Prithvi Raj Singh *ML Engineer*

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PROFILE

Passionate ML Engineer proficient in developing and deploying cutting-edge machine learning models to solve complex problems. Skilled in signal processing, data preprocessing, feature engineering, model selection, algorithmic implementation, and evaluation. Strong expertise in various ML algorithms and frameworks, with a track record of successful project delivery. Passionate about leveraging AI technologies to drive innovation and enhance business outcomes.

EDUCATION

University of Louisiana at Lafayette Lafayette, LA
Master of Science, Computer Science
Relevant Coursework: Deep Learning, Data Mining, Image Processing, Pattern Recognition, Design and Analysis of Algorithms, Neural Networks, Reinforcement Learning.

McNeese State University Lake Charles, LA
Bachelors of Science, Computer Science
Relevant Coursework: Software-Engineering I & II, Object-Oriented Design, Database Design and Implementation, Data Structure and Algorithms, Statistics and Probability, Advanced Calculus I/II, Linear Algebra & Matrix Theory.

TECHNICAL SKILLS

Machine Learning Algorithms and Techniques
- Supervised Learning (e.g., regression, classification)
- Unsupervised Learning (e.g., clustering, dimensionality reduction)
- Reinforcement Learning, Deep Learning (e.g., neural networks, CNNs, RNNs)
- Ensemble Methods (e.g., random forests, gradient boosting)
- Transfer Learning, Hyperparameter Optimization, Data Augmentation
- Generative Adversarial Networks (GAN), Transformers, BERT

Programming Languages
- Python (including libraries like TensorFlow, Keras, PyTorch, and Scikit-learn)
- C++ (for production-level code, Digital Signal Processing), Scala, C#, BASH

Tools and Platforms: Jupyter Notebook, Git/GitHub, AWS, Azure, Docker, PySpark, MLflow, AirFlow
Data Analysis and Manipulation: Pandas, SQL, R, Dask, Pandas, Numpy, Seaborn
Object Oriented Programming
Signal Processing Tools: SciPy (filtering, convolution, and spectral analysis), statsmodel, DSP Library in C++
Deployment and production of ML models (MLops)

PROFESSIONAL EXPERIENCE

Research Associate (Software Engineer) 08/2021 – 08/2023 | Baton Rouge
Louisiana Transportation Research Center
- Crafted and engineered Windows and web form applications using C# and Visual Basic within the .NET framework.
- Seamlessly navigated the complete software development lifecycle (SDLC), ensuring comprehensive understanding and adaptation.
- Spearheaded the development and publication of diverse Windows applications, specializing in meticulous data cleaning and analysis through Excel and VBA.
- Pioneered the implementation of CI/CD on the Azure DevOps pipeline, elevating software quality, reliability, and availability.
- Orchestrated an impactful training seminar, empowering Geotech Engineers with in-depth knowledge of newly developed software and enhanced features in existing solutions.
- Guided the seamless transition of legacy code from VB6 to modern VB and C# within the .NET framework, resulting in a substantial boost in performance efficiency.

Associate Researcher 09/2023 – present | Lafayette
Cyber-Physical and Human Systems Lab, ULL
- Drive the design, implementation, and optimization of cutting-edge computer vision algorithms using Python and C++, with a focus on small object detection and tracking.

- Spearhead the collection and curation of innovative datasets, utilizing Python for data management and ensuring the availability of high-quality data crucial for seamless research implementation.
- Harness Python's capabilities for advanced data analysis and statistical techniques, demonstrating expertise in feature engineering and conducting rigorous hypothesis testing.
- Execute precise data cleaning, wrangling, and preprocessing using Python, ensuring a seamless implementation of Machine Learning algorithms across diverse datasets.
- Orchestrate and conduct thorough Machine Learning experiments with a focus on precision, ensuring robust predictive modeling outcomes.

THESIS PROJECT

"Real-time object detection and tracking of fast-moving small objects using RGB-D camera and computer vision techniques" - Masters Thesis

- Designed and implemented a computer vision model using a stereo camera to track small and fast-moving objects like tennis balls and racquetballs using MLOps principles.
- Optimized the model for deployment on limited resource devices like JetsonTX and implemented state-of-the-art techniques for 3D object detection and tracking.
- Pioneered and implemented a novel tracking algorithm leveraging physics for better tracking of fast-moving small objects in 3D space resulting in over 80% accuracy improvement.

"Bidirectional Autonomous Robot for path finding" - Bachelors Capstone Project

- Designed a small robot from scratch powered by Raspberry Pi 4B and implemented a Breadth-first search algorithm for optimal path planning.
- Worked on the fusion of lidar and camera stream for better obstacle avoidance and motion resulting in significant efficiency in path finding.

PROFESSIONAL DEVELOPMENT

DataCamp Courses : Machine Learning Fundamentals, MLOps Fundamentals, SQL Fundamentals, Data Analyst with Python (Certification Preparation), Python Programmer, Statistics and Probability in Python, Deep Learning Fundamentals, Data Scientist with Python (Certification Preparation), Machine Learning Engineer (In progress)

PUBLICATIONS

Restart-with-Delayed-Retransmission Scheme for Reliable Live Video Streaming at the Edge. (In Progress)

Tracking and Trajectory Forecasting of fast-moving small objects in 3D space. (In Progress)

LLM COURSEWORK AND PROJECTS

- Prompt Engineering for Developers.
- Reinforcement Learning from Human Feedback
- LangChain for LLM application development
- Finetuning Large Language Models
- Building Gen AI applications with Gradio
- Building and Evaluating advanced RAG application
- Vector Databases: from embedding to application
- Pair Programming with Large Language Model

REFERENCES

Dr. Raju Gottumukkala, *Associate Professor,* UL Lafayette
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Dr. Catherine Anderson, *Professor Emeritus,* McNeese State University
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Dr. Anthony Maida, *Associate Professor,* UL Lafayette
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PORTFOLIO WEBSITES

Github: https://github.com/Prithviraj97
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