Sri Ram Karthik Bhagavatula

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SUMMARY

- Skilled in integrating and testing key ADAS features, including Park Assist Module (PAM), Adaptive Cruise Control (ACC), Traffic Sign Information (TSI), Lane Keep Assist, Blind Spot Monitoring, Automatic Emergency Braking (AEB), Rear Cross Traffic Alert (RCP), cameras, and Drowsy Driver Detection systems.

- Capable of calibrating vision-based systems, ensuring optimal functionality and compliance with automotive safety standards

- Proficient in evaluating and optimizing algorithms for efficient and accurate object detection, showcasing the ability to contribute to the advancement of ADAS technologies.

- Proficient in creating and simulating diverse electrical circuits, such as Buck Boost Converters, Single-Phase Bridge Inverters, solar PV cells, and PID Controllers.

- Demonstrated a strong foundation in object recognition, a critical component of Advanced Driver Assistance Systems (ADAS) technology.

- Expertise in implementing advanced computer vision techniques, including Blob Analysis, Gaussian Matrix Method, and Single-Mode Background Analysis.

- Expertise in object recognition, collision avoidance, and automated safety measures, vital for ADAS functionality.

- Acquired in-depth knowledge and expertise in the critical aspects of electric vehicle engineering, offering the ability to model and optimize EV systems for enhanced performance and efficiency.

- Demonstrated hands-on experience in sensor-guided robotics by constructing line-following and obstacle-avoiding robots using Arduino UNO, highlighting expertise in sensor integration and robotics control.

EDUCATION

Western Michigan University, MI, USA   **December 2024**
Master of Sciences in Electrical Engineering   GPA:3.38/4

Gayatri Vidya Parishad College, India   **May 2022**
Bachelor of Technology in Electrical and Electronics   GPA:6.46/10

TECHNICAL SKILLS

- **Programing Languages:** C, C++
- **Software Tools:** MATLAB/Simulink, Keil & Proetus's , STM32 MX, IAR Workbench
- **Hardware:** 8051,STM32F429ZI, Arduino
- **ADAS Tools**: Canap, Canalyer, CDA

- **Sensor Technologies**: Radar, Lidar, Cameras, Ultrasonic
- **Diagnostic and Analytical Skills**: Root cause analysis, system diagnostics, performance optimization

ACADEMIC PROJECTS

Controller Design for Industrial Conveyor Systems
- Designed and simulated a DC motor controller using MATLAB Simulink for BorgWarner manufacturing plants.
- Utilized root locus and pole placement techniques to ensure system stability, achieving zero steady-state error and desired performance metrics (14% overshoot, 3s settling time).
- Validated the system's response under transient load conditions through closed-loop control implementation.

Position Estimation of Free-Falling Objects Using Kalman Filter
- Developed a Kalman filter model in MATLAB to estimate the position of a free-falling object with imprecise laser rangefinder measurements.
- Simulated dynamic systems to handle noise and uncertainties, achieving enhanced precision in position and velocity estimation.
- Demonstrated the practical applicability of Kalman filters in scenarios requiring robust estimation amid data inaccuracies.

Dynamic Wireless Charging and Security Protocols for Electric Vehicles
- Conducted a comprehensive review of dynamic wireless charging (DWPT) systems, exploring the integration of authentication protocols to secure EV data exchanges.
- Analyzed state-of-the-art security measures for ensuring privacy, billing, and payment in EV charging infrastructure.
- Highlighted challenges and future directions for DWPT system development, emphasizing scalability and environmental benefits.

Modeling and Simulation of Tesla Model S
- Simulated the Tesla Model S architecture using MATLAB Simulink to analyze key components, including electric motors, battery systems, and regenerative braking.
- Investigated energy efficiency, environmental impacts, and practical considerations like infrastructure needs and policy incentives for EVs.
- Recommended advancements in thermal management and renewable energy integration for improving EV sustainability.

Statistical Analysis of Cognitive Stages in Alzheimer's Disease Using Glucose Uptake

- Conducted a study using 18F-FDG PET scans to differentiate cognitive stages in Alzheimer's Disease (CN, MCI, EMCI) from ADNI participants.
- Collected and standardized PET scan data, ensuring consistent radiotracer dose and patient weight normalization.
- Utilized BET, FLIRT, and FAST tools for brain image segmentation into gray matter (GM), white matter (WM), and cerebrospinal fluid (CSF).
- Extracted standardized uptake values (SUVs) for glucose in segmented brain regions to measure metabolic activity.
- Performed pairwise t-tests to compare mean glucose uptake across different cognitive stages, identifying significant metabolic differences.
- Findings highlighted early metabolic markers crucial for AD diagnosis, enhancing early diagnostic accuracy and guiding therapeutic strategies.

Skills: Neuroimaging Analysis, Statistical Analysis, Python, MATLAB, BET, FLIRT, FAST

Comparison of YOLOv5 and YOLOv7 Algorithms
- Successfully implemented the YOLOv5 and YOLOv7 algorithms, two cutting-edge solutions for real-time object detection, showcasing a strong grasp of deep learning and computer vision technologies.
- Led a rigorous comparative analysis to assess the strengths and weaknesses of these algorithms across a range of real-world scenarios and use cases.
- Utilized extensive testing, benchmarking, and data evaluation to provide a comprehensive evaluation of the algorithms' performance, accuracy, and efficiency.
- Offered key insights and recommendations for selecting the most suitable algorithm for specific object detection applications, contributing to informed decision-making in the field.
- Demonstrated a commitment to staying at the forefront of machine learning and computer vision advancements, emphasizing the ability to drive innovation and optimize solutions for real-world challenges.

Real Time Object Detection Using Matlab
- Designed and developed a real-time object detection system using MATLAB, exemplifying a strong command of computer vision and image processing principles.
- Leveraged advanced computer vision techniques, including Blob Analysis for feature extraction, Gaussian Matrix Method for noise reduction, and Single-Mode Background Analysis for real-time scene understanding.
- Implemented a comprehensive, end-to-end solution for real-time object detection, from image acquisition to object recognition, tracking, and visualization.
- Conducted rigorous testing and optimization to ensure high accuracy, real-time performance, and robustness in varying environmental conditions.
- Demonstrated the capacity to contribute to cutting-edge computer vision applications, emphasizing innovation and the ability to solve real-world challenges through technology.
- **Techniques Utilized**: Blob Analysis ,Gaussian Matrix Method, Single-Mode Background Analysis

Solar-Powered Battery Charging with Reverse Current Protection
- Designed and executed a project focused on solar-powered battery charging, showcasing expertise in renewable energy applications.
- Developed a system that efficiently charges batteries using solar energy, with integrated reverse current protection to prevent damage to the batteries.
- Demonstrated the ability to harness and store solar energy for practical use while ensuring the safety and longevity of energy storage solutions.

Motor Selection and control for electrical Vehicles
- Led a project focused on motor selection and control systems for electric vehicles (EVs).
- Evaluated various electric motor options for EV applications, considering factors such as efficiency, power output, and weight.
- Designed and implemented motor control algorithms and systems to optimize performance and energy efficiency in electric vehicles.

Master Class on EV design using MATLAB.
- Participated in an in-depth Master Class focused on Electric Vehicle (EV) design and modeling utilizing MATLAB.
- Gained comprehensive knowledge and practical skills in designing, modeling, and optimizing electric vehicles using MATLAB tools and techniques.

Simulink Models for Various Electrical Circuits of Power Systems
- Built and simulated different kinds of circuits like Buck Boost Converter, Single Phase bridge inverter, solar PV cell, PID Controller using MATLAB/Simulink
- Utilized MATLAB/Simulink to create accurate and efficient models, showcasing expertise in circuit design and simulation.

Sensor Guided Robotics

- Designed and implemented a project involving sensor-guided robotics, utilizing the Arduino UNO microcontroller.
- Constructed autonomous robots with line-following and obstacle-avoidance capabilities, demonstrating expertise in sensor integration, hardware design, and robotics control.
- Successfully programmed and fine-tuned the robots to navigate and perform tasks in a dynamic environment, showcasing proficiency in real-world applications of robotics technology.

Nano Technology Workshop
- Actively participated in a Nano Technology Workshop, gaining knowledge and insights into the cutting-edge field of nanotechnology.
- Explored advanced concepts and practical applications of nanotechnology, including nanoscale materials, devices, and their impact on various industries.

Academic Achievements

Master's Thesis:

"Exploring Alzheimer's Disease Stages: Insights Through t-SNE and UMAP Visualizations"

- **Institution:** Western Michigan University, MI, USA
- **Advisor:** Dr. Abdel-Qader
- **Summary:** This thesis investigates the effectiveness of dimensionality reduction algorithms in analyzing Alzheimer's Disease (AD) features using the ADNI dataset. Focused on two main algorithms: t-distributed Stochastic Neighbor Embedding (T-SNE) and Uniform Manifold Approximation and Projection (UMAP).
- **Objective:** To compare and evaluate the computational efficiency, accuracy, and interpretability of the results provided by each algorithm, enhancing the understanding of their applicability in real-world clinical settings.

EXPERIENCE

ADAS Testing Intern

Employer: LER Technology Force
Client: FEV (Project for Stellantis)
Location: Chelsea, Michigan
Duration: July 2024 – Present
- Testing of advanced driver assistance systems (ADAS) for Stellantis projects using specialized tools such as Canap, Canalyer, and CDA.
- Perform system integration and functional testing of crucial ADAS features, including Park Assist Module (PAM), Adaptive Cruise Control (ACC), Traffic Sign Information (TSI), Lane Keep Assist, Blind Spot Monitoring, Automatic Emergency Braking (AEB), and Rear Cross Traffic Alert (RCP).
- Conduct calibration and configuration of vision-based systems, including cameras and Drowsy Driver Detection systems, ensuring optimal functionality.
- Utilize advanced diagnostic tools for troubleshooting, performance assessment, and validation of system responses under diverse scenarios.
- Analyze data from various ADAS components to suggest necessary adjustments, improving system integration and functionality.
- Prepare and present detailed test findings to project stakeholders, providing key insights and actionable

recommendations for system enhancements.
- Collaborate closely with engineering teams to optimize ADAS system performance, ensuring alignment with safety and customer satisfaction standards.
- Conduct technical validation focusing on system and component performance, creating detailed validation reports as a customer would interact with the vehicle & system.
- Engage in troubleshooting and root cause analysis, providing effective communication to management and Subject Matter Experts (SMEs).

Embedded Systems Trainee Engineer, APSSDC
- Gained hands-on experience working with a variety of microcontrollers, including 8051, Arduino UNO, ARM (LPC2148), and nodeMCU (esp8266).
- Participated in a mini project focused on designing a Water Level Indicator, showcasing the ability to apply embedded systems knowledge to practical applications.
- Developed skills in programming, interfacing, and hardware integration within the field of embedded systems.