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

- Developing algorithms and reliable AI/ML models for underwater sonar image detection to enhance submarines underwater surveillance and exploration capabilities.
- By integrating Explainable AI within a framework, ensured transparency and trust in decision-making processes within this critical defense domain, leading to reliable and interpretable AI models.
- Successfully delivered a self-explainable AI model using LIME and SHAP for underwater SONAR image detection and classification, which NPOL, DRDO, and the Defense Ministry of India are currently testing.

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

- Handled data for high-profile products like Alexa, Ring, and Halo, ensuring data quality and integrity. Utilized NLTK and SpaCy for text preprocessing, including cleaning, tokenization, stemming, and stopwords removal.
- Leveraged Pandas and NumPy expertise to clean and preprocess structured data, handling missing values, outliers, and feature scaling, etc.
- Established standardized data processing techniques, resulting in improved data labeling and consistency. Designed and developed performance dashboards to drive continuous performance optimization and data-driven decision-making.

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

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

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

- Handled client portfolios worth $10 million every day and stock brokerage operations, ensuring seamless transactions and effective communication between clients and the trading desk.
- Analyzed market trends and provided strategic insights to clients, contributing to increased 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`

- A chat bot designed to answer queries from the uploaded PDF file, developed 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`

- Scene classification using transfer learning along with functionalities for explaining predictions using LIME and Grad-CAM. Additionally, a user interface built with Gradio allows users to upload or paste images for classification and visual explanation.
- Tools Used: Python, Tensorflow, Scikit-learn, LIME, Grad-CAM, Gradio

Piezoelectric Generator

- A transducer to collect energy from wasted sources, such as mechanical vibrations to power microdevices, deployed on campus to power the lights.
- 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.