Shubham Vashishth

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shubhamvashishth | shubhamvashishth | Portfolio

EDUCATION

University of Stuttgart — Stuttgart, Germany
MS Computer Science(Autonomous Systems) — October 2024 - Present

Greater Noida Institute of Technology(GGSIPU) — Greater Noida, India
B.Tech in Computer Science Engineering — Aug 2019 - July 2023
Cumulative GPA: 8.52/10.0

SKILLS

Scripting Languages : Python | C++
Libraries & Frameworks : Tensorflow |Pytorch | Scikit-learn | Keras |NumPy | Pandas | OpenCV
Model Deployment : Flask | FastAPI | Docker
Tools & Technologies : Git|LLM |RAG |Langchain |AWS |GCP |AZURE | VS Code | Jupyter

WORK EXPERIENCE

RIPIK.AI — Noida, India
Machine Learning Engineer — April 2024 – Aug 2024

- Improved the design and development of **Optimus**, a sophisticated production planner tool tailored for the pharmaceutical industry, leveraging linear optimization algorithms for optimal scheduling.
- Developed and implemented **meta-heuristic** algorithms, specifically designed to accommodate the **constraints** and **requirements** of plant production teams.
- Implemented robust optimization techniques that resulted in a **10%** increase in production efficiency across six different Pharma plants. Utilized **LLMs** to curate comprehensive monthly reports of the entire schedule, presenting data in a user-friendly format with visualization graphs and analytics.
- Engineered a sophisticated **compliance tracking** system that meticulously compares actual plant performance against the Optimus-generated schedule over a monthly production cycle. This feature enabled in-depth performance analytics, identification of **deviations**, and facilitated continuous process optimization.
- Provided training and support to plants end-user, facilitating smooth adoption and maximizing the tool's impact on production workflows.

CONSTEMS-AI — Noida(Remote), India
Associate AI Software Developer — April 2023 – April 2024

- Contributed in a project to develop an AI-based model for **real-time vehicle** data analysis on roads, deployed successfully on Indian roads in collaboration with **NHAI.**
- Individually led the conceptualization, design, and execution of a comprehensive **pipeline**, specializing in the **detection** of vehicles moving in the **wrong direction** on roadways. Innovatively harnessed **optical flow** technology to establish a sophisticated solution, showcasing technical prowess in creating an **end-to-end** pipeline for precise identification and reporting of misaligned traffic movements.
- Implemented machine learning models for predicting **traffic bottlenecks** and adaptive traffic signal control algorithms based on **reinforcement learning** techniques, resulting in a **15%** reduction in overall travel time.
- Developed a robust **product recognition system** for unstructured store layouts, improving accuracy in identifying and pricing products by **25%** and reducing instances of mislabeling.
- Engineered a state-of-the-art **product identification model** that demonstrated a **97%** accuracy in discerning diverse **brands** and their respective **variants**, showcasing a keen eye for detail.
- Served as a mentor to junior interns, offering comprehensive guidance on standard operating procedures to ensure a thorough understanding and seamless integration into the workflow.

CRON LABS Bangalore, India
Data Scientist Intern Dec 2022 – March 2023

- Developed an automated trading system using Python and AlphaTrade API for data analysis and execution of trades, implemented machine learning algorithms for identifying profitable trades and **optimized** trade execution which was **faster by 47% than previous versions**.
- Build an **Object Detection model** using YOLOV5 to detect various features of local kirana/medical shops like assets, products, machinery etc.
- Built and maintained data pipelines using **AWS Data pipeline** and managed **data lake architecture** on S3 for data storage and retrieval.

PROJECTS

DASH CAM NUMBER PLATE AND FACIAL RECOGNITION FOR ONCOMING TRAFFIC (Final year project)

- **Implemented** custom deep neural networks, **fine-tuning** hyperparameters and **optimizing** layer architectures. Utilized **TensorFlow** for efficient model training and deployment, incorporating **transfer learning** with pre-trained models to expedite convergence. Employed **GPU acceleration** to significantly enhance computational efficiency during the training phase.
- Deployed **CNNs** with multiple convolutional and pooling layers for real-time object detection. Utilized frameworks like **PyTorch** to implement region-based CNNs (R-CNNs), optimizing anchor box configurations for precise localization. Integrated **non-maximum suppression** techniques to refine detection outputs and eliminate redundant bounding boxes.
- **Engineered** OCR algorithms using recurrent neural networks (RNNs) for sequence modeling. **Implemented** bidirectional LSTMs to capture contextual information and boost character recognition accuracy. Employed **transfer learning** from pre-trained language models, such as **Tesseract**, **fine-tuning** for specialized license plate character recognition.
- Implemented **Siamese networks** for facial feature extraction, incorporating **contrastive loss** functions for discriminative embeddings. Introduced **triplet loss** functions to enforce a margin between positive and negative pairs, enhancing the system's ability to distinguish between individuals. Model parameters were **fine-tuned** using advanced techniques, including **gradient clipping** for stable convergence.

BLUR DETECTION USING CNN

- Developed a robust Convolutional Neural Network (**CNN**) model to detect and quantify image blur, achieving accurate predictions based on **Laplacian map variance**. Trained on diverse datasets (**Undistorted**, **Artificially Blurred**, **Naturally Blurred**) for comprehensive image quality assessment.
- Serialized training data and model for reproducibility, **deployment** and seamless **integration** into deployment pipelines., designed and trained a multi-layered CNN **architecture** for feature extraction and blur prediction.
- Established **normalization** and **denormalization** processes to enhance model **convergence** during training and facilitate meaningful interpretation of **predictions**., resulted in a high accuracy score of **95%,** indicating the model's proficiency in predicting image blur.

STOCK PRICE ANALYSIS AND PREDICTION USING LSTM

- Developed a sophisticated **predictive model** utilizing LSTM neural network architecture to conduct a **comprehensive analysis** of Google's stock prices and make informed predictions.
- Utilized the widely-used **yfinance** library in Python to download historical **stock** price data for Google, allowing for a thorough examination of trends and patterns.
- Employed advanced data preprocessing techniques such as **scaling** and **windowing** to optimize the data for input into the LSTM model.
- Produced visually appealing and informative charts using **data visualization** tools such as Matplotlib, providing investors with **valuable** insights into both historical and predicted stock prices.

CERTIFICATIONS

1. **Baseline: Data, ML, AI**
2. **Perform Foundational Data, ML, and AI Tasks in Google Cloud**
3. **Kubernetes in Google Cloud**
4. **Google Cloud Computing Foundations: Data, ML, and AI in Google Cloud**