

# Rajendra Singh

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

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## SUMMARY

- Skills** : Artificial intelligence(AI) and Robotics
- Internships** : UST Global, Researchshala and IIT Madras.
- Projects** : Simultaneous localization and mapping (SLAM), Swarm Algorithms
- Position** : Former Head, Robotics club, IIT Palakkad
- Achivement** : KVPY fellowship, AWES Scholarship, IIT-Jee( 99.3 Percentile)

## EDUCATION

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

## TECHNICAL SKILLS

Title	Skills
Robotics	• SLAM(RtabMap, Gmapping, Hector) • Perception(SIFT, SURF, HOG, R-CNN, ICP, SGM, etc.) • Sensor fusion(KF, EKF, UKF, PF) • Motion and path planning(A*,D*,RRT,OMPL, Bezier and B-spline curve) • Swarm algorithms(PSO,ACO,ABC) • Robot kinematics and dynamics(DH, Newton and Lagrange method) • Embedded system(ARM, RTOS, FPGA)
Reinforcement Learning	Q-learning, TD, Sarsa, Monto carlo, Multi-armed bandit, DQN, DDPG, A3C, Genetic algorithm
Deep Learning	CNN, RNN(LSTM, Seq2seq,etc.), GANs, Unstructured data, Topic modeling, Word embedding
Languages	C++ , Python and Java
Software/Tools	ROS1/2, Moveit, Gazebo, V-REP, Matlab, Fusion 360, Keil, Atmel studio 6, Eagle, OpenGL, Cuda
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

- Summer intern, UST Global, Trivandrum** May-July, 2019  
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.
- Data Science intern, Researchshala, Chandigarh** May-July, 2018  
Worked on [NLP projects](#) related to transfer learning, topic modelling, web and pdf scraping, extrating and analysing useful information from unstructured data.
- Vistaar Program, IIT Madras** May-June, 2017  
Studied state of art 3D printing technology and then built [Prusa i3 3D printer](#) and a robotic arm using this printer.

## SEMINAR PRESENTATIONS

- Visual SLAM on [mobile manipulator](#) using ROS, Industry-Academia Conclave'19, IIT Palakkad August, 2019
- Low cost 3D printer [Prusa-i3](#), Open House'17, Centre for Inovation([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 [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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| • <b>Mr. Ashok Nair</b><br>Director Service Delivery,<br>UST Global, Thiruvananthapuram<br>E-Mail: <a href="mailto:ashok.nair@ust-global.com">ashok.nair@ust-global.com</a> | • <b>Mr. Shubham Jain</b><br>Founder and CEO,<br>Researchhala, Chandigarh<br>E-Mail: <a href="mailto:shubham@researchhala.com">shubham@researchhala.com</a> | • <b>Dr. Piyush P. Kurur</b><br>Professor, Department of Computer<br>Science and Engineering, IIT Palakkad<br>E-Mail: <a href="mailto:ppk@iitpkd.ac.in">ppk@iitpkd.ac.in</a> |
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