Vivek Singh

LinkedIn +91 7355695707 viveksingh.com vivekkgp97@gmail.com . Pune, India

Profile

Applied Machine learning Engineer with 5 years of experience in Machine Learning, Neural Network, Data Science, MLOps, System Identification, Computer Vision, Smart Manufacturing & IIoT, LLM. Leading a Data Science Team in transforming business requirements into actionable data driven solutions. Worked closely with MIT's device realization lab team to develop innovative solutions. Experienced in developing and deploying SaaS solutions for B2B and B2C markets, with a strong focus on leveraging Spark for big data processing.

Skills

- **Programming:** Python, Matlab, SQL, C++
- **Machine Learning/Robotics:** Pytorch, Tensorflow, Clustering, Supervised, Neural Network, NLP, Reinforcement Learning, System Identification, Matlab & Simulink, Computer Vision, YOLO, Gym, CUDA
- **Gen AI:** Transformer, LLM, Langchain, Huggingface, LLM-finetuning, RAG, RAGAS, Quantization, Distillation, PEFT
- **Data Science & Miscellaneous Technologies:** Pandas, PySpark, scikit-learn, numpy, Flask, HTML, CSS, Dash, Plotly, Matplotlib, OOP, Bagging, Boosting, Kernel, Dimensionality Reduction
- **MLOps:** Git, Docker, Vertex AI, Artifact Registry, Vertex AI, CI/CD Pipelines, Cloud Function, Spark, RESTful API, Airflow, Google Cloud, AWS
- **Management Skills:** Team leadership, Strategic Planning, Decision making, Problem solving

Work Experience

STL Technology Solutions

Jul'19 – Present

Sr. Machine Learning Engineer (Deputy Manager)

Pune, Maharashtra

MIT's Device Realization Lab, Prof. Brian Anthony (banthony@mit.edu)

Data Driven Modeling of system dynamics and control design

- Led the development of LSTM-based models for adaptive control systems. Designed, trained, and validated RNN and system identification models for Digital Twins, saving $2 million annually.
- Collaborated with MIT on a POC for real-time process correction in fiber drawing using Deep Reinforcement Learning, outperforming traditional control methods.

Automated customer enquiries using LLM

- Created an automated question-answering system using RAG with Langchain and Mistral 7B, reducing manual effort by 75-80%.

Automated PLC logs to actionable items using LLM

- Implemented PEFT to fine-tune an LLM for anomaly detection in PLC logs, reducing downtime with over 80% accuracy. Achieved superior performance with Code T5 Plus compared to LLAMA 2 and FLAN T5 XL.

Data Driven Adaptive Control of Fibre Coating Process

- Implemented and integrated a system identification model into PLC as a lookup table and transfer function, resulting in a 25% reduction in coating scrap, equating to annual savings of approximately $1.5 million.
- Processed high volumes of IoT data, used noise reduction and tapering techniques that resulted in significant performance boost.

Defect Detection System using Computer Vision

- Designed and implemented a Computer Vision platform (Edge Detection) in Google Cloud to improve the Mfg. process quality and productivity.
- It involved deploying a python job on Google App Engine that can fetch the images from GCS Bucket and apply edge detection algorithms and save geometrical and spatial information of edges in the BigQuery.
- Saved approx 100 Man hours/month.

Deployed ML prediction models

- Deployed a few Fiber/cable Scrap Reduction ML models on Google Cloud, saving $1M annually. Reduced raw materials waste and testing time of the batch by significant 6-15 man hours/day

Built Virtual Sensors with ML models

- Led the team to develop and deploy ML model as a REST API using Flask, Dockerization, and Google Cloud services that takes the machine generated file (IoT data) from cloud storage and predicts glass optical quality and saves the record to Bigquery, optimizing business processes.
- This tremendously reduced the manual testing effort,raw material wastes, saving 200 Man hours/month

Research Internships/ Projects

NeoAero, Controller Designer, *VTOL autonomous drones for last mile logistics* Apr'19 – Jun'19
Simulation and position control of VTOL drone *NeoAero, London, UK*

- Designed and implemented position control algorithms for a food delivery quadcopter using MATLAB, Simulink, and Simscape.

Taiwan Tech, Research Scholar, *Distinguished Prof. Chyi-Yeu Jerry Lin* Apr'18 – Aug'18
Control and synchronization of motor driven 7 bar mechanism *Taiwan Tech, Taiwan*

- Implemented a control algorithm for a motor-driven mechanism mimicking a jogger's face on a treadmill. Established serial communication between camera sensor and Faulhaber DC motor for real-time synchronization

SKALA: *Stair climbing mobile robot* Nov'16 – Apr'17
Vision based navigation *IIT Kharagpur*

- Developed real-time object tracking for an autonomous vision-based control system using Kanade-Lucas tracking of Shi Tomasi corners.

Roles & Responsibilities

- Led a team of five, coordinated tasks, and encouraged brainstorming sessions, achieving early project completion with a 5% scrap reduction and saving 200 man-hours/month.
- Led cross-functional collaboration to define project scope, benefits, and expectations.
- Led, mentored, and monitored team performance for process efficiency.
- Managed collaboration with MIT, USA.
- Shared findings with management and stakeholders for model improvement and additional data/measurement solutions.

Education

Indian Institute of Technology Kharagpur, *West Bengal* 2015 - 2019
Bachelor's degree, *CGPA 8.01/10, Mechanical Engineering*

Massachusetts Institute of Technology 2023 - present
Micromaster's degree*, Statistics and Data Science*

Relevant Coursework – Machine Learning with Python, Statistical Modeling and Computation, Probability, Fundamental of Statistics, Deep Learning Specialization by Andrew NG, Introduction to Artificial Intelligence, Reinforcement Learning by David Silver, Statistical Method, Data Analysis and Algorithm, Advanced Image Processing, Digital Signal Processing, MLOps Fundamental, Docker Mastery, Optimal control, Robotics, Soft Computing, System and Control.