Rajendra Singh

Fourth year
Computer Science and Engineering
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SUMMARY

◆ **Domain**	:	Artificial intelligence(AI) and Robotics
◆ **Internships**	:	UST Global, Researshala and IIT Madras.
◆ **Projects**	:	SLAM, Swarm robotics, Manipulators
◆ **Position**	:	Former Head, Robotics club, IIT Palakkad
◆ **Achivements**	:	KVPY fellowship, AWES Scholarship
◆ **About**	:	Passionate about vision-based robotics, research oriented and looking forward to work with enuthusiatic team in this domain.

EDUCATION

Program	Institution	%/CGPA	Year
• **B. Tech**	Indian Institute of Technology, Palakkad	7.19 (Till VI Semester)	2016 - April, 2020
• **XII**	Delhi Public School, Udaipur	89%	2015 - 16
• **X**	Delhi Rajasthan Public School, Rajsamand	96%	2013 - 14

TECHNICAL SKILLS

Title	Skills
▸ **Robotics**	• SLAM(2D / 3D) • Perception(Feature matching, Segmentation, Detection) • Motion and path planning • Sensor fusion(Kalman, Particle filter) • Swarm algorithms • Robot kinematics and dynamics(DH/Newton/Eular/Lagrangian method) • Control system • Embedded system(ARM, RTOS, FPGA)
▸ **Reinforcment Learning**	Q-learning, Sarsa, Monto carlo, TD, Multi-armed bandit, DQN, Genetic algorithm
▸ **Machine Learning**	Linear Regression, Regularization(Ridge,LASSO), Classification(Naive Bayes, SVM, KNN, Decision Trees), Clustering(K-mean/DBSCAN/BIRCH/DIANA), Ensembling, Cross validation
▸ **Deep Learning**	CNN, RNN, LSTM, Unstructured data, Topic modeling, Word embedding
▸ **Languages**	C++ , Python
▸ **Software/Tools**	ROS1/2, Moveit, Gazebo, V-REP, Matlab, Fusion 360, Keil, Atmel studio 6, OpenGL
▸ **Hardware**	Rplidar A2M8, Realsense D435, Nvidia Jetson(Tx2, nano), Raspi3B+, GstarIV GPS, Zybo-zyng FPGA, KL25Z arm cortex-M0+ , Atmega16/32/2560, NodeMCU, GSM, Pyboard, OpenMV, PlutoX

WORK EXPERIENCES

May-July, 2019
Research intern, UST Global, Trivandrum
Studied various **SLAM** algorithm and implemented it using ROS by fusing sensor data of lidar and 3d depth camera. Later, I worked on control and planning of robotics manipulator for vision based pick and place task.

May-July, 2018
Data Science intern, Researchshala, Chandigarh
Worked on **NLP projects** related to transfer learning, topic modelling, web and pdf scraping, extrating and analysing useful information from unstructured data.

May-June, 2017
Vistaar Program, IIT Madras
Studied state of art 3D printing technology and then built **Prusa i3 3D printer** and a robotic arm using this printer.

SEMINAR PRESENTATIONS

August, 2019
- **Visual SLAM on mobile manipulator using robot operating system**
  - Industry-Academia Conclave'19, IIT Palakkad
    Presented a poster showcasing implementation of 3D visual SLAM on a industrial manipulator robot.

October, 2017
- **Low cost Prusa-i3 3D printer**
  - Open House'17, Centre for Inovation(CFI), IIT Madras
    Showcased low cost, self made Prusa-i3 3D printer and its applications.

SELECTED PROJECTS

▸ **Swarm**	Simulating swarm behaviour of flocking and foraging in V-REP and Argos simulator	**October-December, 2019**
▸ **Q-learning**	Q-learning based controlled for ARdrone, simulated in gazebo using ROS	**August - October, 2019**
▸ **Manipulator**	Vision based **control** and trajectory **planning** of robotics manipulator in pointcloud data	**June - July, 2019**
▸ **SLAM**	Implemented **SLAM** on **AGV** by sensor fusion of data from 2D lidar and 3D camera	**May - June, 2019**
▸ **Biomedical**	Built **EOG** based typing system for individual with motor neuron diseases	**January - April, 2019**

To know more about these projects, please visit: **https://iamrajee.github.io/projects/**

SELECTED COMPETITIONS

▸ **SIH, Hardware**	**Path planning** to fly two drones in synchronized manner, maintaining same altitude and attitude.	**January - June, 2019**
▸ **E-yantra**	Simulated thristy crow story using wheel robot, overhead camera, aruco marker, blender models, Augment environment using OpenGL, Path planning and navigation on hexagon grid us IR sensors.	**August,18-March, 2019**
▸ **Inter-IIT**	Build model for **Satellite image classification** using just 14 images, for Inter-IIT, IIT Bombay	**July - December, 2018**
▸ **Inter-IIT**	Built automated **Toilet Cleaning Robot** for cleaning toilet seat and floor, Inter-IIT, IIT Madras	**July - December, 2017**

RELEVANT COURSES

Area	Courses
▸ **Maths**	Linear algebra, Probability, Stochastic Process and Statistics, Differential and Integral Calculus
▸ **CS**	Data Structures and Algorithms, DBMS, OS, Computer networks, Compilers, Parallel programming
▸ **AI**	Principle of machine learning, Deep learning, Reinforcement learning
▸ **Robotics**	Robotics manipulation and control, Embedded system, Signal and system, Engineering mechanics, Biomedical and Instrumentation

POSITION OF RESPONSIBILITY

➢ **Head of Robotics Club, IIT Palakkad** — July 2018 - May 2019
- Teach basics and advance concept of robotics.
- Mentor student projects.
- Encourage student to participate in regional and national competition.
- Prepare and lead team in competitions.

SCHOLASTIC ACHIEVEMENTS

- Winner, Kaizen Robotics Competition, Lema labs. — 2017
- Awarded Kishore Vaigyanik Protsahan Yojana(KVPY) Fellowship by DST, Govt. of India. — 2016
- Qualified IIT-Jee Advanced 2016 with a percentile of 99.3 amongst a total of 1.2 million students. — 2016
- Best Student of Year Award 2014–15, Rajsamand District Private Education Committee. — 2015
- Awarded Merit Scholarship Class X, Army Welfare Education Society(AWES). — 2014

REFERENCES

- **Mr. Ashok Nair**
  Director Service Delivery,
  UST Global, Thiruvananthapuram
  E-Mail: **ashok.nair@ust-global.com**
- **Mr. Shubham Jain**
  Founder and CEO,
  Researshala, Chandigarh
  E-Mail: **shubham@researchshala.com**
- **Dr. Piyush P. Kurur**
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