Hemantha Krishna Bharadwaj

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Education

Georgia Institute of Technology — Atlanta, GA
MS Electrical and Computer Engineering, DSP-Machine Learning Specialization — *Aug 2022 – May 2024*
Teaching Assistant, OMSCS Machine Learning, GPA: 3.83/4.0

Birla Institute of Technology and Science [BITS] Pilani — India
B. Eng. Electrical and Electronics, GPA: 9.3/10.0 — *Aug 2018 – May 2022*

Skills

Programming Languages: Python, C, C++
Machine Learning: PyTorch, TensorFlow, Scikit-learn
Retrieval & Search: Vector Databases, Semantic and Hybrid Search, Embedding Models
NLP & LLMs: OpenAI API, OpenAI Evals, Langchain, Claude API, Azure AI Studio, HuggingFace, DSPy
Cloud & Deployment: Azure AI Studio, Git, Docker

Experience

Machine Learning Data Scientist — *Jun 2024 – Present*
RippleWorx
- Developed and deployed large language model (LLM) systems for diverse applications, incorporating plug-and-play LLM subsystems for output generation, evaluation, and iterative prompt optimization
- Engineered hybrid search engines combining semantic and keyword search to enhance functionalities across company software, improving search quality and hit rate by 80%
- Implemented vector databases and optimized retrieval algorithms, resulting in a 50% reduction in response times
- Leveraged Azure AI Studio to deploy scalable, production-ready ML systems for high availability and performance

Generative AI Technical Lead — *Jul 2023 – Jan 2024*
Airlinq
- Led a cross-functional team of 15 in developing an AI system allowing personalized conversations between vehicle owners and their cars, deployed in leading Indian automotive OEMs
- Leveraged LLMs in conjunction with retrieval augmented generation and autonomous task generation for creating tailored experiences for car owners, vehicle manufacturers, and service engineers
- Designed and implemented a system comprising vector databases, LLM chains, autonomous agents, and memory
- Utilized various tools and frameworks including Langchain, LLMs (OpenAI, Llama2, Falcon), speech transcription (Whisper AI), HuggingFace embedding models to create a robust and scalable AI solution

Machine Learning for Speech — *Aug 2022 - Dec 2022*
Georgia Tech
***Project**: Analysis of SSL Models for Speaker Identification*
- Improved self-supervised speaker-ID models (Hubert & Wav2Vec2) using an embedding ensemble approach and optimizing audio length, achieving a 97.31% accuracy on the VoxCeleb dataset, outperforming baseline models
- Implemented data processing pipelines to handle large-scale audio datasets, reducing preprocessing time by 35%

Machine Learning Intern — *Feb 2022 - April 2022*
Digital Audio Processing Lab, IIT Bombay
***Project**: Multi-modal audio-visual Raga and Singer Classification using CNNs*
- Developed 3 2D convolutional network architectures for Raga (melodic mode) identification, achieving 92% accuracy on a diverse dataset
- Experimented with 6 spectrogram inputs with 2D CNN for the classification task for multimodal classification

Machine Learning Thesis, Bill and Melinda Gates Foundation — *Aug 2021 – Feb 2022*
SPIRE Lab, Indian Institute of Science
***Project**: Speech Recognition in Agriculture, Finance for the Indian Poor*
- Developed a domain-specific web scraping pipeline in Python to create NLP training text corpora in 9 local Indian languages that increased scraping efficiency by 40%
- Analyzed collected text corpora to design and train domain-specific NLP language models for use in speech recognition and speech-to-text systems
- Developed speech recognition models in local Indian languages for use in educationally backward rural areas

Machine Learning Intern — *May 2021 – Aug 2021*
University of Calgary
***Project**: Identification and Cancellation of Fauna Noise using AI*
- Developed an audio processing model using deep neural networks for identification and cancellation of environmental fauna noise from professional audio recordings
- Preprocessed audio recordings into mel spectrograms for a 4-layer neural network identifying possible noise frequencies for subsequent removal from the original audio signals

Publications

H. K. Bharadwaj et al.," A Review on the Role of Machine Learning in Enabling IoT Based Healthcare Applications," in IEEE Access, vol. 9 [Link] [150+ citations]