Nikhil Kumar

AI and ML Engineer
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EDUCATION

Master of Information Technology, SRH Hochschule Heidelberg — Oct/2023 - March/2025
Focus of study: AI/ML and Computer Vision. — Heidelberg, Germany

Bachelor in Electronics and Communication — June/2016 - Oct/2020
Visvesvaraya Technological University — Bangalore, India

TECHNICAL SKILLS

- **Programming Languages:** Python Expert for AI, machine learning, deep learning, and data processing workflows. Experienced with C++ for performance-critical modules and deployment of AI models. Skilled in using Python libraries such as NumPy, Pandas, scikit-learn, TensorFlow, PyTorch, and OpenCV for model development, training, and evaluation.

- **AI/ML and Computer Vision Expertise:** Proficient in AI/ML architecture for model development, training, and evaluation. Strong command of neural networks, including RNN, CNN, LSTM, and LLMs (e.g., LLAMA). Skilled in implementing supervised and unsupervised learning, feature engineering, and model optimization. Solid experience in Computer Vision algorithms such as image classification, object detection (YOLO, HOG), edge detection, and segmentation. Applied graph-based segmentation and image preprocessing techniques in research and projects. Experience with EDA, time-series analysis, and sensor fusion for physiological and wearable data.

- **Generative AI and LLMs:** Experience with prompt engineering, fine-tuning LLMs (LLaMA, GPT), and integrating generative models into real-world applications. Built and deployed LLM-based agents for use cases including healthcare, customer service, and data preprocessing. Strong foundation in NLP, Transformers, RNNs, LSTMs, and sequence modeling. Experience using Hugging Face Transformers, LangChain, QLoRA, and custom data pipelines for LLM applications.

- **Tools:** GIT, Visual Studio Code, SVN, Eclipse, GitLab, Jupyter, PyCharm, Eclipse, Colab Pro, Hugging Face Transformers, LangChain, Docker, Git, GitHub Actions. Streamlit (for prototyping model UIs). Hugging Face Hub, Weights § Biases, Neptune.ai (for tracking § collaboration). Fine-tuning techniques (LoRA, QLoRA, PEFT) on open-source LLMs using domain-specific dataset

- **Working Discipline:** Agile SDLC (Scrum), V Model, Jira, Confluence, Jamma Connect, DOORS, GITHUB, MS Office, IBM Rational Synergy, IBM Rational Change, Microsoft Excel, Microsoft PowerPoint. Open communication, interdisciplinary teamwork, proactive, collaborative, independent, and problem-solving abilities, Analytical and solution-oriented thinking.

WORK EXPERIENCE

Generative AI and LLM Engineer — June 2023 - Present
Freelance / Independent Projects · Remote

- Designed and deployed LLM-powered solutions (LLaMA, GPT-based models) for real-world use cases like healthcare chatbots, lead generation, and data preprocessing tools.

- Built prompt-engineered agents for tasks such as sales automation, WhatsApp communication, and data extraction – aligned with CHECK24's LLM use case expectations.
- Applied fine-tuning techniques (LoRA, QLoRA, PEFT) on open-source LLMs using domain-specific datasets, enhancing accuracy and task relevance by over 30
- Integrated LLM-based microservices into existing IT systems using Python APIs, Dockerized deployments, and secure RESTful endpoints.
- Developed modular backend systems capable of ingesting diverse file formats (CSV, PDF, Excel) and transforming them for supervised training or LLM fine-tuning workflows.

MASTER THESIS

Heart Rate Estimation Using Wearable Sensors and Machine Learning

- Developed a machine learning pipeline for heart rate estimation using multi-sensor physiological data (ECG, PPG, EDA, ACC, TEMP). Built and trained 72 different deep learning models (CNNs, LSTMs, GRUs) with varied preprocessing techniques and architectures for time-series prediction. Implemented custom preprocessing for signal denoising, feature extraction, and label alignment via R-peak detection. Optimized models using MAE, MSE, and RMSE, and converted data into training-ready formats to enable efficient experimentation and real-time inference.

OTHER PROJECTS

- **Human Activity Classification using Inertial Measurement Device and Recurrent Neural Networks** Developed a model to classify five cooking activities using time-series data from an IMU sensor (CMU-MMAC dataset). Utilized Recurrent Neural Networks for accurate recipe prediction based on motion data.
- **Handwritten Digit Classification using Gaussian Naive Bayes in Machine Learning:** Built a model to classify MNIST digits using Gaussian Naive Bayes, focusing on image processing and probabilistic classifiers.
- **SMS Spam Detection using N-Gram Models:** Implemented an SMS spam detection model using n-gram analysis for text classification and feature extraction.
- **Object Detection based on the Histogram Of Oriented Gradients:** Developed an object detection technique using Histogram of Oriented Gradients, improving accuracy in image recognition.
- **Convolutional Neural Networks in Computer Vision:** Developed an AI model for classifying handwritten digits from the MNIST dataset. This involved data preprocessing, model architecture design, training, and performance evaluation, demonstrating proficiency in deep learning and Computer Vision techniques.
- **Robotics:** Developed an autonomous robot from scratch, integrating microcontrollers, motor drivers, and sensors for precise path tracking. Implemented PID control in C/C++, optimizing motor speed and steering for smooth and adaptive navigation across various line patterns and surfaces.
- **Graph-Based Image Segmentation:** Applied graph theory for image segmentation, optimizing pixel grouping based on intensity differences for enhanced image recognition.

LANGUAGES

- **English:** Proficient (C1)
- **German:** Intermediate (B1) – Currently working towards C1 level for professional fluency.