Contact

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Top Skills

Triton
XGB
Boruta

Certifications

SOLIDWORKS: Design for Mechatronics
HTML, CSS, and Javascript for Web Developers

Honors-Awards

Formula Bharat Cost Event
DJ IETE Strike
MS Honors
FSEV Powertrain Design Event

Publications

Development of an Automatic Safety Override System for a Shaft-Based Machine
Intelligent Farm Assistant

Harsh Benahalkar

MSEE Honors @ Columbia University | LLM Research @ IBM | AI @ Oden Technologies | AI and ML | Data Science | Deep Learning | Big Data | Databases
New York, New York, United States

Summary

An engineer focused on developing technical and leadership skills, intending to contribute by building high-quality and reliable solutions designed for long-term broad global impact.

I am currently pursuing my masters in Electrical Engineering from Columbia University, New York. I focus on domains like Deep Learning, Distributed Systems, and Natural Language Processing.

Prior to this, I have worked for two years. My career started as the lead developer at ACDM in Mumbai, by creating end-to-end vision, automation, and web solutions tailored for India's industrial needs.

This unconditional affection for embedded systems, automation, and the Internet of Things (IoT) started during undergrad where I worked and contributed to my FSAE electric-car team DJS Racing for three years.

Apart from my academic and professional life, I am an active investor, an avid melomaniac, and an urban flâneur with a keen eye.

Experience

IBM

Research Collaborator
October 2024 - December 2024 (3 months)

Working under IBM's Dr. Antoni Viros on PyTorch's Nested-tensor code base. Focusing specifically on making Hugging Face transformers and IBM's FMS (Foundational Model Stack) compatible with nested tensors on inference (forward pass) and gradient descent (backward pass).

Columbia Engineering

1 year 3 months

Graduate Research Assistant
September 2024 - December 2024 (4 months)
New York, United States

Working under Professor Micah Goldblum to build multi-modal LLM pipeline to encode large tabular databases into an LLM's context.

Adapting LLavA (Large Language and Vision Assistant) to perform tabular tasks instead of vision. Experimenting swapping LLaVA's CLIP with a T5 model and running tests with HuggingFace's amd/AMD-Llama-135m.

Graduate Teaching Assistant
September 2024 - December 2024 (4 months)
New York, United States

Assisting Professor Micah Goldblum in the course "Generative AI and Modern Deep Learning" (course code - EECS6694), offered by the Department of Electrical Engineering at Columbia University in New York.

Key responsibilities for the classroom, with students from diverse backgrounds include:
1. Conducting lecture on Variational autoencoders (VAE) and Generative adversarial network (GAN).
2. Conducting weekly recitation and discussion sessions to assist the students in understanding the course material.
3. Holding weekly Office Hours (both remote and in-person) to address student inquiries and clarify doubts.
4. Managing course-administrative work such as handling course content on university platforms and responding to student emails.

Professional Development and Leadership (PDL) Fellow
March 2024 - November 2024 (9 months)
New York, United States

Recipient of the highly selective Professional Development and Leadership (PDL) Fellowship for demonstrating outstanding leadership qualities and a strong commitment to professional development, joining an elite cohort of 25 graduate students out of ~2000+ from the School of Engineering & Applied Science at Columbia University.

This prestigious fellowship offers a unique opportunity to engage in targeted professional development initiatives and leadership training, empowering me

to excel in my career and make meaningful contributions to my organization and community.

Graduate Research Assistant
October 2023 - March 2024 (6 months)
New York, United States

Collaborated with Dr. Helen H Lu to develop an incubator for monitoring the environmental conditions of a biochemical reaction. The bioreactor required a 19:1 ratio of gaseous N2 and CO2, along with a constant temperature of 310 K.

Gas monitoring sensors, integrated with a programmable controller, were used to monitor the gas ratio. Additionally, a PID temperature controller and a temperature sensor were implemented to maintain a consistent temperature.

Oden Technologies
Engineering Intern
June 2024 - August 2024 (3 months)
New York, United States

A firm specializing in capturing, aggregating, and analyzing streaming manufacturing data.

Built an LLM system for Natural Language to a custom Oden Query Language translation.
Implemented sentence-fusion leveraging OpenAI API for dataset synthesis for LoRA PEFT on Google's Codey LLM.
Integrated Langchain and transcribed documents to build a RAG pipeline.
Built a Slack bot to interface the system and deployed the application on Google Cloud using Cloud Run and Cloud Bucket.

Columbia University Graduate School of Arts and Sciences
Graduate Teaching Assistant
January 2024 - May 2024 (5 months)
New York, United States

Assisted Professor Alexander Peterhansl in teaching the course "Projects in Advanced Machine Learning" (course code - QMSS5074GR), offered by the Department of Quantitative Methods for Social Sciences at Columbia University in New York.

Key responsibilities for the classroom, with students from diverse backgrounds include:

1. Conducting weekly recitation and discussion sessions to assist the students in understanding the course material.
2. Grading individual and project-based assignments and providing constructive feedback.
3. Holding weekly Office Hours (both remote and in-person) to address student inquiries and clarify doubts.
4. Managing course-administrative work such as handling course content on university platforms and responding to student emails.

During the course, we use various core skills and frameworks, including modelshare AI, Deep Learning, Machine Learning, Google Colab, Python, scikit-learn, Keras, and Git.

Advanced Control Data Machines
Senior Embedded Software Engineer
June 2021 - May 2023 (2 years)
Mumbai, Maharashtra, India

An Industrial Internet of Things (IoT) startup firm dealing in Industrial-grade sensors, instruments, and devices. A firm importing sensors and instruments from ifm-Germany and designing and manufacturing devices in India.

Lead Developer on the Linux Vertical platform.
Accountable for creating industrial-grade applications for loggers, controllers, and user interfaces for clients in the food, metal, power, automobile, telecom, and media sectors. Areas of expertise included firmware development (Python, C), web development (NodeJS, React), hardware (PCB design, test bench setup), databases (SQL, PostgreSQL), communication protocols (MODBUS, CAN, MQTT, FTP, OPC-UA, I2C), and cloud (Azure). My goals included operational and technological changes in the company to ensure the vision of the Industry 3.0 revolution in India.

Assumed additional responsibility for delivering product demonstrations to clients. Selected to guide junior colleagues and interns for faster onboarding to operational protocols and to ensure continued innovative development in the workspace.

Taxir Aviation
Electronics Intern
April 2021 - June 2021 (3 months)

Mumbai, Maharashtra, India

A company aimed at preventing Unmanned Aerial Vehicle (UAV) damage caused by uncontrolled free-fall.

Intern - Electronics, Mechanical, and Marketing
My roles included designing and validating the prototype Printed Circuit Board (PCB). Responsible for designing the Computer Aided Design (CAD) for the enclosure housing the parachute and electronics. Led the initiative to procure parachute fabric at wholesale price.

DJS Racing
3 years 4 months

Low Voltage Systems Lead
April 2020 - June 2021 (1 year 3 months)
Mumbai, Maharashtra

DJS Racing is the official multi-discipline FSAE team of Dwarkadas J. Sanghvi College of Engineering involving engineers from the Electronics, Computer Science, and Mechanical disciplines. The sole goal was to design, manufacture, and test out a single-seat electric car for national and international competitions.

Head of the Low Voltage and Data Acquisition Dept.
Accountable for managing the juniors to ensure they build and validate designs properly. Led the initiative to build a custom Data Acquisition system involving the transmitter and the datalogger. Managed procurement of components from electronic vendors and sponsors. Took additional responsibility for conducting mock scenarios to prepare juniors for competitions.

Electronic Designer
March 2018 - March 2020 (2 years 1 month)
Mumbai Area, India

Member of the Low Voltage Dept.
Accountable to design and manufacture 1)Printed Circuit Boards 2)Wiring Harness 3)Software programs for the microcontrollers. Researched on utilizing new components for the circuit boards. Led the initiative to research new methods to improve signal processing and integrity, and reduce reliance on OEMs.

Education

Columbia University

Master of Science - MS, Electrical Engineering · (August 2023 - December 2024)

University of Mumbai

Bachelor of Engineering - BE, Electronics and Telecommunications Engineering · (August 2017 - May 2021)