MADHAV KANDA

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Education

University of Illinois, Urbana-Champaign (UIUC) **Aug 2024 - May 2026**
Master of Science in Computer Science (Thesis Track) *GPA: 4.0/4.0*

Indian Institute of Technology, Gandhinagar (IITGN) **Nov 2020 – Jun 2024**
Bachelor of Technology with Honours in Computer Science and Engineering *GPA: 9.16/10.0*

Technical Skills

Language: Python, C, C++, MATLAB, Verilog, R, HTML, CSS, Javascript, SQL, Slurm, Typescript
Tools: Docker, Git, LaTeX, Jupyter, Firebase, React, Flask, PyTorch, TensorFlow, Jax, NumPy, Matplotlib, Pandas, Linux, Apache Spark, Kafka, PostgreSQL, Node.js, AWS, Scikit-learn, OpenCV, NLTK, Unix, Autogen
Relevant Courses: Software QA with GenAI, Advanced NLP, Data Structures & Algorithms, Data Science, Databases

Work Experiences

Aalto University, Finland **May'23 – Present**
Research Assistant | Mentor: Prof. Aki Vehtari | Bayesian Inference | [Code](#) *Espoo, Finland*
- Modified **Hamiltonian Monte Carlo**, a method used to sample from complex probability distributions, by learning non-linear reparameterization during the warmup phase, leading to a **70%** improvement over existing methods.

Indian Institute of Science, Bengaluru **May'22 – Jul'22**
Research Intern | Mentor: Prof. A.G. Ramakrishnan | NLP | [Recommendation](#) *Bengaluru, India*
- Enhanced the pronunciation of Indian proper nouns in English by leveraging a **seq2seq** model for Hindi-to-English transliteration and phonetic transcription, achieving an accuracy of **91.11%**.

Spyne.ai, India **Feb'22 – Apr'22**
Computer Vision Intern | Generative AI *Remote*
- Performed an in-depth study of existing literature for the integration of Generative Adversarial Networks (**GAN**), segmentation maps, and masking for commercial implementation of Virtual Try-On HD research paper.

Projects

MMF: Multi-Agent Modularized Framework for Compositional Reasoning **Aug'24 – Feb'25**
Mentor: Prof. Unnat Jain & Prof. Heng Ji | VLM | Multi-Agent Collaboration | Compositional Reasoning *UIUC*
- Designed a novel multimodal, **multi-agent** modularized framework that enables complex visual reasoning and task-solving by leveraging specialized modality-specific agents. Manuscript under review in **ACL 2025**.

Enhancing Semantic Accuracy in LLM-Generated Code **Aug'24 – Present**
Mentor: Prof. Sasa Misailovic | LLM4Code | Probabilistic Programming *UIUC*
- Designed and implemented a framework leveraging **Grammar-Guided LLMs** for code generation, to address issues such as incorrect function arguments & compatibility issues arising from outdated code produced by LLMs.

Automatic Software Debugging using Small Language Models **Jan'25 – Present**
Mentor: Prof. Lingming Zhang | LLM4Code | Multi-Agent Collaboration *UIUC*
- Developing an **agent-based** framework leveraging 7B Small Language Models for automated software debugging. Optimizing performance on SWE-bench tasks through multiple iterations and trace inclusion, enhancing the model's problem-solving capabilities.

Active Learning for Efficient Data Acquisition for Wearable Spirometry **Jan'23 – Oct'24**
Mentor: Prof. Nipun Batra | Applied ML | Ensemble ML Methods | [Preprint](#) *IITGN*
- Achieved comparable results to a full dataset model using just **48%** of the data by devising an active learning strategy for wearable spirometry models, utilizing QBC & **uncertainty-based sampling**.

Scalable Identification of Brick Kilns from Satellite Imagery **Aug'23 – Dec'23**
Applied ML | Transfer Learning | [Code](#) | [Published @NeurIPS'23 RealML](#) *IITGN*
- Developed an **active learning** method using transfer learning to fine-tune models such as **EfficientNet-B0** for brick kiln detection, reducing manual labeling to combat air pollution. Identified **700+** brick kilns using this approach.

Achievements

(1) Teaching Assistant for Data Structures & Algorithm [CS 225] at UIUC **(2) Acknowledged** in the book, Probabilistic Machine Learning: Advanced Topics. **(3)** Contributed to multiple large **open-source projects**. **(4) Gold medalist** & **Dean's list** awardee at IITGN.