Dakshesh Gusain

dgusain@buffalo.edu , +1716-398-1720, https://github.com/dgusain , https://linkedin.com/in/dgusain04
Portfolio: https://dgusain.github.io/

Graduating with MS in AI in May 2025, seeking research, job opportunities in LLM, ML/ AI applications, Data Science

Profile

Machine Learning Engineer with hands-on experience in NLP, deep learning, and transformer architectures, skilled in building and fine-tuning real-time AI solutions for conversational robots including semantic analysis and multimodal processing. Experienced in distributed computing and cross-functional collaboration driving impactful, high-performance intelligent AI solutions.

Projects

SignMimic: Reinforced Imitation Learning for reality-based dynamics on robotic hand, (Github) **July 2024 – Present**

- Developed an anatomically accurate strategy for mapping 15 joints from 3D body model to 24 degree of freedom in a robotic hand model on OpenAI's MuJoCo environment, using Graph Neural Networks in Encoder-Attention in Decoder model.
- Deployed reinforcement learning pipeline using Recurrent PPO, with Actor Critic (A2C), achieving 98% confidence score using Quaternion angular displacement with cosine similarity. Enhancing the pipeline with dual framework supervised learning with imitation learning using triplet neural network for refined robotic dynamics in gesture generation, creating a tool to map any SMPL model to physically plausible environment.

Key Skills

Programming	Python, PySpark, MATLAB, C/C++, C#, Java, Linux, SQL, Apache Solr, Scala, Apache Spark
Software Expertise	Web development (React, Node.js, Flask), building RESTful APIs, Git version control, Database management (SQL, NoSQL), Distributed Systems (Apache Kafka, Hadoop HDFS, Kubernetes, Amazon S3), SSH, SSL/TLS, Shell scripting, Cloud Computing, Cloud Migration, Apache Hive
ML Expertise	Distributed Computing, Data Parallel, Proximal Policy Optimization, Time Series Forecasting, Predictive Analytics, Prescriptive Analytics, Feature Engineering, Clustering, Statistical modeling, Vision Machine learning, chatbots
Libraries	PyTorch, TensorFlow, scikit-learn, OpenMim, Gymnasium, NumPy, Transformers, Tokenizers, NLTK, OpenCV, Docker, MuJoCo, GNU, CUDA, Robotic Operating System (ROS), Internet of Things (IOT), Pandas, NumPy,
Engineering	Raspberry Pi, Arduino, Blender, CAD, CFD, Embedded Systems, Audio-visual systems, User-interaction, Autonomy
Frameworks	Git, Jupyter Notebook, Azure, AWS, Databricks, Spark-SQL, Airflow, Google Cloud Platform (GCP)

Experience

University at Buffalo, New York:

Research Assistant, Center for Unified Biometrics and Sensors (CUBS/CEDAR) **Aug 2024 – Present**

- Deployed **end-to-end** conversational pipeline on MISTY 2 social **robot** for speech language therapy, integrating **Google's** Automatic Speech Recognition (**ARS**) with fine-tuned LLMs and Text to Speech (TTS) for real-time speech language therapy.
- Achieved **latency** benchmarks: **1.4 seconds** (Llama-3.2-1B), 1.75 seconds (Llama-3.2-3B), **2.4 seconds (Llama-3.2-11B-vision)** and 2.45 seconds (Llama-3.1-8B). Significant enhancements in multimodal responses with AV streaming, mixed precision training.

Research aide, SUNY Research Foundation, High Performance Computing lab **Aug 2024 – Present**

- Developed a comprehensive natural language processing pipeline to identify toddlers as late talkers or typically developing, based on parent-child audio conversations. Implemented audio transcription and **diarization** using OpenAI Whisper and Pyannote, introducing novel part-of-speech tags, and applying causal modeling to analyze word usage in vocabulary.
- Annotated a dataset of **2.5 million** words and **40K** vocabulary across new linguistic categories Shape/Non-shape nouns and result/manner verbs using GPT-4o-mini and **LLaMA 3.1 405B** models via prompt engineering. Fine-tuned **RoBERTa-base**, achieving **94%** accuracy for Shape/Non-shape noun classification and **97%** for result/manner verb classification.

Graduate Student Assistant, State University of New York **Sept 2023 – Nov 2024**

- Employed human behavioral and cognitive analysis software suites, conducted reliability studies of behavioral coding, ensuring smooth operation across **6** psychological laboratories.
- Developed and deployed cost effective **$300 autonomous** biomedical device using **Raspberry Pi** for **20-member** research 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 (Github).

Education

University at Buffalo	Master of Science	**Artificial Intelligence**	Aug 2023 – May 2025	**3.46 / 4.0**
Amrita Vishwa Vidyapeetham	Bachelor of Technology	Aerospace Engineering	July 2019 - June 2023	3.78/4.0

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

Publications

- Murugan, Udhayakumar, Dakshesh Gusain, Baskar Balasubramani, Sagar Srivastava, Sai Ganesh, Srikrishnan Ambattu Raghavannambiar, and Kannan Ramaraj. 2024. "A Comprehensive Review of Environment-Friendly Biomimetic Bionic Superhydrophobic Surfaces." *Biofouling*, October 1–23. doi:10.1080/08927014.2024.2414922