

# Rajendra Singh

Fourth year  
Computer Science and Engineering  
Indian Institute of Technology, Palakkad

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## SUMMARY

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

## EDUCATION

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

## TECHNICAL SKILLS

Title	Skills
► <b>Robotics</b>	<ul style="list-style-type: none"><li>• SLAM(2D / 3D)</li><li>• Motion and path planning</li><li>• Swarm algorithms</li><li>• Control system</li><li>• Perception(Feature matching, Segmentation, Detection)</li><li>• Sensor fusion(Kalman, Particle filter)</li><li>• Robot kinematics and dynamics(DH/Newton/Euler/Lagrangian method)</li><li>• Embedded system(ARM, RTOS, FPGA)</li></ul>
► <b>Reinforcement Learning</b>	Q-learning, Sarsa, Monte Carlo, TD, Multi-armed bandit, DQN, Genetic algorithm
► <b>Deep Learning</b>	CNN, RNN(LSTM, Seq2seq, etc.), Unstructured data, Topic modeling, Word embedding
► <b>Languages</b>	C++ , Python
► <b>Software/Tools</b>	ROS1/2, Moveit, Gazebo, V-REP, Matlab, Fusion 360, Keil, Atmel studio 6, OpenGL
► <b>Hardware</b>	Rplidar A2M8, RealSense D435, Nvidia Jetson(Tx2, nano), Raspberry3B+, GstarIV GPS, Zybo-zynq FPGA, KL25Z arm cortex-M0+ , Atmega16/32/2560, NodeMCU, GSM, Pyboard, OpenMV, PlutoX

## WORK EXPERIENCES

May-July, 2019	● <b>Research intern, UST Global, Trivandrum</b> Studied various <a href="#">SLAM</a> 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	● <b>Data Science intern, Researchshala, Chandigarh</b> Worked on <a href="#">NLP projects</a> related to transfer learning, topic modelling, web and pdf scraping, extracting and analysing useful information from unstructured data.
May-June, 2017	● <b>Vistaar Program, IIT Madras</b> Studied state of art 3D printing technology and then built <a href="#">Prusa i3 3D printer</a> and a robotic arm using this printer.

## SEMINAR PRESENTATIONS

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|--|---------------|
| • Visual SLAM on <a href="#">mobile manipulator</a> using ROS, Industry-Academia Conclave'19, IIT Palakkad | August, 2019  |
| • Low cost 3D printer <a href="#">Prusa-i3</a> , Open House'17, Centre for Innovation(CFI), IIT Madras     | October, 2017 |

## SELECTED PROJECTS

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- Implemented [SLAM](#) on automated guided vehicle([AGV](#)) by sensor fusion of data from 2D lidar and 3D camera.
- Vision based [control](#) and trajectory [planning](#) of robotics manipulator in pointcloud data.
- Path planning of [Swarm of drone](#) for flying in synchronized manner, under Smart India Hackerthon 2019.
- Built [EOG](#) based typing system for individual with motor neuron diseases.
- Built automated [Toilet Cleaning Robot](#) for cleaning toilet seat and floor, Inter-IIT 2017-18, IIT Madras.
- Build model for [Satellite image classification](#) using just 14 images, for Inter-IIT 2018-19, IIT Bombay.

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

## RELEVANT COURSES

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

## POSITION OF RESPONSIBILITY

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- **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

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- ◆ 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

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• **Mr. Ashok Nair**

Director Service Delivery,  
UST Global, Thiruvananthapuram  
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• **Mr. Shubham Jain**

Founder and CEO,  
Researchhala, Chandigarh  
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• **Dr. Piyush P. Kurur**

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