ANIMESH NEMA

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INTRODUCTION:

Robotics Engineer keen to apply his skills in a passionate company. Team player with Systems, Mechanical and Software development & integration skills. Strong lab and communication skills with a keen attention to detail. Proficient at utilizing available resources and achieving project success within aggressive timelines.

EDUCATION:

WORCESTER POLYTECHNIC INSTITUTE (WPI), Worcester, MA
Master of Science Robotics Engineering, May 2019 - (GPA 4.0/4.0)

SRI RAMASWAMY MEMORIAL UNIVERSITY (SRM), Tamil Nadu, India
Bachelor of Technology Mechanical Engineering, May 2017

WORK EXPERIENCE:

4/05/2021-present   **Berkshire Grey, Bedford, MA**
                              Field Application Engineer

Working on Artificial intelligence enabled robotics system designed for automation of order fulfilment and warehouse operations in a multi-disciplinary team.

Technical responsibilities include but are not limited to the following:
- Developing a good understanding of the complete system architecture.
- Testing and debugging the robotics system for both hardware and software bugs.
- Commissioning the robot arm and other important modules in the system.
- Configuring, calibrating and monitoring stereo cameras, sensors etc. using software tools.

7/11/2019-04/02/2021   **Medrobotics Corporation, Raynham, MA**
                              Robotics Engineer

Robotics Engineer in a team responsible for the development of a Robotic Surgical Platform that provides robotic & manual control of multiple surgical instruments used during Surgical Procedures.

Technical responsibilities included, but were not limited to the following:
- Writing algorithms required to model the control of the robotic arms in the system.
- Conducting tests to analyze the behavior and performance of the system under various conditions.
- Responsible for performing real-time tracking of the robotic arm movements in 3D space.
- Writing development code for new features and correcting existing software bugs in the system.

SKILLS:

- Programming Languages: C++, C, Python, Buzz
- Software Tools: ROS, Git, MacTalk, Procman
- Libraries: PyTorch, TensorFlow, Keras, OpenCV
- CAD design tools: SolidWorks, CATIA, AutoCAD
- Simulation Tools: RViz, Gazebo, Robot Studio
- Computational tools: MATLAB
- Operating systems: Windows, Linux, QNX

PROJECT EXPERIENCE:

10/2018-4/2019   **Visual Odometry based Relocalization using ORB feature descriptor**
                              Worcester Polytechnic Institute (WPI)

Directed Research
- Developed a computationally inexpensive re-localization module for a vision-only based system, using computer vision techniques and a single Kinect camera.
- Applied ORB feature descriptor to identify key points in a scene and find matches from the map.
- Performed perspective transformation on images to find the relative pose of the camera, for pose estimation.
- Utilized algorithms like RANSAC to minimize outliers and improve accuracy.
- Visualized the results and computed time taken to confirm the cost effectiveness of the approach

10/2018-12/2018   **Automated Aerial Cinematography using an UAV**
Worcester Polytechnic Institute (WPI)

Motion Planning
- Developed a motion planning algorithm to enable the quadcopter to autonomously traverse in an environment and capture scenes, while avoiding obstacles.
- The quadcopter was given a fixed trajectory, but on approaching an obstacle it used RRT* planner to move away and automatically navigate back to original path.
- Utilized ROS for communication and simulated using Gazebo.

7/2018-7/2018   **Automated Image Captioning**
Worcester Polytechnic Institute (WPI)

Computer Vision / Deep Learning
- Developed an LSTM recurrent neural network architecture that worked in parallel with another CNN architecture to generate automated image captions.
- The CNN would first identify objects of interest and output keywords from a given image and the RNN would then generate captions based on the keywords received.

6/2018-7/2018   **Facial Key point Detection**
Worcester Polytechnic Institute (WPI)

Computer Vision / Deep Learning
- Designed an algorithm to detect 68 key points on a face (to identify features such as eyebrows, eyes, nose, lips and facial contour) by applying computer vision and deep learning techniques.
- Applied various transformations on the image dataset and developed a CNN using PyTorch.

3/2018-4/2018   **Adaptive trajectory control of a Robotic arm subject to Varying Payloads**
Worcester Polytechnic Institute (WPI)

Robot Controls
- Modelled an adaptive trajectory tracking controller on a 2-link Robotic arm to carry objects of unknown masses while maintaining its desired path.
- Modified the conventional approach by using function approximation techniques, resulting in a less expensive and a much smoother performance.
- Visualized the path on a graph and compared it with the original algorithm to verify the inference.

2/2018-4/2018   **Robotic Control of Surgical Laser Waveguide using ABB IRB120 Robot**
Worcester Polytechnic Institute (WPI)

Robot Dynamics
- Performed dynamic modeling and control of the ABB IRB120 robot mounted with a laser waveguide, to follow certain trajectories and carry out tissue ablation.
- Developed a Python code for generating trajectories.

9/2017-12/2017   **Predicting Grade of Road for Autonomous Vehicles using Supervised Deep Learning**
Worcester Polytechnic Institute (WPI)

Deep Learning
- Trained a CNN on a labeled dataset of IMU and GPS readings to predict the grade of the road ahead of the autonomous vehicle.
- Carried out video parsing, data filtering and data augmentation techniques to improve performance.
- Analyzed the performance of the model by observing the real-time video implementation of the results.

1/2017-5/2017   **Three Finger Robotic Gripper with Tactile Sensors**
SRM University

B.S. Final Year Project
- Modelled a 3-finger robotic gripper design in SolidWorks and manufactured using 3-D printing.
- Researched, identified and selected the proper resistive force sensors that were mounted on the tip of each gripper to determine the appropriate minimum grasping force.
- Actuated Robotic fingers using a single servo motor, programmed using an Arduino PCB and S/W Development kit (SDK).

PERSONAL INTERESTS
Cricket, Fitness, Musical Instruments (piano, guitar)

REFERENCES
Available upon request