DAKSHESH GUSAIN

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Graduating in Dec 2024, seeking research, job opportunities in ML/AI, Robotics

PROFILE:

Robotics and AI researcher with hands-on experience in developing multimodal large language models for socially assistive robotics, with a focus on healthcare applications, such as speech-language therapy, clinical psychology, American Sign language gestures. Passionate about leveraging intelligent robots to improve patient care, communication for vulnerable populations. Applied understanding of biomedical image segmentation, LLM distillation, behavioral analysis.

EXPERIENCE

University at Buffalo, New York:

Research Assistant, Centre for Unified Biometrics and Sensors ***September 2024 - Present***

- Quantizing, fine-tuning multimodal LLMs tailored for speech-language therapies in children; integrated into MISTY 2 social robot, enabling real-time interactive sessions with minimal low-latency.
- Designed universal evaluator for benchmarking LLMs: TinyLLama, Microsoft-phi, GPT-2, Gemma-2b-it, Google Flan-T5, for performance metrics: memory footprint, efficiency, quality (BERT score, METEOR, Distinct-N score).

Research Aide, SUNY Research Foundation, High Performance Computing Lab ***August 2024 - Present***

- Developing, fine-tuning Large Language models (LLaMA 2, BERT) leveraging low rank adapters for understanding of grammatical features and nuances in early child development, aimed at identifying late talkers.

Graduate Student Assistant, Dept. of Psychology ***September 2023 - Present***

- Managed Noldus software for human behavioral observation ensuring smooth operation across 6 psychological laboratories; executed reliability studies and administrative duties.
- Developed and deployed cost effective $300 autonomous vape smoking device for 20-member biomedical team across 3 universities: increasing efficiency by 200%, experimental time reduced by 66%, with operational performance equivalent to $45000 smoke machine at Roswell Park Cancer Institute.

PROJECTS

Deal-no-deal: LLM empowered stock market predictor, ***July 2024 – August 2024***

- Employing Retrieval-Augmented Generation (RAG) architecture leveraging Facebook FAISS with LLaMA-3 (8B, 70B) to analyze financial news, assessing impact on stock prices of companies based on news sentiment, source credibility and temporal relevance.

Sign-Mimic: Robotic hand simulator for sign language using reinforcement learning, ***July 2024 - Present***

- Developed robotic hand simulation model in OpenAI's MuJoCo physics engine for communication in American sign language utilizing dual framework architecture of reinforced imitation learning.
- Employed pose estimation models (SMPLX, OSX, Hands4Whole) for extraction of sequence of poses from input video sources; mapped 15 SMPLX joints to 24 joints on physics model.

NeuroBeatsDL: Reconstructing functional brain networks modeling attention span in presence of binaural beats using EEG and deep learning, (Git repo) ***January 2024 - May 2024***

- Managed and analyzed EEG data in psychophysiological study involving 64 participants, utilizing CNN-LSTM models, VAE and conditional GANs to reconstruct functional brain networks at 128 Hz, 256 Hz and 512 Hz.
- Developed novel metric to measure attention span in presence of binaural audio stimuli, averaging over 32 channels and 5 frequency waves.

EDUCATION

3.46 / 4.0	Master of Science	Artificial Intelligence	University at Buffalo	Aug 2023 - Dec 2024
3.78 / 4.0	Bachelor of Technology	Aerospace Engineering	Amrita University	July 2019 - June 2023

Coursework:

Computer Vision & Image Processing, Data Intensive Computing, Pattern Recognition, Reinforcement Learning, Analysis of Algorithms, Robotic Algorithms, Information Retrieval, Deep Learning.

KEY SKILLS

Programming	Python, PySpark, MATLAB, C/C++, C#, Java, Linux
ML/AI Expertise	LLM Quantization (ONNX Runtime, Hugging Face Optimum), CUDA, cuDNN, OpenGL, Distributed Computing, Data Parallel, Imitation learning, Proximal Policy Optimization, Reinforcement Learning with Human Feedback, Git version control, Shell scripting, Cloud Computing, Cloud Migration, Jenkins.
Libraries	PyTorch, Tensorflow, sklearn, OpenMim, MM-Detection, Numpy, Transformers, Tokenizers, NLTK, OpenCV, Docker, MuJoCo, AWS, Google Cloud Platform, GNU
Engineering	Raspberry Pi, Arduino, Blender, CAD, CFD, Biomedical robotics, Audio-visual systems, User-interaction

CERTIFICATIONS

- Generative AI with Large Language Models, Deep-Learning.AI, AWS.
- CITI Social, Behavioral & Biomedical Research Investigators, CITI Program.