Minal Suresh Patil

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Education

Umeå Universitet **Sep. 2020 – Sep. 2024**
Ph.D., Computer Science *Umeå, Sweden*

University College London **Sep. 2018 – Sep. 2019**
MSc., Data Science *London, UK*

R.V. College of Engineering **Sep. 2011 – Sep. 2015**
B.E., Computer Science *Bengaluru, India*

Experience

Scania CV AB **Sep. 2024 – present**
Senior Researcher (Formal Methods × Generative AI) *Södertälje, Sweden*

Propinquity Labs **June 2016 – Sep. 2019**
Data Scientist *Bengaluru, India*

- Developed machine learning models to analyze satellite imagery, improving land classification accuracy by 15%.
- Implemented deep learning architectures for object detection in aerial imagery, reducing manual annotation time by 40%.
- Developed a cloud-based pipeline to efficiently handle terabytes of imagery and vector data for model training and inference.

Sensus Labs **Sep. 2015 – June. 2016**
Data Scientist *Bengaluru, India*

- Developed deep learning models to estimate user location from smartphone sensor data, improving accuracy by 25%.
- Implemented Extended Kalman Filters (EKFs) to fuse data from inertial sensors, Wi-Fi, and Bluetooth beacons for seamless indoor navigation.
- Optimized EKFs through fine-tuning, improving positioning accuracy by 30% and reducing latency by 20%.

Internship

Scania CV AB **February 2024 – July 2024**
PhD Research Intern *Södertälje, Sweden*

- Lead the development of a framework for generating secure C code, known as `spec2code`, designed to meet both formal and informal specifications using Large Language Models.

Virgin Media **May 2019 – August 2019**
MSc Research Intern *London, UK*

- Developed a halo-forecasting model using data from over 100,000 customers, achieving 88.4% accuracy and increasing conversion rates by 15% through targeted up-selling strategies.

Publications

- **M.S. Patil**, Gustav Ung, Mattias Nyberg. **Towards Specification-Driven LLM-Based Generation of Embedded Automotive Software.** *In 2nd Artificial Intelligence International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (AISoLA), 2024*
- **M.S. Patil** and Kary Främling. **Enhancing Vulnerable Class Robustness in Adversarial Machine Learning.** *In IEEE World Congress on Computational Intelligence (IEEE-WCCI): International Joint Conference on Neural Networks (IJCNN), 2024*
- **M.S. Patil** and Kary Främling. **Investigating Lipschitz Constants in Neural Ensemble Models to Improve Adversarial Robustness.** *In Proceedings of 7th International Conference on System Reliability and Safety (IEEE-ICSRS), 2023*
- **M.S. Patil** and Kary Främling. **Improving Neural Network Verification Efficiency through Perturbation Refinement.** *In 32nd International Conference on Artificial Neural Networks (ICANN), 2023*
- **M.S. Patil** and Kary Främling. **Do Intermediate Feature Coalitions Aid in the Explainability of Black-Box Models?.** *In 1st World Conference on eXplainable Artificial Intelligence (XAI), 2023*
- **M.S. Patil. Explainability in Autonomous Pedagogically Structured Scenarios.** *In Workshop on Explainable Agency in Artificial Intelligence at 36th Association for the Advancement of Artificial Intelligence (AAAI), 2022*

Technical Skills

Languages: C++, Python, OCaml, Rust
Verification Tools: Lean and Coq (proof assistants), Frama-C, Dafny
Technologies/Frameworks: PyTorch, AWS, Docker