Venkateshh Miryalkar

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SUMMARY

- AI/ML Engineer with 5+ years of experience in robotics, computer vision, and autonomous systems. Skilled in designing and optimizing algorithms for perception, navigation, and motion control using AI/ML techniques and sensor fusion. Proficient in integrating LIDAR, cameras, IMUs, and deep learning models into real-time robotic applications. Strong collaborator with cross-functional teams to develop high-performance, reliable systems. Committed to continuous learning and innovation in robotics and AI/ML.

EDUCATION

Arizona State University, US **Dec 2023**

Masters in Mechanical Engineering (Robotics)

Relevant Coursework: Calculus, Linear Algebra, Advanced DSA, Robotics, Deep Neural Networks, Robotics, AI ML

Jawaharlal Nehru Technological University, India **May 2019**

Bachelors in Mechatronics

ACCOMPLISHMENTS

- CUDA Certification from NVIDIA
- Deep Neural Networks with PyTorch Certification from OpenCV University.
- State Estimation and Localization for self-driving cars Coursera
- Neural networks and Deep learning certification from Coursera.
- Leetcode Rating 1850+, (top 5% worldwide)
- Solved 800+ DSA

LINKS

- Leetcode: https://shorturl.at/bluxQ
- Hacker rank: https://shorturl.at/dAEI9
- GitHub: http://tinyurl.com/5w74jkfj

WORK EXPERIENCE

Robotics AI ML engineer| BOVI.AG, Spokane, WA **June 2024 – Present**

- Design, train, and deploy AI/ML algorithms for robotics, focusing on vision, decision-making, and control systems.
- Optimize algorithms for performance, efficiency, and robustness in real-time robotic applications.
- Develop perception systems using sensor data (LIDAR, cameras, IMUs) for environmental understanding and intelligent decision-making.
- Integrate AI/ML models with robotic hardware for seamless functionality.
- Implement algorithms for autonomous navigation, motion planning, and decision-making in complex environments.
- Collect, preprocess, and annotate datasets for model training and evaluation.
- Continuously evaluate model performance using key metrics like accuracy, efficiency, and safety.
- Stay updated on advancements in AI, ML, and robotics, applying new techniques to improve systems.
- Collaborate with cross-functional teams to align AI/ML solutions with project goals and timelines.

Robotics Software Engineer | BEAGLE ROBOTICS | Dublin. CA **Dec 2023 – April 2024**

- Design, develop, and implement software algorithms for robotic systems, ensuring high-performance and real-time responsiveness for applications such as perception, navigation, and motion control.
- Collaborate with cross-functional teams (hardware engineers, roboticists, and researchers) to integrate software with hardware components and ensure seamless system functionality.
- Write efficient, maintainable, and scalable code using programming languages such as C++, Python, and ROS (Robot Operating System), adhering to industry best practices and standards.
- Develop control systems for autonomous robots, including path planning, obstacle detection, and avoidance.
- Optimize machine learning algorithms for robotic perception, such as object recognition, image processing, and sensor fusion.

Robotics engineer| ATHES ROBOTICS, Salt Lake City. UT **June 2023 – Dec 2023**

- Responsible for creating and engineering robotic systems, including their mechanical, electrical, and software components, ensuring they are optimized for various tasks and industries.
- Conduct routine diagnostics and maintenance on robotic systems, identifying and resolving technical issues promptly to ensure continuous and efficient operation.
- Work closely with software engineers, mechanical engineers, and product managers to ensure seamless integration and implementation of robotic systems into existing workflows or production lines.
- Test robotic prototypes and systems under various conditions, analyze their performance, and optimize algorithms and mechanical designs to improve efficiency, accuracy, and reliability.

Full Stack Developer | SIMPLIFY WELLNESS, Hyderabad, India **Dev 2019 – Sep 2021**

- Design, develop, and maintain both frontend and backend components of web and mobile applications using modern technologies like React, Node.js, and Express, ensuring scalability and efficiency.
- Implement user-friendly interfaces and intuitive designs that support the wellness goals of users, improving overall user experience across various platforms.
- Develop and integrate AI-driven features, such as personalized wellness recommendations, health tracking insights, and predictive analytics, to enhance user engagement and overall experience.
- Collaborate with AI/ML teams to integrate AI models into the platform, optimizing them for performance and scalability.
- Collaborate with data scientists to fine-tune and implement machine learning algorithms that support personalized wellness journeys.
- Create robust backend services and APIs to support real-time data processing, such as health metrics and user activity logs, using frameworks like Node.js and Django.

Jr AI engineer| AVISO AI, Hyderabad, India **Dev 2018 – Dec 2019**

- Work alongside senior engineers to design, train, and optimize machine learning models for various applications, including natural language processing (NLP), computer vision, and predictive analytics.
- Collect, clean, and preprocess large datasets to ensure they are suitable for training machine learning models. This includes handling missing data, normalization, and feature extraction.
- Support the evaluation and testing of AI models by applying various metrics to assess their performance, identifying areas for improvement, and collaborating with the team on tuning model parameters.
- Assist in implementing AI and machine learning algorithms using programming languages like Python, and frameworks such as TensorFlow, PyTorch, or scikit-learn.
- Work with data scientists, software engineers, and business stakeholders to integrate AI solutions into production systems and ensure the alignment of AI models with business goals and technical requirements.

RESEARCH

Lab Assistant| ASU ROBOTICS LAB, Tempe, Az **Jan 2023 – May 2023**

- Implemented Semantic segmentation Research on RGB Data and LiDAR Data for building Point cloud in Mobile Robotics.
- Implemented Semantic segmentation Algorithm SUMA++ for generating lidar point cloud data of outdoor environment.

KEY PROJECTS

Humanoid Walking | ASU

- Designed and Implemented PPO Reinforcement learning Algorithm, custom Rewards, Terminations for Cassie Robot.
- Trained the robot in Omniverse, Isaac lab using 4096 Agents. trained the model in 5 minutes for a plane ground scenario, and in under 10 minutes with pyramid stairs scene.
- Robot achieved highest reward without falling or slowing down. observed very good control in balancing during the walk.

MINI GPT | ASU

- Designed and implemented a GPT-2 (124 million params) model for text generation based on a transformer decoder architecture.
- Developed and evaluated different attention mechanisms, including an efficient masked self-attention module, to optimize performance.
- Trained the transformer model from scratch using 256 tokens, 768-dimensional embeddings, and 6 layers with 6 multi-head attention blocks, achieving meaningful text generation.
- Observed a loss of 6.52, This is due to lower computation power and a smaller dataset.

Self-driving cars transformer for motion prediction. | ASU

- Designed a transformer decoder model to predict ego-vehicle motion trajectories, considering the initial state (pose and odometry) of up to 256 surrounding vehicles.
- Trained and validated the model using the Agroverse 2 dataset, comprising 50GB of real-world driving data.

SSD HUMAN RECOGNITION | ASU

- Created Custom Single Stage detector for detecting human beings on live stream.
- Implemented Feature Extractor Using Resnet18 and FPN (Feature Pyramid Network), and used two predictors networks one for class and other for bounding box prediction.
- Implemented cross Entropy for classification and Focal loss for bounding box predictions.
- Observed a mean Average precision (mAP) of 0.62.

SEMANTIC SEGMENTATION FOR SELF DRIVING CARS | ASU

- Developed a semantic segmentation model for self-driving cars using a ResNet encoder and FPN decoder, achieving a mean Intersection over Union (IOU) of 0.57 on the CamVid dataset.

Imu-Gnss-Lidar Sensor Fusion | ASU

- Implemented Sensor Fusion using IMU, GNSS and LIDAR sensors to predict the pose of the vehicle using Kalman Filters.
- IMU is used for predicting the next state. GNSS and LIDAR data was used to correct the steps.

Sudoku Solving Robot | ASU

- Designed a cartesian coordinate robot with stepper motors, electromagnetic gripper and camera that senses the colors on a grid, creates a sudoku puzzle and solves the sudoku puzzle by arranging the missing colors.
- Used photo sensor to get information of the grid. different colors mean different numbers.
- Used Arduino microcontroller to control the End effector.
- Wrote Ros service to solve sudoku puzzle and get the commands to fill in the remaining spaces.

Bipedal 2d Walking | ASU

- Wrote Reinforcement learning Algorithm to make the bipedal 2d walker robot from gym to walk.
- Used Twin delayed Deep deterministic policy gradient Algorithm to train the robot to walk.
- Used 2 deep layers of 64 each with inputs as positions of all joints and outputs of Actor network as actions to be taken at joints. for critic network it was reward value that was generated.
- Training took around 16 hours using Nvidia GPU and robot was able to walk successfully in the given environment.

Human Mimicking Robot Arm Specialist | ASU

- Designed ML Pipeline to detect human fingers using OpenCV and control the robotic arm using the finger movements.
- Used the multicore processors with shared memory where each processor has specific task with information shared at the common memory place. .

TECHNICAL SKILLS

Software

• Python, C++, DSA, SQL.
• Sensor Fusion, Kalman filters.
• Linux, ROS2, NAV2, Rviz, Gazebo.
• CUDA, Multi-threading, GPU.
• Jetson Xavier, Orin.

Machine Learning Algorithms

Linear regression, SVM, KNN, Naive Bayes, Logistic Regression, Random Forest, Boosting, K-means clustering, Hierarchical clustering, Collaborative Filtering, Neural Networks, NLP

Artificial Intelligence

• Deep Neural Networks, ANN, Machine Learning, PyTorch, Computer vision, OpenCV, Reinforcement Learning, Probability Statistics
• Omniverse, Replicator, Isaac Sim, Isaacman.

Mechanical

• SolidWorks, AutoCAD.