DEVESH DATWANI

ROBOTICS ENGINEER

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OBJECTIVE

Seeking for full time co-op positions in the space of computer vision and/or robot perception

SKILLS

LANGUAGES
Python 3+ ● MATLAB ● C

SOFTWARE STACK
ROS 1 & 2 ● Git ● OpenCV ● TensorFlow
Numpy & Keras ● PyTorch ● Django & Flask
Linux ● SolidWorks ● AutoCad ● AWS

HARDWARE STACK
Arduino Uno ● Raspberry Pi 3 B

FIELD OF INTEREST
Deep Learning ● Computer Vision
Robot Perception ● Probabilistic Estimation

EDUCATION

MS IN ROBOTICS ENGINEERING
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MA | AUG 2021 - MAY 2023

KEY COURSES: Artificial Intelligence
Machine Learning ● Robot Control
AI For Autonomous Vehicles ● Robot Dynamics

BE IN MECHANICAL ENGINEERING
APSIT MUMBAI UNIVERSITY
MUMBAI, INDIA | AUG 2014 - MAY 2018

NOTABLE ACHIEVEMENT: Received the "Young Innovator" award for research on Plasma Actuators at the ICASTe conference

PERSONAL PROJECT

AERIAL VEHICLE DESIGN & AUTONOMY [DOC]
2011 - 2019 | MUMBAI
- Designed & built semi autonomous fixed wing & multi rotor craft
- Integrated open source firmwares on PixHawk microcontroller to gain cruising altitude flight autonomy
- Developed firmware code to build PD controller for yaw-pitch-roll correction in cruise mode
- Gained hands on experience in building semi autonomous drones with 50+ successful flights

ACADEMIC PROJECTS

HUMAN POSE ESTIMATION WITH CNN [GITHUB]
MAR 2022 - MAY 2022 | WPI
- Implemented the DeepPose paper to build a convolution neural network for estimating human-body pose in 2 dimensions
- Created a TensorFlow pipeline to fetch, load and train the model on FLIC dataset through Google's cloud compute services
- Recorded MSE values of ~ 400 or 70% accuracy on PCP metrics

TRAFFIC SIGN DETECTION WITH MASK R-CNN [GITHUB]
SEP 2021 - DEC 2021 | WPI
- Implemented adaptations to the Mask R-CNN network to enhance its performance in detecting traffic signs
- Trained the adapted model on an augmented dataset of 10000 traffic sign images (motion blur, condensation) to improve model robustness in adverse weather and driving conditions
- Enhanced mAP value by ~32% on "unfavorable condition" test set

URBAN STREET SEMANTIC SEGMENTATION [GITHUB]
MAR 2022 - MAY 2021 | WPI
- Built a customized U Net with PyTorch that is optimized for urban street segmentation for perception task of autonomous vehicles
- Researched & experimented with model hyperparameters and introduced VGG16 model architecture into a U Net
- Observed recall rates of ~87% in urban street cases which is a 2% improvement over the baseline model

TURTLE BOT RRT - SLAM [GITHUB]
SEP 2021 - DEC 2021 | WPI
- Tailored the RRT-SLAM algorithm for mapping environments with a bot equipped with a simple range sensor in ROS & Gazebo
- Attempted to optimize frontier nodes / exploration points to maximize information gain
- Achieved ~80% area coverage over multiple static maps in Gazebo environment

RESEARCH PROJECTS

AIRFLOW ACTUATION WITH PLASMA ACTUATORS [DOC]
AUG 2017 - MAY 2018 | MUMBAI UNIVERSITY & INDIAN INSTITUTE OF TECHNOLOGY | PATENT APPLICATION NO. 201921038313
- Spearheaded a team of 4 students to design a research project aimed at inducing & actuating airflow with plasma actuators
- Designed a plasma actuator to induce airflow inside hollow pipes placing the pipe material as a dielectric barrier
- Recorded peak volumetric airflow of ~9000 liters/hr & experimented with control variables to define system correlation

SPACE GOAT | DESIGN & PERCEPTION ENGINEER
SEP 2021 - JAN 2022 | WPI
- Competed at the NASA Extreme Terrain Challenge 2022 to build an all terrain rover while representing WPI in a 15-member team
- Actively contributed in the design of a legged Martian rover powered by a novel OTM capstone clutch mechanism
- Integrated sensors with the rover and contributed to the firmware code for rover-environment-perception and pose estimation by implementing statistical filtering algorithms on IMU and ultrasonic sensor data