RIYA PONRAJ

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EDUCATION

Easwari Engineering College (affiliated to Anna University), Chennai, India 2019 - 2023

- Bachelor of Engineering in Computer Science CGPA: 9.4/10
- Graduated First Class with Distinction; placed 3rd in a class of 180
- Data Structures, Computer Architecture, Design & Analysis of Algorithms, Operating Systems, Database Management Systems, Compiler Design, Computer Networks, Data Science, Artificial Intelligence and Natural Language Processing, Engineering Math 1 & 2 (calculus, linear algebra), Discrete Math, Probability & Number Theory

PUBLICATIONS

1. S. Kayalvizhi, **Riya Ponraj**, S. Roshni, and S. Priya Dharshini, "**A Comprehensive Study on Supermarket Indoor Navigation for Visually Impaired using Computer Vision Techniques**," (published in IEEE Xplore through OTCON 2.0, 2023) https://riyaponraj.github.io/files/indoornav.pdf
2. Sai Santhosh V, Nikhil Eshwar T, **Riya Ponraj**, Kiran K, "**Comprehensive Strategy For Analyzing Dementia Brain Images And Generating Textual Reports Through ViT, Faster R-CNN And GPT-2 Integration"** (accepted and presented at ICAEECI 2023, pending publication in IEEE Xplore) https://riyaponraj.github.io/files/dementia.pdf
3. Sai Santhosh V, **Riya Ponraj**, Nikhil Eshwar T, Kiran K, **"Breaking the Boundaries of Oncological Diagnosis: A Holistic Framework for Multi-Cancer Identification and Comprehensive Diagnostic Reporting Utilizing Advanced AI and NLP"** (ICRASET 2023, accepted and pending publication) https://riyaponraj.github.io/files/oncology.pdf

PRESENTATIONS

1. **Title:** A Comprehensive Study on Supermarket Indoor Navigation for Visually Impaired using Computer Vision Techniques, **Conference:** OPJU International Technology Conference on Emerging Technologies for Sustainable Development (OTCON), Raigarh, Chhattisgarh, India, presented on Feb 8th, 2023
2. **Title:** Comprehensive Strategy For Analyzing Dementia Brain Images And Generating Textual Reports Through ViT, Faster R-CNN And GPT-2 Integration, **Conference:** 2023 International Conference on Advances in Electrical, Electronics and Computational Intelligence (ICAEECI 2023, presented on Oct 19th, 2023)

RESEARCH EXPERIENCE

Undergraduate Researcher | Easwari Engineering College, India 2021-2023

- Under the supervision of Prof. S. Kayalvizhi, to assist the visually impaired in navigating a supermarket, developed an enhanced model to identify product names using the OpenVINO toolkit's "horizontal-text-detection" model and tesseract. As part of senior thesis, the indoor object detection model was improved by incorporating pre-trained MobileNet and Faster R-CNN models to enable the identification of features required for mapping pathways in images. The model accuracy was increased from 67 percent to 75 percent.
- Conducted research in cancer diagnostics, focusing on developing advanced deep learning models (VGG-19, DenseNet201, MobileNetV3, ResNet50V2, YOLOv5, GPT-2) for precise cancer classification. This resulted in the creation of a diagnosis system that seamlessly integrates object identification (YOLOv5), natural language processing (GPT-2), and image classification models (VGG-19, DenseNet201, MobileNetV3, ResNet50V2). This novel system enhances diagnostic accuracy and provides decision support for medical professionals.
- Developed a model for dementia brain image analysis by researching Vision Transformers (ViT), Faster R-CNN, and GPT-2. This research provides a solution for automating and improving the analysis of dementia-related brain images, offering more accurate and detailed diagnostic reports by standardized MRI images, extracting intricate features, detecting abnormalities, and generating detailed X-ray reports.

- Under the guidance of Prof. KPK Devan, curated a dataset of over 50,000 tweets and integrated a fine-tuned BERT model to discern linguistic patterns, sentiment, and context. As a result, we significantly enhanced the model's accuracy, precision, recall, and F1 score, strengthening its ability to distinguish authentic from fake tweets.

Research Intern | Bayes Labs, Bangalore, India Aug 2021 to Dec 2021

- Utilized the SATPDB database to gather a range of peptides (viral, bacterial, fungal, hypersensitivity, cancer, allergenic) and categorized the collected peptide data. Developed a pipeline using the ProtBert pre-trained model for feature extraction from protein sequences.
- Conducted research on implementing the DeepPurpose framework and integrating it with a Pythonic protein engineering framework. Evaluated and assessed the predictive accuracy of enzyme and protein datasets, demonstrating the effectiveness of the predictive models for various target properties, resulting in an 87% accuracy in distinguishing useful proteins.

INDUSTRY EXPERIENCE / INTERNSHIPS/ PROJECTS

Machine Learning Curriculum Developer Intern | Sustainable Living Labs, Chennai, India Apr 2023 – Jul 2023

- Collaborated with a global team of experts, designers, and educators to create artificial intelligence & machine learning educational course content for Intel.
- Incorporated Generative AI (GEN AI) content into courses and developed an automated chatbot that produces generative AI responses to user queries.
- Created a cryptocurrency price prediction and trading bot using Python, ARIMA models, and Streamlit for classroom training. This project involved data preprocessing, time series forecasting, model persistence, and a user-friendly web interface to work with financial data.
- Other works: Image Captioning Model, Style Transfer, Image Inpainting.

Image Processing Intern | APTCODER Mar 2023 -Aug 2023

- Extracted text from handwritten student code submissions using **Tesseract OCR** with modifications such as resizing images, converting to grayscale, applying contrast and brightness adjustments, and adding bounding boxes for text region identification. Further enhancements include noise reduction, skew correction, and fine-tuning Tesseract settings, resulting in 78% accuracy.
- Integrated AWS Textract into the model to enhance text extraction and to reduce issues from font and spacing variations. Extracted code (in Python and Javascript) is compiled and cross-referenced with answer keys for code accuracy validation.

Machine Learning Intern | IOTIOT.IN Dec 2022 - May 2023

- Optimized the transfer learning process for **Traffic Monitoring and Vehicle Type Detection** to improve traffic monitoring under varying weather conditions.
- Implemented TensorFlow's Unique Object Detection API, fine-tuned the "ssd_mobilenet_v2_fpnlite_320x320_coco17_tpu-8" model with adjusted parameters, and monitored training with TensorBoard. Exported an inference graph, evaluated the model with test images, and assessed performance using metrics like mAP, IoU, and accuracy.
- Dockerized TensorFlow Object Detection (SSD MobileNet v1) for streamlined recognition.
- Skills: SDLC, Git, CI/CD, DevOps, Git workflows, coding, code refactoring, and Docker.

HONORS AND AWARDS

Second Place in Smart India Hackathon 2022, India 2022-2023

- Amongst a **nationwide pool of thousands of teams,** won **second place among the top 40 finalists** during the Smart India Hackathon 2022, a Government of India forum that provides an opportunity to students across the country to address some of the pressing problems facing the country.
- Leveraged advanced data science and machine learning techniques to construct a predictive model, enabling precise assessment of water suitability for both drinking and irrigation.
- Led a team of six to tackle the problem and created a stand-alone desktop application using Python & ElectronJS to analyze, visualize, and interpret hydrochemical data, which helped us get Rs. 25,000/- cash prize.

Jury Member in Smart India Hackathon Internals 2023, India Sept 2023

- Invited by my college to serve as a jury member for the 2023 Smart India Hackathon internal team selection.
- Assisted in shortlisting teams, with over 20 participating in the panel.
- As the winner of the previous year, identified areas for improvement and provided input on their projects.

TECHNICAL SKILLS

- **Machine Learning Tools**: Pandas, Numpy, matplotlib, seaborn, NLTK, OpenCV, keras, Scikit-Learn, TensorFlow
- **Languages**: Python, C, Java, SQL
- **Web Tools**: HTML, CSS
- **Others**: Power BI, Anaconda, Jupyter Notebook, Hadoop, Tableau, Streamlit, Cloud and AWS.

TEACHING AND MENTORSHIP

- Arranged a seminar inviting students from nearby high schools to explore Machine Learning concepts.
- Led an engaging 4-week introductory workshop on Machine Learning, equipping 50 high school students with essential skills for practical ML implementation.
- Actively mentored lower-classmen in project selection, coding strategies, and problem-solving techniques while choosing ML projects for competitions.

CERTIFICATIONS

1. **Supervised Machine Learning: Regression and Classification,** Coursera with Andrew Ng
   - Proficient in implementing gradient descent optimization algorithms to fine-tune models for research projects.
   - Skilled in applying regularization techniques to ensure model generalization in research work.

2. **Neural Networks and Deep Learning,** Coursera with Andrew Ng
   - Ability to identify key architecture parameters for optimizing model performance and use that in training, testing, and analyzing variance for deep learning applications. Built neural networks using TensorFlow.

3. **Real-Time Communication System Powered by AI for Hearing & Speech Impaired, IBM**
   - Implemented a Convolutional Neural Network (CNN) with a layered architecture for sign language gesture recognition. Deployed "categorical cross-entropy loss," evaluation metric, and "Adam" optimizer.

SERVICE

Technical Events Coordinator | Easwari Engineering College, Chennai, India 2022-2023

- Coordinated the organization of technical events for a national-level department symposium (Kratos), overseeing event selection, planning, and execution.
- Crafted coding tasks with interactive features, utilizing precise grading and scoring methods for multi-round technical competitions, ensuring thorough skill assessment.

NSS Volunteer | Assisted visually impaired students by serving as an exam scribe 2019-2022