Udit Singh Parihar

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EDUCATION

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY HYDERABAD

MS by Research Computer Science
Expected December 2020 | Hyderabad, India
Cum. GPA: 8.67

INDIAN INSTITUTE OF TECHNOLOGY JODHPUR

B.TECH. Mechanical Engineering
April 2018 | Jodhpur, India
Cum. GPA: 7.1

COURSEWORK

Computer Vision
Mobile Robotics
Topics in Applied Optimization
Deep Learning- Theory and Practices
Introduction to Parallel Computing
Probability and Statistics
Programming and Data Structures
Machine Learning - Coursera

SKILLS

PROGRAMMING LANGUAGES

• C++ • Python • C • MATLAB

LIBRARIES

• PyTorch • Keras • OpenCV
• ROS • Eigen • PCL • g2o
•CVXOPT • Cuda • OpenMP
• SFML

PROJECT

FEATURE MATCHING UNDER EXTREME VIEWPOINT

Project Link | Under review in IROS 2021

- Proposed rotation invariant deep feature descriptors and matching via orthographic view generation to enhance descriptor quality.
- Achieved twice the recall rate in Image Retrieval task and 80 % reduction in Rotation Error compared to state of art.

PLACE RECOGNITION FROM OPPOSITE VIEWPOINT

Paper Link | Accepted at VISAPP 2021
Robotics Research Center, IIITH | October 2019 - March 2020

- Developed a Visual Place Recognition algorithm to detect places from 180^0 opposite viewpoints, using a novel idea to localize based on floor signatures.
- Incorporated our VPR pipeline into SLAM system to allow map reconstruction from 180^0 opposite robot viewpoint.

SLAM ON FEATURE-LESS ENVIRONMENT

Project Link | Accepted at ICRA 2020
Robotics Research Center, IIITH | June 2018 - September 2019

- Used semantics understanding to assist loop closure detection and localization
- Implemented our algorithm using libraries RTAB-Map, PCL, g2o, OpenCV on p3dx bot using RGB-D Sensor, IMU and wheel odomety.

DEVELOPMENT OF ROBOTICS TOOLBOX

Project Link | Mobile Robotics | August 2019 - November 2019

- Implemented Bundle Adjustment from scratch. Compared performance of Gauss Newton and LM algorithm for optimization.
- Implemented Extended Kalman Filter algorithm on the standard ”Lost in the Woods” dataset.

DEVELOPMENT OF PARALLEL COMPUTING TOOLBOX

Project Link | Parallel Scientific Computing | Jan 2019 - April 2019

- Implemented PCA algorithms for image compression using C++/Cuda. Compared performance against MATLAB standard PCA implementation.
- Implemented parallel Monte Carlo algorithm for calculation of digits of PI using OpenMP and MPI.

SIMULATION OF PATH PLANNING ALGORITHMS

Project Link | Autonomous Vehicle GUI | August 2017 - November 2017

- Created a 2D simulation for a vehicle in C++ using SFML Multimedia library
- Investigated a comparative analysis for Dijkstra and A* path finding algorithms
- Effectively used concepts of Object Oriented Programming to design Back-end

DEVICE FOR MEDICAL AID

Project Link | Product Design and Development | August 2016 - June 2017

- Collaboratively worked with AIIMS to develop a jaw opening device for patients having jaw disorder
- Formulated a mathematical structure for constrained multiobjective optimization for 65 variables
- Achieved 300% more accuracy than general analytical techniques

PUBLICATIONS

1. Topological Mapping for Manhattan-like Repetitive Environments
   Sai Shubodh Puligilla* , Satyajit Tourani* , Tushar Vaidya* , **Udit Singh Parihar*** , Ravi Kiran Sarvadevabhatla and K. Madhava Krishna
   International Conference on Robotics and Automation (ICRA), France, 2020

2. Early Bird: Loop Closures from Opposing Viewpoints for Perceptually-Aliased Indoor Environments
   Satyajit Tourani*, Dhagash Desai*, **Udit Singh Parihar***, Sourav Garg, Ravi Kiran Sarvadevabhatla and K. Madhava Krishna
   International Conference on Computer Vision Theory and Applications(VISAPP), 2021

ACHIEVEMENTS

2016-17	Represented suspension team, SAE BAJA, Designed, manufactured and tested the subsystem
2014-16	Represented Basketball team in Inter-IIT Tournament
2014	Secured 4763 rank among 1.2 million students in JEE Advanced 2014