Jegadit Sakthi Saravanan

rulerofeternalnight.github.io | rulerofeternalnight | jegaditsakthisaravanan@gmail.com | Google Scholar

Education

University of Illinois at Chicago — **2024 - Present**
MS in Computer Science — *GPA: -.-/-.-*

Amrita Vishwa Vidyapeetham, Coimbatore, India — **2020 - 2024**
B.Tech in Computer Science and Engineering - First Class with Distinction — *GPA: 8.1/10*

Experience

Deep Water Marine Club (DWMC) | Website | **Volunteering** — **May 2022 – June 2024**
Robotics Engineer & ML/DL Researcher

- Supervised the design and construction of the Autonomous Underwater Vehicle (AUV) named Sea Dragon.
- Spearheaded the development of an improved sensor noise reduction algorithm (AGAKF algorithm) for the AUV, enhancing the precision of navigation and control by 87-95% even in complex underwater environment.
- Implemented advanced Deep Learning algorithms to autonomously navigate the AUV and enhance data processing efficiency.

TIFAC-CORE in Cyber Security | Website — **Nov 2022 – March 2023**
Part Time Project Staff — *Amrita Vishwa Vidyapeetham, Coimbatore*

- Performed various application testing strategies, reverse engineered and rebuilt applications with custom vulnerabilities.
- Successfully emulated the CVE-2019-11932 vuln in an isolated virtual environment on older versions of WhatsApp.
- Built a Neural Network Architecture that can distinguish Encrypted and Compressed data with an accuracy of 72%

Publications

Enhancing AUV Sensor Precision with Adaptive Genetic Algorithm aided Kalman Filtering (AGAKF)
Yet to be published | Blog | *Python, MATLAB, Simulink*

AI based parameter estimation of ML model using Hybrid of Genetic Algorithm and Simulated Annealing
IEEE Xplore | PyPi | Github | Blog | *Python, scikit-learn*

Selected Projects

JSS-Optimizer - Python Package | Blog | Github | PyPi | *Python*

- Developed a Python package for hyperparameter fine-tuning and optimization, based on the research paper "AI based parameter estimation of ML model using Hybrid of Genetic Algorithm and Simulated Annealing"
- Integrated with machine learning models for hyperparameter tuning, focusing on efficiency & performance improvement. Provided support for Random Forest Classifiers & Regressors and ensured compatibility with diverse datasets.
- Released multiple versions, with enhanced features and improved performance. Actively working on extending the package's capabilities to handle a wider range of data and model scenarios for future releases.

Amrita University Canteen App | Blog | Github | *Python, Flask, Tensorflow*

- Created a Web application using Flask to show the current menu and crowd statistics in the college's canteens.
- Custom DL models were built on the 'ssd-mobilenet-v2-fpnlite-320' model to process and extract data from CCTV images of the menu. The same CCTV images were also used to process the crowd density in the canteen.
- Was under consideration for adoption in the canteens by the college board. But, not pursued for undisclosed reasons.

Customer Churn Prediction Analysis | Github | *Python, Flask, scikit-learn*

- Developed a web application using Flask to predict customer churn for a service, leveraging ensemble machine learning techniques such as max-voting and stacking.
- Achieved 98% accuracy by implementing advanced ensemble methods, optimizing the model's predictive performance.

Skills

Languages: C, C++, Python, Java, GoLang, JavaScript, Haskell, Bash
Developer Tools & frameworks: VS Code, Eclipse, Google Cloud Platform, TensorFlow, Android Studio, AWS, NGROK, NGINX, GIT, Docker, Wireshark, Postman, Burp Suite, ApacheWeb Server, Jira
Modelling Tools: SketchUp, SolidWorks, AutoCAD
Web Technologies & frameworks: HTML, JDBC/ODBC, Flask, Bootstrap, REST and JavaScript, CSS
Database: MySQL
OS: Windows and Linux

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Selected Projects

Sea Dragon - *AUV* | Blog | Website | *ESP32, Raspberry Pi 4B, L298N, LifeCam VX-2000, BMP280, DS18B20*

- Collaborated in multidisciplinary teams to refine the mechanical design, electronic circuitry, and software architecture, ensuring cohesive integration and functionality.
- Developed and integrated real-time data processing algorithms on the Raspberry Pi 4B, enabling autonomous navigation and decision-making based on sensor inputs.
- Achieved a significant enhancement in AUV performance by integrating AGAKF, leading to a 90% reduction in sensor noise and substantial improvements in data accuracy and reliability, contributing to more precise underwater navigation.

Juggernaut - ROBOWAR | Github | *Arduino Mega, L298N, HC-05*

- Optimized robot design and functionality to withstand rigorous combat conditions, utilizing robust mechanical and electronic components for durability and reliability.
- Implemented Bluetooth Low Energy (BLE) technology for seamless and responsive wireless control of the Juggernaut during Robowar competitions, enhancing maneuverability and tactical flexibility in dynamic combat environments.
- Successfully competed in Robowar events, showcasing the robot's reliability and performance under competitive stress, and achieving commendable results in challenging combat scenarios.

Amrita University Canteen App | Github | *Python, Flask, Tensorflow*

- Created a Web application using Flask to show the current menu and crowd statistics in the college's canteens.
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- Spearheaded the development of an improved sensor noise reduction algorithm (**AGAKF algorithm**) for the AUV, **enhancing the precision of navigation and control by 87-95%** even in complex underwater environment.
- Developed a comprehensive dashboard for an Autonomous Underwater Vehicle (AUV), integrating real-time sensor data visualization, media resource management (video, images, audio), & remote control functionalities.
- Implemented advanced Deep Learning algorithms to autonomously navigate the AUV and enhance data processing efficiency.

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Selected Projects

Profile Builder and Networking Application | Github | *Python, Flask, Bootstrap MySQL, AWS, Docker, Jira*

- Web app. built for the students & faculties of Amrita University to network people based on their desired research field
- Built using HTML, CSS, JS, Bootstrap on Flask webserver with MySQL database by following the Agile (Scrum) practices for managing the project using Jira and performed various automated testing techniques.
- Was tested in an isolated docker environment,& following the DevOps practices, was deployed on an EC2 AWS instance.

Job Allocation and Time Optimization System | Github | *Java*

- Utilized Java OOP paradigm including classes & objects to model workers, jobs, and tasks. Employed inheritance to extend base classes for specialized job types and worker roles, enhancing code reusability and maintainability.
- Created algorithms to calculate minimum job completion times and sequence tasks to minimize delays. Implemented dynamic hiring mechanisms to address job vacancies and adjust worker allocation based on job deadlines.
- Employed Java multithreading to handle simultaneous job assignments and worker scheduling, significantly improving system performance and responsiveness during high-demand scenarios.

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Modelling Tools: SketchUp, SolidWorks, AutoCAD
Web Technologies & frameworks: HTML, JDBC/ODBC, Flask, Bootstrap, REST and JavaScript, CSS
Database: MySQL
OS: Windows and Linux