RAHUL KUMAR | 16CS10042

COMPUTER SCIENCE & ENGG. (B.Tech 4Y)

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2020	B.TECH	IIT Kharagpur	9.20 / 10
2016	AISSCE (+2)	DAV Kapildev Public School	95.4%
2014	AISSE	Radha Govind School	10 / 10

INTERNSHIPS

Amazon Robotics, Seattle, USA (May'19 to July '19)

Topic: End to end system for hands free automation of box picking using a robotic arm.
Worked to build an end to end stack to demo the automation of manual box picking using UR10 (6-DoF robotic arm). Designed perception module to identify boxes from time-of-flight image using clustering and plane fitting methods. Integrated controller, motion planning and calibration modules.
Working Areas:Perception, Path Planning, State Machines, Robotic Automation and Controls

Personal Robotics Lab, University of Washington (May '18 to July '18)

Supervisor: Prof. Siddhartha Srinivasa (CSE, UW)
Learning Roadmaps for Robot Motion Planning : Devised non-uniform sampling strategies to accelerate the path planning process. Implemented algorithms that favor sampling in bottleneck regions while maintaining robustness by incorporating diverse pathsets.
Research Areas: Deep Learning, Conditional Variational AutoEncoders, Graph Space Planning, Narrow Passages and Constrained Space Problems

PUBLICATIONS

Intelligent Robots and Systems (IRoS) 2019, Macau, China

LEGO: Leveraging Experience in RoadmapGeneration for Sampling-Based Planning
by Rahul Kumar, Aditya Mandalika, Sanjiban Choudhury and Siddhartha Srinivasa,
Intelligent Robots and Systems, IROS, 2019 IEEE/RSJ International Conference, (Macau, China). Nov 2019

PROJECTS

Kharagpur RoboSoccer Students' Group, IIT Kharagpur

Supervisor: Prof. Jayanta Mukhopadhyay (CSE, IIT KGP)
Implemented path planning algorithms and Finite State Machines (FSM) Architecture for RoboCup Small Size League Robots, Designed a simulator for robots using PyQt, Worked on Kalman Filter to tackle noisy data from Camera, enhancing World Model of the Game State.
Research Areas: Multi-agent systems, motion planning, noise filters, robot soccer

Digital Legal Assistant | Open Soft 2019, General Championships, IIT Kharagpur

Developed the stack to search for related cases and acts for a given natural language query. Database was made of around 50000 supreme court case. Used page ranking algorithms on citation graphs to determine the ordering of results and cases.

Shopping Mall Management System

Supervisor: Prof. Sudip Misra (CSE, IIT KGP)
Term Project: Developed an object orientated system using Java to provide an online platform for different stakeholders, easing their services and requests. Explored various stages of Software Development Life Cycle including SRS preparation, UML Designining, Implementation and Testing.

COMPETITION/CONFERENCE

Smart India Hackathon 2019: Was among the top 6 teams competing for the Smart India Hackathon Grand Finale 2019 (Software)
RoboCup 2018: Qualified for SSL, RoboCup 2018 among top 24 Teams across the globe. (Team: KgpKubs)
IBM Blockchain Hackathon, 2018: Secured 3rd position in the national level hackathon organized at Kshitij, 2018
Hack-A-Bit, 2018: Secured 3rd position in the 36 hrs national level hackathon organized at BIT Mesra, Ranchi
Best Fresher, Conquest, Kshitij 2017: Participated in a Robotics Event at Kshitij 2017. Awarded the best fresher at IIT Kharagpur

AWARDS AND ACHIEVEMENTS

KVPY Fellowship 2015-16: Secured an All India Rank 9 in Kishore Vaigyanik Protsahan Yojana Examination in SX stream
JEE Advanced 2016: Secured an All India Rank 266 in JEE Advanced 2016 amongst 200,000 candidates
ACM ICPC 2017: India Rank 104 in ACM ICPC Asia-Chennai Online Round amongst 3000+ teams.
Student Par Excellence Award: Was among the top 7 students selected for the Student Par Excellence Award by CSE Department

SKILLS AND EXPERTISE

Languages: C, C++, Python, Matlab, LATEX
Libraries and Tools: Tensorflow, OMPL , OpenCV, ROS, PyQt, Octave, Docker
Field of Interest: Computer Vision, Path Planning, Machine Learning, Decentralised Systems.

COURSEWORK INFORMATION

Completed :*Programming and Data Structures, *Algorithms - I, II, Formal Language and Automata Theory,*Software Engineering, Probability and Statistics. *Computer Architecture, Matrix Algebra, Knowledge Modelling and Semantic Technologies, *Compilers, *DBMS
Ongoing : Artificial Intelligence, Reinforcement Learning, Image Processing
*: Theory + Lab

POSITIONS OF RESPONSIBILITY

Instructor (MIT-IIT Robotics Workshop , May 2017): Conducted a fortnight long Robotics workshop for high school students.
IEEE Robotics Winter Workshop , IIT Kharagpur (Dec 2018): Conducted a week-long workshop for first and second year undergraduates at IIT Kharagpur and taught Image Processing methods using OpenCV and C++.
Advisor, Code Club, IIT Kharagpur: Organised AI BootCamp to let participants dive into the theory of Machine Learning and its applications during Up.AI Summit, 2018.

!self declaration by the student