M. Nomaan Qureshi

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Research interests

Vision based Manipulation, Control and Navigation.

Education

International Institute of Information Technology Hyderabad, India
Integrated BTech/MS in Computer Science August, 2018 – Present
Advisor: Prof. K. Madhava Krishna. *GPA: 8.71/10.*

Academic Achievements

Dean's Research List for excellence in research for the year 2020-21.
Dean's Merit List for academic excellence for the year 2019-20.
Dean's Merit List for academic excellence for the year 2018-19.
Ranked in top 1 percentile in JEE-Advanced 2018 (total participants : 1 Million)

Publications

RTVS: A Lightweight Differentiable MPC Framework For Real Time Visual Servoing
M. Nomaan Qureshi*, Pushkal Katara*, Abhinav Gupta*, Harit Pandya , Y V S Harish , AadilMehdi Sanchawala , Gourav Kumar, Brojeshwar Bhowmick and K. Madhava Krishna
Accepted at International Conference on Intelligent Robots and Systems (IROS), 2021.

Learning Arc-Length Value Function for Fast Time-Optimal Rearrangement Sequence Planning and Execution
Prajwal Thakur*, **M. Nomaan Qureshi***, Arun K. Singh , Y V S Harish , Pushkal Katara , Brojeshwar Bhowmick and K. Madhava Krishna
Under Review, International Conference on Intelligent Robotics and Automation, 2022.

Research Experience

Research Intern, Robotics Institute, Carnegie Mellon University, U.S.A.
Advisor: Prof. David Held. April, 2021 – Present
• April, 2021 - Present : Developed differentiable trajectory representation to accelerate the learning and transfer of model free reinforcement learning algorithms. Tested our algorithm on metaworld benchmarks. Our algorithm is able to outperform various baselines. We are currently trying to extend my work into a paper.

Research Assistant, Robotics Research Center, IIIT Hyderabad.
Advisor: Prof. K. Madhava Krishna. May, 2020 – Present
• May, 2021 - March, 2020 : Worked on learning based visual servoing methods which led to a accepted paper in IROS 2021.

• November, 2021 - Present : Worked on the problem of table rearrangement planning. Our submission is under review at ICRA, 2022.

Skills

Languages : C, C++, Python, Javascript
Frameworks : Pytorch, Garage, Git, Habitat-Simulator, Open3D

Other Projects

Generating Occupancy Grids
Using pre-trained DL models and camera transformations for generating occupancy maps.

C-Shell
Inspired by the Bash built in to LinuxOS, I programmed a Shell using C programming language and system calls.

Robotics CV Algorithms
Collection of core tasks related to robotics, computer vision and deep learning

BP Monitoring Mobile Application
Developed an android application to monitor BP of patients. Features included Chat, location tracking, getting data from sensor using bluetooth, raising alerts etc.

Pose Graph Optimization for 2D SLAM
Optimized the 2D trajectory of a robot from scratch using the Levenberg-Marquardt method for non-linear least squares.

Model Predictive Control for Path Planning
Implemented the MPC algorithm for an omnidirectional robot to navigate a two dimensional space, avoiding known locations with various obstacles given the localization information.

Database Engine
Implemented a mini SQL engine that supported various SQL operations like select, join and where clause. Additionally implemented recursion in the SQL engine to support nested SQL queries.

Co-Curricular

Coordinator : Robotics Club, IIITH.
Organising Robotics Events and Competitions, conducting Teaching sessions for college students.