BALA GUHANESH

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Education

Vellore Institute of Technology **Chennai, India**
B.Tech in Computer Science in specialization with AI and Robotics *Sep 2021 - May 2025*
Cumulative GPA: **8.5/10**

Work Experience

Research Intern **Alberta, Canada**
MITACS Globalink Research Internship *May 2024 - Aug 2024*

- Worked under the supervision of Dr. Maiga Chang at Athabasca University, Edmonton, on the research project titled "Key Phrase Extraction for Enhanced User Question Answering". Developed a Next Word Prediction Model utilizing N-grams and Achieved 94% accuracy with the Binary Neural Network. Created a custom Tokenizer and enhanced the Tokenizer's subword handling efficiency by 25%, improving model throughput by 15%.
- Developed a Python library that enables novice users to interact with various large language models (LLMs) for integration into their own applications. My work also involved prompt engineering to enhance response accuracy and improve user interactions.

Research Lab Assistant **Chennai, India**
Data Analytics and Robotics Lab, VIT Chennai *Sept 2022 - May 2024*

- Led research in pattern recognition and Developed algorithms that achieved classification accuracy of 87% for high-resolution raster data. Enhanced operational efficiency by 30% through Sparse Attention and Transformer integration.

Publications

- Authored a review paper on the progression of code-based language models, from the introduction of attention mechanisms to the latest innovations in code generation providing a comprehensive overview on Code Language models (CLMs) - (Under Review).

Machine Learning Intern **Mumbai, India**
Digital EPCS Pvt Ltd *Aug 2022 - Sep 2022*

- Developed an E-learning chatbot utilizing 3D CNNs to capture both spatial and temporal features from video frames. This reduces learning time for users by 40% through targeted video queries.
- Integrated Retrieval-Augmented Generation (RAG) with a web scraping mechanism to enhance the chatbot's ability to generate context-aware answers from online sources, enriching the overall user experience and improving the contextual accuracy by 20%.

Research Intern **Bangalore, India**
Ratan NVP groups *May 2023 - July 2023*

- Developed a continual learning model to address frequent retraining challenges, reducing retraining frequency by 35%. Leveraged a Neuro-modulated Meta-Learning architecture with selective activation mechanisms, achieving an average task accuracy of 92.4% across 10 benchmarks. Additionally, optimized Diffusion model performance by refining Gaussian noise addition (variance tuned to 0.01) and retrieval processes, resulting in 12% faster convergence during training and a 15% reduction in sample generation time.

Leadership Experience

Research Project **Chennai, India**
AI/AR Integrated Smart Glasses for Visually Impaired *Feb 2023*

- Led the end-to-end design and development of AI/AR smart glasses, integrating ESP32 cameras, 8 multi-sensor arrays, and GPS, enabling advanced data collection and improving user insights by 65% in usability studies. Implemented object detection achieving a detection accuracy of 95.3% and optimal path recognition with a processing latency of less than 150 ms using transformer-based models with diffusers for real-time operations. Successfully integrated web scraping language models to deliver contextual information to the visually impaired, reducing response time by 20% and offering real-time environmental understanding through multi-source data fusion and web-based insights.

IoTHINC Club **Chennai, India**
Club Member/ Secretary, VIT Chennai *Jan 2023 - Jan 2024*

- Led a team of 5 members in developing a LiDAR drone system capable of processing terrain data and performing autonomous navigation in complex environments with 85% accuracy. Designed and implemented a real-time 3D mapping and terrain analysis pipeline, reducing terrain processing time by 32.3% using LiDAR data. Integrated ArcGIS and QGIS for geospatial data processing, improving data handling efficiency by 25.1%, which significantly enhanced the drone's adaptability to diverse topographies.

DROPRENEUR (Startup in AI Automation, Social Media Marketing, Web Development) **Remote**
ML Department Lead *Jan 2024 - Present*

- Leading the Machine Learning department, specializing in the integration of open-source large language models (LLMs) achieving a 20% reduction in product development cycle time while addressing complex business challenges across 5+ projects.
- Collaborated with the Human-Computer Interaction (HCI) department to drive innovation, implementing solutions that improved user interaction and predictive analytics accuracy by 15% through the fusion of sensory data and computational prediction models. Delivered 3 novel prototypes that advanced the company's technological capabilities.

Skills and Interests

Technical Expertise: TensorFlow, PyTorch, Keras, OpenCV, WebGL, Three.js, MATLAB, Langchain, NLTK, Node.js, UIPath, Python, C, C++, Java, JavaScript, SQL, ArcGIS, QGIS, ENVI, Leaflet, Arduino, Jetson Nano, CUDA.
Interests: AI, ML, DL, NLP, Computer Vision, Robotics, GIS, IoT, Quantum Computing.