Purushothaman Natarajan

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Skills

Languages: Python, SQL

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

Cloud Platforms: GCP, AWS

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.

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   Aug 2022 – Apr 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.

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	July 2024

Purushothaman Natarajan, Athira Nambiar

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

- Scene classification using transfer learning along with functionalities for explaining predictions using LIME (Local Interpretable Model-Agnostic Explanations) and Grad-CAM (Gradient-weighted Class Activation Mapping). 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 (2024-Present): Taught Machine Learning and Deep Learning courses.

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: 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.