

Abhimanyu Bellam

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EDUCATION

North Carolina State University, Raleigh, NC

Aug 2022 – May 2024

Master of Computer Science | GPA – 4.0/4.0

Mahindra Ecole Centrale, Hyderabad, India

Aug 2016 – Sep 2020

Bachelor of Technology in Computer Science & Engineering | GPA – 8.97/10

Courses: Deep Learning, Machine Learning, Information Retrieval & Natural Language Processing, Resource/Time dependent learning, Design and analysis of Algorithms, Software Engineering, Object Oriented Design and Development, Operating Systems

TECHNICAL SKILLS

Programming/Scripting Languages: Python (pandas, scikit-learn, spaCy, NLTK), Java, Node.js, C/C++, HTML, CSS, SQL, MongoDB, R

Technologies: Databricks, Azure Services, AWS, GCP, RAG, MLOps, Spark, TensorFlow, PyTorch, ONNX, Hugging Face, Docker

EXPERIENCE

Data Scientist Intern (Summer & Spring), Volvo Group | Greensboro, NC

May 2023 – Present

Retrieval Augmented Generation (RAG) Project: Case Reduction Chatbot

- Built a RAG pipeline using Azure AI search and OpenAI, where search indexes were tailored for internal case reduction documents
- Handled token limitations for OpenAI services by summarizing chat history, prompt engineering and deployed a streamlit application for users
- Attained a faster way for technicians to serve customers, allowing for more cases to be solved within the same time

ML Project: Balanced Pipeline Simulation

- Simulated the state of the manufacturing pipeline of Mack Trucks for supply chain inventory planning using Queueing theory.
- Forecasted service times of trucks transitioning from one stage to another through ML and Statistical time-series forecasting models like Prophet and Silverkite for all combinations of truck segments and order types by leveraging 7 years of historical data.
- Achieved a 40 times faster and 15% more accurate estimation than the existing manual approach.

Graduate Research Assistant, North Carolina State University

Aug 2023 – Present

- Explaining the cause of unfairness due to Post training Quantization on Convolutional Neural Networks, via an impact flowing through the network, involving changes in logits, gradient norms, eigenvalues of the Hessian matrix and example difficulty.

Machine Learning Engineer, Hubble Connected | Bangalore, India

Jul 2021 – Jul 2022

Computer Vision & Software Development Project: [Covered Face Alerts & Precious Baby Moments](#)

- Developed a pipeline for Key-Frame Extraction and YOLO based baby detection (mAP@0.5 of 81.3 on 1500+ images) and expression identification (86.5% on 2000+ images) from baby monitor feed, concurrently interacting with server via AWS SQS messages.
- Detected covered face situations using face and posture detection, while enhancing pipeline speed via multi-processing & threading on EC2.
- Created a decision making algorithm and collage maker to periodically generate beautiful collages of babies in the Hubble Club app.

Machine Learning Engineer, Guise.ai | Hyderabad, India

Jan 2020 – Jul 2021

Computer Vision & Software Development Project: [Customer Demographic Analysis, for Sharp NEC](#)

- Developed a pipeline on Raspberry Pi to process live CCTV footage of persons entering a store and detect, track faces, predict age group & gender (Acc: 76% & 96% respectively on 40,000+ faces) to keep track of customer base.
- Utilized post training weight-quantization and optimizations to improve speed to an average of 10 frames per second (fps).

Computer Vision Project: [Traffic Analysis and AI powered Fuel Stations](#)

- Developed YOLO models to identify vehicles (VD), their license plates (LPD) & perform Optical Character Recognition (OCR) on them.
- Devised a Fuel Nozzle tacking method to estimate wait time for each vehicle in a fuel station.
- Achieved overall VD mAP@0.5 of 69.8, LPD mAP@0.5 of 78.2, OCR accuracy of 79.3% and Fuel Nozzle detection mAP@0.5 of 73.5

Undergraduate Research Assistant, Mahindra University

Aug 2019 – Aug 2020

Software Development & Algorithms Project: Strategy for Warehouse Resource Allocation

- Allocated 5000 tasks to 60 agents according to task due times, agent counts & category by splitting tasks via a divide & conquer strategy based Single and Multi-Objective Differential Evolution with weight-modulation & re-combination.
- Achieved delay of 10 units and average agent utility of 0.977, with no simultaneous allocations for 2000 tasks and 60 agents of 3 categories.

PROJECTS

Social Impact project at Major League Hackathon (Winner): [Right to Know](#)

Mar 2024 – Mar 2024

- Developed a Mobile Web App that prompts users with real time suggestions about their rights during any situation with law enforcement
- Recorded live audio, transcribed, prompt engineered to utilize Google Gemini (GCP) to search the web and create responses

Large Language Model (LLM) Project: [Detection of AI Generated Text](#)

Mar 2023 – Apr 2023

- Gathered highly similar BART summary generator encodings from human and AI-generated text inputs from GPT wiki-intro.
- Evaluated BART against a classifier obtained by training BERT on the same data and found that BERT fails in 49% of the cases.

PUBLICATIONS AND PRESENTATIONS

- **A. Bellam, K. Jung-Eun**, "How does Quantization Disparately Skew a Model?", submitted to International Joint Conference on Artificial Intelligence (IJCAI), Jan 2024 (currently in the **final stage** of review)
- Demonstrated my work on 'Balanced Pipeline Simulation', Volvo Group Intern Expo, Aug 2023
- J. Malagavalli, S.R. Gowtham K, **A. Bellam**, et al., "[Multi-Objective Differential Evolution with unbalanced Divide-and-Conquer Strategy for Warehouse Resource Allocation](#)", International Conference on Emerging Techniques in Computational Intelligence (ICETCI), Oct 2021

AWARDS

- Received **Graduate Support Package** of \$15,000, North Carolina State University, Aug 2023
- Awarded **Academic Scholarship** worth INR 100,000, Mahindra Ecole Centrale, Aug 2019