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	9.0*/10.0
2017	ISC – XII	City Montessori School, Lucknow (CISCE)	95.5%
2015	ICSE – X	St. Francis' College, Lucknow (CISCE)	95%

Honors and Achievements

- 2nd in 15+ teams, Student AUV Competition (SAVe), organised by **NIOT, Chennai** in 2019
- Top 0.7%, JEE Advanced (amongst 160,000 candidates)
- Top 0.1%, JEE Main (amongst 1.3 million candidates)
- Top 1% (U.P.), National Standard Examination in **Physics**
- Top 1%, National Standard Examination in **Chemistry**

Projects

Team AUV-IITK *Software Team Member*
Faculty Advisor: Prof. Mangal Kothari 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 focussing 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 *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 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

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

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

Team AUV-IITK *Science and Technology Council*
Software Team Lead 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 while in high school, on game development framework **Unity** using JavaScript & C#, updated on Github with Android & Windows builds

Relevant Coursework

Fundamentals of Programming (A∗) Probability & Statistics Introduction to Robotics (*i*)
Data Structures and Algorithm (*i*) Engineering Design and Graphics (A∗) Introduction to Microeconomics (A)

A∗: Grade for exceptional performance, *i*: In progress, A: grade