Nischal B. Krupashankar

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Education

- **Indiana University Bloomington** — Bloomington, IN
  Master of Science in Computer Science; GPA: 3.90 — *Aug. 2023 – May. 2025*
- **Visvesvaraya Technological University** — Bangalore, India
  Bachelor of Engineering in Computer Science; GPA: (9.21/10.0) — *Aug. 2019 – Jun. 2023*

Programming Skills

- **Languages**: Python, Java, C, C++, JavaScript, SQL
- **Frameworks and Packages**: PyTorch, TensorFlow, PyQt5, NetworkX, PyTorch Geometric, Plotly, Dash, OpenCV, Selenium, LangChain, CUDA
- **Tools and Technologies**: Docker, Multi-threading/Multi-Processing, LLMs, Machine Learning, GitHub
- **Relevant Coursework**: Elements of AI, Computer Vision, High Performance Graph Analytics, Data Mining, Knowledge Based AI, Applied Algorithms, Computer Networks, Cyber-Defense Competitions

Experience

- **Indiana University Bloomington** — Bloomington, IN
  Graduate Research Assistant, Dr. David Leake — *Jan. 2024 - Present*
  - **Multi-Agent Workflow**: Developing a SOTA reasoner using LangGraph to match the performance of o1-mini with 3x reduction in API costs. Implements case based reasoning to improve interpretability.
  - **LLM Finetuning**: Automated the generation of hand-crafted indices for case bases using 'LLAMA 2-70b' and 'LLAMA 3-70b', enabling access to larger datasets and the development of smarter 'case-based reasoners'.
  - **Prompt Engineering**: Composed task-independent prompts with OpenAI's meta-prompting framework, improving the quality of indices generated for case bases by 60%.
  - **LLM Deployment**: Deployed Python/C++ versions of LLAMA 2-7b, LLAMA 2-70b and LLAMA 3-70b on HPE Cray EX clusters (Big Red 200), ensuring finer control and easy replication
- **Indiana University Bloomington** — Bloomington, IN
  Graduate Research Assistant, Bioinformatics Lab — *May. 2024 - Nov. 2024*
  - **Multi-Modal Learning**: Leading the development of interpretable transformer-based models, integrating MRI imaging and genetic data to improve diagnostic accuracy for Alzheimer's disease. (Accuracy: 84.6%).
  - **Model Interpretation**: Improved model performance by 15% by implementing GRAD-CAM, allowing for finer interpretation of model predictions through activation heatmaps.
  - **Model Deployment**: Developed scripts for seamless deployment on Big Red 200 HPC clusters, including parallelized data loading and distributed training across multiple GPUs which decreased training time by 40%.
- **Indian Institute of Science** — Bangalore, India
  Research Assistant, Computational Intelligence Lab — *Aug. 2022 - Jun. 2023*
  - **Computer Vision**: Developed deep learning models: a 'MoveNet'-inspired heatmap-based keypoint estimator for pose estimation and an enhanced 'SiamMask' incorporating 'Kalman Filters' for improved object tracking.
  - **Graphical User Interfaces**: Created a multi-threaded PyQt5 tool with synchronized playback for deep learning-assisted biomechanical analysis of multiple video streams, securing $100,000 in 'ArtPark' IISc funding.
  - **Data Visualization**: Deployed real-time Plotly dashboards with Flask and Dash to analyze and plot streaming biomechanical data from Google's MoveNet Thunder.

Projects

- **Virtual Labs**: Cloud based environments for remotely executing and visualizing OpenGL code using a web browser.
- **Neural Style Transfer**: Replicated the Neural Style Transfer algorithm in PyTorch with parallelized data loading.
- **Localized OCR extractor**: PyQt5 OCR tool for extracting text from deeply trained regions of interest. Received $2000 for the most creative solution. (HoneyWell International Inc.)
- **Automated Simulation Tool**: Java/C++ tool for simulating access controlled flow of packages in industrial settings. Received $1500 to pursue further development. (HoneyWell International Inc.)