Shreyas Ramesh

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Highly skilled Engineer with a strong background in deep learning, robotics, and project management experience, seeking a challenging role to leverage expertise in delivering innovative results using AI that shapes new and impactful products and technologies.

EDUCATION

UNIVERSITY OF PENNSYLVANIA

Master of Science – Robotics Specialization | CGPA 3.7/4

Aug 2021 – May 2023 | Philadelphia, PA

M S RAMAIAH INSTITUTE OF TECHNOLOGY

Bachelor of Science – Mechanical Engineering | CGPA 4/4

Aug 2015 – May 2019 | India

SKILLS

Programming Languages
- Python • C/C++ • SQL

Machine Learning and DL Frameworks
- PyTorch • TensorFlow • Pandas • OpenCV • GPT-3 • Wav2Letter

Simulators
- Gazebo • RViz • Gym

Miscellaneous
- ROS • ROS2 • MATLAB • Simulink • Git • CUDA

WORK EXPERIENCE

Graduate Research Assistant

Rehabilitation Robotics Lab, UPenn   **Jun 2022 – Dec 2022**

- Analyzed 2D pose estimation of patients with cerebral palsy from Camera data using OpenPose
- Developed multiple ML Models to evaluate the motor abilities and assisted therapists to personalize rehabilitation programs

Graduate Teaching Assistant

University of Pennsylvania   **Jan 2021 - Present**

- Assisted Professors in multiple courses by conducting doubt clarification sessions and Assignment walkthroughs for ~600 students
- Courses: Artificial Intelligence, Mathematical Foundations for Computer Science, Statistics for Data Science

Production Planning Engineer

Varman Aviation Pvt. Ltd., India   **Aug 2019 – Jun 2021**

- Managed a team of 15 members and systematically planned the various processes in engine overhauling projects
- Reviewed spares and consumables requirements for projects and reduced production costs by ~ 10%
- Lowered lead time of overhaul projects by ~ 25% through modularization of tasks

PROJECTS

Computer Vision

NeRF: NEURAL RADIANCE FIELDS FOR NOVEL VIEW SYNTHESIS

- Successfully implemented NeRF (Neural Radiance Fields) for synthesizing photo-realistic images of complex 3D scenes
- Able to achieve a high PSNR (25) within 3000 iterations (as opposed to 31 at ~100-300k iterations in the original paper)

STEERING AND THROTTLE COMMAND PREDICTION FOR AUTONOMOUS DRIVING

- Developed end-to-end self-driving neural network architecture, on Udacity's Car simulator, enhanced real-time road detection and improved the manoeuvrability of the car

TWO VIEW AND MULTI VIEW STEREO RECONSTRUCTION

- Implemented a two-view stereo algorithm for dense 3D reconstruction of the scene, including rectification, disparity map computation, and LR consistency checks
- Utilized the plane sweep stereo algorithm for multiview stereo reconstruction, enhancing scene reconstruction accuracy and handling occlusion.

VISUAL ODOMETRY USING RGB-D DATA

- Estimated the pose and orientation of a camera along with trajectory using sparse features from RGB-D Images along with path generation and loop closure.
- Optimized computational time using Shi Tomasi Feature detector, estimated the transformation using ICP Algorithm and updated using a Kalman Filter

OBJECT DETECTION AND SEGMENTATION

- Implemented state-of-the-art Object detection and Segmentation algorithms such as YOLOv5, SOLOv2 and Mask R-CNN with ResNeXt as backbone
- Achieved an Average Precision of over 91% in all the three architectures for vehicle and pedestrian tracking

Localization and Motion Planning

AUTONOMOUS PICK AND PLACE CHALLENGE

- Autonomously controlled a 7-DOF Robot Arm for picking up for static and dynamic blocks in ROS, Gazebo, and RViz, and integrated with the physical robot.
- Developed an efficient joint-space planner using RRT and A* algorithms, incorporating collision checking to ensure safe and obstacle-free robot motion

OBSTACLE AVOIDANCE TRAJECTORY PLANNER AND CONTROLLER FOR QUADROTOR

- Implemented a minimum snap trajectory planner for a quadrotor.
- Implemented Visual Inertial Odometry using imu and camera data to estimate quadrotor position and state. Utilized Error State Kalman Filter (ESKF) for accurate estimation.

Machine Learning/DL

AUTOMATIC SPEECH RECOGNITION ERROR CORRECTION USING DL ARCHITECTURES

- Conducted ASR Error Correction as an NLP post-processing task using grammar correction models
- Finetuned HuggingFace grammar correction model and GPT-3 models, with Wav2Letter model as a baseline
- Achieved a reduction of 5% in Word Error Rate using text-to-text Transformer architecture

Other Projects

- Stock Price Prediction using ML Architectures • GANs • VAE • Canny Edge Detection • Unscented Kalman Filter • Image Morphing

RELEVANT COURSEWORK

Visual SLAM, Computer Vision, Machine Perception, Deep Learning, State Estimation, Mobile Robotics, Robot Operating Systems, Machine Learning, Sensor Fusion, Linear Control Systems, Computational Motion Planning, Big Data Analytics