Dharun Muthaiah Nataraj

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EDUCATION

Vellore Institute of Technology, Chennai 2021 – present | Chennai, India
B. Tech Electronics and Communication Engineering
CGPA - 9.11 | Coursework: Signals and System, Digital Signal Processing, Artificial intelligence & Machine Learning, VLSI Design, Embedded System Design, IoT Domain Analytics, Microprocessor & Microcontroller.

Pupil Saveetha Eco School 2021 | Chennai, India
XII Grade
Percentage - 95.4%

PROFESSIONAL EXPERIENCE

R&D intern Jun 2024 – Aug 2024 | Chennai, India
Qneuro India Pvt Ltd
- Conducted research on a skin conductance-based emotion recognition system using Galvanic Skin Resistance sensor (GSR).
- Worked on creating custom Data Acquisition Protocols to categorize signals into stress-inducing, amusing, and normal.
- Utilized Preprocessing steps like Moving average and Min-Max Normalization for Normalizing signal.
- Feature Extraction algorithms like cvxEDA used to segregate Normalized EDA signal into phasic and tonic component.
- Leveraged Machine Learning Algorithms like SVM and Random Forest for classification.
- This role sharpened my ability to manage and work in complex projects and collaborate with cross-functional teams.

AI/ML Intern Sep 2023 – Nov 2023 | Coimbatore, India
Dotworld Technologies Pvt Ltd
- Implemented and optimized AI models for voice cloning, ensuring model deployment and improving system efficiency.
- Created custom audio dataset and pre-processed it to reduce noise for wake word detection system.
- Extracted spectral features from audio signals using Mel-frequency cepstral coefficients (MFCC) and utilized a custom CNN based deep learning model for detecting wake word.
- Contributed to projects involving 3D Gaussian Splatting in data acquisition.
- Gained experience with Secure Shell (SSH) and Linux OS during projects.

RESEARCH EXPERIENCE

NIR based Non-Invasive Blood Glucose detection - (Dr. Jagannath M) Aug 2024 – Nov 2024
Sent for Publication at AdSoc-5.0 (2025), GNIT, India (IEEE)
- Developed a working prototype to non-invasively detect and monitor blood glucose level.
- Deployed a Customized NIR sensor module to predict the glucose level through amount of light penetrating the skin.
- A custom dataset of reference glucose levels with estimated sensor values was created for 4 sessions before and after eating.
- Based on obtained data, statistical models like random forest, polynomial regression, support vector regression along with logistic regression were utilized for prediction.
- LCD display and Buzzer integrated with Arduino Uno to display predicted glucose values and alert when High Blood glucose level detected.

Smart Waste Segregation System - (Dr. Berlin Hency V) Feb 2024 – Jun 2024
Accepted for Publication at IEEE-iSES 2024, IIIT Delhi, India (IEEE)
- Developed a Waste Segregation system to segregate waste into dry, organic, hazardous and plastic.
- Integrated ESP32 camera for computer vision with Inductive sensor to improve efficiency of the proposed system.
- Used MobilenetV2 for segregating of dry, organic and plastic waste obtained accuracy score of 97% and inductive for hazardous waste.
- Utilized EDGE Impulse platform for training and dataset creation.
- Ultrasonic sensors were deployed to monitor waste level and update cloud in real time.

Autism Spectrum Disorder Detection using fMRI - (Dr. Jagannath M) Nov 2023 – May 2024
Accepted for Publication at ICMLDE 2024, Dehradun, India (Elsevier)
- Applied machine learning techniques to classify autism spectrum disorder based on fMRI data from the ABIDE dataset.
- Preprocessed data by transforming fMRI from 4D format to 2D using libraries such as Nilearn and Nibabel.
- Built a deep learning network utilizing Multihead Attention Network and Squeeze & Excitation layer for feature extraction.
- Machine Learning models such as SVM and random forest leveraged to detect ASD from extracted features.
- Achieved an overall classification accuracy of 98.59%.

PROJECT

Veggie Vision - Vegetable Detection and weight Estimation Jun 2024
Object detection, Bounding Boxes, Flask, Yolo-v8 - Kleos Hackathon
(DY Patil University)

- Utilized YOLOv8 model to train on our custom datasets for vegetable detection.
- Implemented bounding boxes using Roboflow for approximate weight estimation.
- Contributed to deploying the model for real-time detection through a Flask-based web application, optimizing performance and user interface.

Retinal Image based blood vessel segmentation Aug 2023 – Nov 2023
Attention U-net, Deep Learning algorithm - (VIT Chennai)

- Dataset's such as Drive-DB for training and Chase DB for testing were used in segmentation of blood vessels.
- Utilized preprocessing techniques like Contrast-limited adaptive histogram equalization (CLAHE) and data augmentation such as Horizontal, Vertical flip and Rotation of image.
- Implemented custom deep learning pipeline by integrating advanced segmentation algorithms such as Attention U-net and Squeeze Excitation layer.
- Obtained IoU score results of 75.4%, accuracy of 90.4% and Loss of 0.14.

Driver Drowsiness Detection Apr 2023
Real Time Classification and alert - (VIT Chennai)

- Led the project to develop and implement a real-time drowsiness detection system, optimizing model accuracy and ensuring practical application in real-world scenarios.
- Utilized libraries like Dlib and Haar cascade algorithm for detecting eyes in real time.
- Trained the model using an eye dataset sourced from Kaggle, achieving a test score of 94%.
- Implemented the CNN based model to classify drowsiness in real-time using the algorithm developed.

CLUBS AND ACTIVITIES

ViTeach (VIT Chennai) Jan 2023 – Aug 2023 | Chennai, India
FFCS member
ViTeach is a student run social outreach club committed towards educating and imparting values to underprivileged children. During my tenure in the club, I had a lasting impact in the Content team of the club where I contributed in various works like designing PPT for teaching children and actively took part in various activities organized by the club by supporting and engaging with team members.

Hack Club (VIT Chennai) Oct 2022 – May 2023 | Chennai, India
AI/ML Department
At Hack club I actively participated in various club events by contributing ideas, organizing activities, engaging with fellow members. I contributed to the club's growth by working in marketing department with a goal to spread awareness on events conducted by the club. Gained practical knowledge in machine learning algorithms, including Random Forest, Support Vector Machines (SVM), and others, within the club environment.

SKILLS

AI/ML and Signal Processing
Computer vision, Deep learning, Image processing, TensorFlow, Keras, OpenCV, MATLAB, Dlib, Pytorch, NumPy, Pandas, Scikit-learn

Programming Language
Python, C++, Embedded c, Arduino

Problem solving and Management
Analytical skills, Project Management, Effective Communication and Team collaboration.

CERTIFICATES

Entrepreneurship (NPTEL Course)
Completed the course with a consolidated score of 83% passed with distinction.

Introduction to C++
Obtained Certificate of Excellence from Coding Ninjas Course.

Generative AI Applications using Vertex AI
Google cloud Skills boost Gen AI and Project completion from SmartInternz. Got consolidated score of 95%.

LANGUAGES

English (IELTS-7.5) | **Tamil** | **Hindi** | **Malayalam**