Aware Learning of Probabilistic Circuits" which was accepted for Oral Presentation at AAAI-26 (Association for the Advancement of Artificial Intelligence), Singapore, 2026. and preprint available on [arXiv](#).

**Laboratory of Statistical Artificial Intelligence and Machine Learning** May 2024 – April 2025  
*Part-time Research Intern* Palakkad, Kerala

- Worked on optimizing Bosch's SMT assembly line for PCB production, involving 32 PCB types and 200+ unique components.
- Developed an algorithm to determine optimal feeder arrangements for each product group, improving pick-and-place efficiency under real-world constraints.
- Improved components-per-hour (CPH) by at least 7% while meeting Bosch's practical manufacturing constraints.
- Patent filing underway due to the novelty of the approach.
- Applied Genetic Algorithms, Mixed-Integer Linear Programming (MILP), and Nonlinear Programming techniques and worked with OR-Tools and Gurobi optimizer

## Projects

**Interventional Sum-Product Networks (iSPN) with GNNs** | PyTorch, GNNs

- Extended the iSPN framework by integrating **Graph Convolutional Networks (GCNs)** to encode mutilated causal graphs, replacing standard MLP parameter generators.
- Evaluated the architecture on the ASIA dataset, achieving a **26.15% reduction in test Negative Log-Likelihood (NLL)** compared to baseline models.
- Demonstrated that incorporating graph-structured encoders improves the model's ability to represent causal interventions in sparse, large-scale networks when compared to the denser ones.

**Flow Matching: Path Scheduling and Image Denoising** | PyTorch

- Conducted a study of **Optimal Transport (OT)** versus Cosine and Polynomial path schedulers, analyzing their impact on training stability and vector field curvature.
- Formulated image denoising as a generative flow problem, adapting pre-trained models to solve inverse tasks by manipulating integration time steps.
- Developed a custom visualization suite to render velocity fields and sample evolution, empirically validating the efficiency of straight-path (OT) flows.

## Viśva Mitra- Voice Enabled Agentic AI Assistant | *LangChain, MCP, Ollama, Docker, MLflow*

- Architected a modular agentic system using the **Model Context Protocol (MCP)** to facilitate communication between LLMs and isolated, containerized tool-execution environments.
- Integrated a multi-modal pipeline (Whisper/TTS) with **LangChain and Ollama** for intelligent tool-routing across 15+ actions, including hardware control and real-time search.
- Utilized **MLflow and Prefect** to implement a structured tracking and orchestration layer for monitoring agent execution logs and task workflows.
- Ensured system maintainability and reproducibility through strict service isolation with **Docker** and unified configuration management via TOML/YAML.

## Technical Skills

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**Languages:** Python, PostgreSQL and familiarity with Java, MATLAB, R, Scala

**Libraries and Frameworks:** TensorFlow, PyTorch, Scikit-learn, Numpy, Pandas, ReactJS

**Technologies:** Model Context Protocol, Docker, Apache Spark, Hadoop & Hive, FastAPI, Git, Linux, Jupyter, Vector DBs (LanceDB & Pinecone), Amazon Web Services

## Awards and Achievements

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**Certificate of Academic Excellence** — Certificates awarded by IIT Palakkad for securing the **highest CGPA** among **first-year** (2022-'23) and **second-year** (2023-'24) students in Data Science Department.

**GATE 2025** — Secured **All India Rank - 73** in Data Science and Artificial Intelligence.

**Inter IIT Tech Meet 13.0** — Represented IIT Palakkad at IIT Bombay for Pathway's problem statement on *Dynamic Agentic Retrieval-augmented generation (RAG)* for faster and efficient Information Retrieval; secured **12th place out of 23 IITs**.

## Patents and Publications

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**Accepted Conference Paper:** Hrithik Suresh, Sahil Sidheekh, Vishnu Shreeram M. P., Sriraam Natarajan, Narayanan C. Krishnan. "*Tractable Sharpness-Aware Learning of Probabilistic Circuits*". Accepted at **AAAI-26** (Association for the Advancement of Artificial Intelligence), Singapore, 2026.

**Patent Filed:** **Title:** METHOD, APPARATUS, AND SYSTEM FOR INCREASING THROUGHPUT IN A SURFACE MOUNT TECHNOLOGY ASSEMBLY LINE.

*Patent Application No:* 202541068350.

*Filed on:* July 17, 2025.