Purushothaman Natarajan

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Summary

Experienced Deep Learning Engineer with 3.5+ years of expertise in computer vision and NLP, contributing to high-profile projects with Amazon and DRDO. Successfully developed and deployed LIME and SHAP-based explainable AI models, resulting in a 40% improvement in decision transparency for defense applications, and have published research in various AIML domains.

Skills

Programming Languages: Python, SQL, C++

Technologies & Tools: TensorFlow, PyTorch, Scikit-learn, Keras, OpenCV, NLTK, Pandas, Matplotlib, Spark, Kubernetes, Docker, Tableau, Visual Studio, Git, CUDA

Machine Learning & AI: Machine Learning Algorithms, Metrics, BERT, CNN, RNN, Prompt Engineering, GANs, OpenAI, Dall-E, Stable Diffusion, Langchain, Llama2, spaCy

Cloud Platforms: GCP, AWS

Publications

Underwater SONAR Image Classification and Analysis using LIME-based Explainable Artificial Intelligence Dec 2023

Purushothaman Natarajan, Athira Nambiar

VALE: A Multimodal Visual and Language Explanation Framework for Image Classifiers using eXplainable AI and Language Models June 2024

Purushothaman Natarajan, Athira Nambiar

Experience

Research Fellow (Machine Learning & eXplainable AI), SRMIST – Chennai, IN Sept 2023 – Present

- Developed algorithms and reliable AI/ML models for underwater sonar image detection, enhancing submarines' underwater surveillance and exploration capabilities.
- Integrated Explainable AI into a framework, ensuring transparency and trust in decision-making processes within the critical defense domain and yielding reliable, interpretable AI models.
- Delivered a self-explainable AI model using LIME and SHAP for underwater SONAR image detection and classification, currently being tested by NPOL, DRDO, and the Defense Ministry of India.

Machine Learning Associate, Amazon – Chennai, IN Jul 2022 – May 2023

- Ensured data quality and integrity for high-profile products like Alexa, Ring, and Halo. Preprocessed text data using NLTK and SpaCy, including cleaning, tokenization, stemming, and stopwords removal.
- Cleaned and preprocessed structured data using Pandas and NumPy, handling missing values, outliers, and feature scaling. Developed standardized data processing techniques, resulting in improved data labeling and consistency.
- Designed performance dashboards to drive continuous performance optimization and data-driven decision-making.

Customer Support Executive, Amazon – Coimbatore, IN Aug 2021 – Nov 2021

- Resolved diverse customer and seller challenges, including order tracking, product inquiries, shipping issues, refunds, and returns, while maintaining a positive customer experience and earning recognition for exceptional performance.
- Earned top performer status for two consecutive months by demonstrating composure and empathetic handling of customer concerns, including managing abusive customer support interactions..

Business Analyst, IIFL – Chennai, IN Nov 2020 – May 2021

- Managed transactions valued $10 million in client portfolios daily, ensuring seamless transactions and effective communication between clients and the trading desk. Provided strategic market insights to clients, driving portfolio performance and customer satisfaction.

Education

SRM University, PhD in Computer Science Feb 2024 – Sept 2027

- **Coursework:** Computer Architecture, Artificial Intelligence, Comparison of Learning Algorithms, and Computational Theory.

BITS, Pilani, M.Tech in Data Science Sept 2022 – Aug 2024

- CGPA: 8.38/10
- **Coursework:** Data Science, Applied Machine Learning, Deep Learning, Natural Language Processing, Information Retrieval, Artificial and Computational Intelligence.

Anna University, B.E in Mechanical Engineering Aug 2015 – Nov 2020

- CGPA: 6.4/10
- **Coursework:** Kinematics of Machinery, Thermodynamics, Manufacturing Technology, Internal Combustion Engines, Design and Development.

Projects

Q&A Chatbot from PDF `github.com/Purushothaman-natarajan/Q-and-A-chat-bot-from-PDF`

- Developed a chatbot that answers queries by leveraging information from uploaded PDF files, utilizing BERT.
- Tools Used: Python, Transformers, NLTK, Gradio, Tensorflow

XAI for AID Scene Classification on Remote Sensing `github.com/Purushothaman-natarajan/eXplainable-AI-for-Image-Classification-on-Remote-Sensing`

- Developed a scene classification model leveraging transfer learning, enabling accurate predictions. Implemented LIME and Grad-CAM to provide transparent explanations for model predictions. Designed a user-friendly interface with Gradio, allowing users to upload or paste images for classification and visual explanation.
- Tools Used: Python, Tensorflow, Scikit-learn, LIME, Grad-CAM, Gradio

Piezoelectric Generator

- Designed and deployed a transducer on campus to harness mechanical vibrations and convert them into energy, successfully powering microdevices and lighting systems.
- Tools Used: Solidworks, CAD.

Additional Experience and Awards

Instructor, BrightNext Acadmey (2023-Present): Taught Machine Learning and Deep Learning courses to over 100 students.

Freelancer (Upwork and LinkedIn) (2022-2024): Successfully Delivered AI and ML projects valued between $10K to $20K as an independent contributor.

Third Prize, Innovation & Design on Remote Sensing Data: Recognized for designing a synchronized research and production-ready dashboard for an explainable image classifier, competing against 100+ entries.

Licenses & Certifications

Udacity: Deep Learning, Computer Vision, Generative AI Nanodegree's.

Codecademy: BI Dashboards with Power BI & Tableau, Business Intelligence Data Analyst, SQL for Marketers and Product Managers.

LinkedIn: Advanced SQL, Artificial Intelligence Foundations: ANN, CNN, R-CNN, RNN, LSTM, GNN & Transformers, Advanced NLP with Python for Machine Learning, GANs and Diffusion Models with TensorFlow and PyTorch, Transfer Learning Using PyTorch, Deep Learning for Computer Vision Applications.