

# AYUSH GUPTA

Junior Undergraduate  
Department of Mechanical Engineering  
Indian Institute of Technology, Kanpur

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## EDUCATIONAL QUALIFICATIONS

Year	Degree	Institution(Board)	CGPA/%
July'17 – June'21 (expected)	B.Tech, ME	Indian Institute of Technology, Kanpur	9.2/10.0
2017	ISC – XII	City Montessori School, Lucknow (CISCE)	95.5%
2015	ICSE – X	St. Francis' College, Lucknow (CISCE)	95%

## HONORS AND ACHIEVEMENTS

- Top 0.7%, JEE Advanced (amongst 160,000 candidates)
- Top 0.001%, JEE Main (amongst 1.3 million candidates)
- Top 1%, National Standard Examination in **Physics**
- Top 1%, National Standard Examination in **Astronomy**
- Top 1%, National Standard Examination in **Chemistry**
- 2nd in 15+ teams, Student AUV Competition (SAVe), organised by **NIOT, Chennai**

## PROJECTS

### Team AUV-IITK *Software Team Member*

*Faculty Advisor: Prof. Mangal Kothari* May 2018 - Present

- Fused sensor readings from Doppler Velocity Log (DVL) and IMU using an Extended Kalman Filter to generate odometry message for the vehicle
- Implemented a novel image preprocessing algorithm based on Fusion Framework to formulate a robust underwater computer vision pipeline
- Created multi-class dataset of labeled underwater photos, trained YOLO object detection model and setup real-time inference on Jetson TX2
- Developed and tested acoustic localization system capable of estimating the Direction of Arrival of ultrasonic underwater signals from pinger

### Realtime Onboard Dense RGB-D Mapping on UAVs

*Mentor: Prof. Mangal Kothari* May 2019 - Present

- Studied and experimented various techniques related to 3D mapping of environment using monocular and stereo cameras on Jetson TX2
- Evaluated approaches for shortcomings and computational requirements considering its onboard realtime implementation on UAV

### Chat-IITK

*Course Project - ESC101*

*Mentor: Prof. Puroshottam Kar* 2nd Semester

- Designed and developed a chat application on NodeJS, Express, Socket-IO, and MongoDB
- Implemented real-time chat using Socket-IO with PassportJS for extensively implemented **authentication** and **cookie handling**

### Team Humanoid, IITK

*Software Team Member*

*Robotics Club, IIT Kanpur* Dec. 2017 - April 2018

- Worked on a Bipedal Prototype of the humanoid bot, capable of performing statically stable walking
- Implemented the MATLAB simulated **inverse kinematics walking algorithm** based on ZMP criteria on the actual robot using ROS

### Mechanical Quadruped

*Mentor: Prof. Shantanu Bhattacharya, TA202* 4th Semester

## RELEVANT COURSES

Introduction to Programming(A*)	Probability & Statistics	Introduction to Robotics (i)	Computer Architecture
Data Structures and Algorithms	Probability & Statistics(A*)	Computing Lab - 1(A*)	Computing Lab - 2(A*)
Compiler Design	Functional Programming(A*)	Computer Systems Security	Computer Networks(i)

A\*: Grade for exceptional performance, i: In progress

## WORK EXPERIENCE

### Intelligent Systems Lab

*Robotics Intern*

*Supervisor: Mr. Ravi Prakash, Doctoral Student* April 2019 - Present

- Ported outdated available ROS code to operate on current development platform using ROS Kinetic on Ubuntu 14.04
- Actualized setup for simulation using Rviz and Gazebo for Universal Robots manipulator on a Guardian Robot
- Tweaked the hardware drivers and changed odometry publishers to fix position drift estimated by motor encoders
- Assisted in final objective to create collaborative autonomous robots capable of building walls, extinguishing fires in unknown environments

### New York Office, IIT Kanpur

*Backend Software Intern*

*Supervisor: Prof. Manindra Agrawal* May 2018 - July 2018

- Worked on Scala with Akka-HTTP for scalable and concurrent multi threading using functional programming
- Documented and compiled the entire collection of backend Application Programming Interfaces using PostMan
- Fixed bugs in the Scala backend, and collaborated using Phabricator, while developing an upcoming social platform

## POSITIONS OF RESPONSIBILITY

- **Software Team Lead, Team AUV-IITK** : Maintaining entire stack of an Autonomous Vehicle, deployed on Git, implemented using ROS, OpenCV and simulation integrated using Gazebo.
- **Secretary, Robotics Club, IIT Kanpur 2018-19**
- **Secretary, Consulting Hobby Group, IIT Kanpur 2018-19**
- **Student Guide, Counselling Service, 2018-19**
- **Academic Mentor, Counselling Service, 2018-19**

## SKILLS

**Proficient:** C, Golang, Python, Javascript

**Experienced:** C++, Java, Scala, Android

**Exposure:** Haskell, Rust, Dart, Perl

**Web:** Angular, Akka, TypeScript, Redux, Flutter

**Utilities:** Shell Utilities, Git, Docker, Ansible, PostgreSQL,

MongoDB, OpenCV, L<sup>A</sup>T<sub>E</sub>X, Vim, Emacs, Vagrant

## MISCELLANEOUS

- Runners Up in robotic soccer event Wild Soccer, and Visualise, in inter-hall competition
- Developed an application which generated summaries of the latest news based on the current trending hashtags on Twitter as code.fun.do submission
- Developed a basic platform game on the game development framework Unity3D using JavaScript and C#, updated on Github