# AYUSH GUPTA

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# EDUCATIONAL QUALIFICATIONS

Year	Degree	Institution(Board)	CGPA/%
July'17 – June'21 (expected)	B.Tech, ME & Minor in IME	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

Faculty Advisor: Prof. Mangal Kothari

- 2nd in 15+ teams, Student AUV Competition (SAVe), organised by **NIOT**, **Chennai** in 2019
- 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 Chemistry

#### Projects

#### Team AUV-IITK

Software Team Member May 2018 - Present

- Created multi-class dataset of labeled underwater photos, trained model and setup real-time inference on Jetson TX2
- Designed a **hierarichal finite state machine** for robust autonomous behavior of the vehicle with failsafes
- Fused sensor readings from Doppler Velocity Log (DVL) and IMU using an **EKF** to estimate odometry
- Developed and tested acoustic localization system capable of estimating the Direction of Arrival of ultrasonic underwater signals from pinger, using STFT and Cross-Correlation
- Extensively used Gazebo, a physics engine to simulate vehicle model in a hydrodynamically realistic environment

#### 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 for onboard implementation
- Evaluated approaches for shortcomings and processing requirements while focusing on the scarce size, computation and energy resources on Unmanned Aerial Vehicles (UAVs)

# Chat-IITK

 $Advanced\ Track\ Project\ -\ ESC101$ 

 $Mentor:\ Prof.\ Puroshottam\ Kar$ 

2nd Semester

- Designed and developed a chat application on NodeJS, Express, and MongoDB, selected in **12** out of 400+ students
- Implemented real-time chat using Socket-IO with PassportJS for extensively implemented **authentication** and **cookie handling** for session management
- Database management implemented using MongoDB, and application deployed online on Heroku's server

## Team Humanoid, IITK

 $Robotics\ Club,\ IIT\ Kanpur$ 

Software Team Member 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 a Robot Operating System framework
- Developed a Web Graphical User Interface for monitoring current status and easier debugging of servos using ROS Web Bridge Server and JavaScript, with a CSS frontend

## Work Experience

Robotics Intern

Intelligent Systems Lab

 $Supervisor:\ Mr.\ Ravi\ Prakash,\ Doctoral\ Student \qquad {\it April}\ 2019\ -\ {\it Present}$ 

- 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 aim to create collaborative autonomous robots capable of building walls, extinguishing fires

New York Office, IIT Kanpur

Backend Software Intern May 2018 - July 2018

- Supervisor: Prof. Manindra Agrawal
   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

#### Team AUV-IITK

Software Team Lead

Science and Technology Council
April 2019 - Present

- Spearheading a group of 8 people working on the software of Anahita, planning and implementing technical changes
- Maintaining software stack of Autonomous Vehicle, deployed on Git, developed using ROS, OpenCV and 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

Robotics: ROS, OpenCV, Arduino, Gazebo, CUDA, Gym Data Science: Tensorflow, Keras, Scikit, MATLAB Web Development: Node.js, MongoDB, Flask, Express, Socket-IO, Bootstrap, HTML5, Jekyll, Travis CI Programming Languages: C++, Python, Scala, Javascript Utilities: LabView, LATEX, Git, SVN, Bash, Unity, Postman

## 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 basic platform game on game development framework Unity using JavaScript & C#, updated on Github

#### Relevant Coursework

Introduction to Programming (A\*) Probability & Statistics Data Structures and Algorithm (i) Engineering Design and Graphics (A\*) A\*: Grade for exceptional performance, i: In progress, A: grade

Introduction to Robotics (i)Introduction to Microeconomics (A)