

# Ayush Agrawal

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## Education

### Birla Institute of Technology and Sciences, Pilani

B.E. in Electronics And Instrumentation Engineering | CGPA: 7.38/10

Teaching Assistant: Microprocessor & Interfacing Lab

Pilani, India

August. 2018 - Present

### New Green Field Public Academy, Indore

CGPA - 10 (X Standard) ; Percentage - 89.9 (XII Standard)

Indore, India

2016 - 2018

## Work Experience

### University of New South Wales, Canberra

UNDERGRADUATE THESIS | SUPERVISOR : Dr. Sridhar Ravi

- Obstacle Avoidance in drones Using Bee Vision inspired Algorithms
- Studying about Optic Flow, Time Series Analysis

Canberra, Australia

November 2021- Present

### CSIR-CEERI-Pilani

UNDERGRADUATE RESEARCHER | Co-SUPERVISOR : Dr. Sujan Yenuganti

- Developing a Bio-inspired Odor Following Drone
- Interfacing Gas Sensors with a Micro-Controller attached to a DJI Tello to publish the signals in real time to a ROS topic
- Further developing a ROS Program to process these signals and guide the DJI Tello to reach the odor source
- Fully Sponsored by AUGSD BITS Pilani

Pilani, India

September 2021- Present

### Indian Institute of Technology, Bombay

REMOTE RESEARCH INTERN, GUIDE: Dr. Arpita Sinha RESULTS: [GitHub](#)

- Implemented a Decentralized Multi-Drone Terrain Exploration algorithm on ROS, Gazebo
- No inter robot communication was allowed, and incidence matrix was used as a mode of communication between robots and vertex
- The algorithm assured a complete exploration in limited number of steps with collision avoidance
- Tools Used: Python, ROS, Gazebo, MATLAB

Bombay, India

June. 2021- August 2021

### Birla Institute of Technology & Sciences Pilani, India

UNDERGRADUATE RESEARCHER, EEE DEPT.

- Developing of A Real Time Crop Advisory System Exploiting Nanotechnology Based Nitrogen Sensor With Internet of Farming (IoF) Framework
- Personally developed an architecture for soil sensing and visualization using ESP32 and AWS
- Currently researching AI Algorithms for reducing the effects of interfering input(moisture) on the Nitrogen Sensor readings sensed by this architecture
- Guide : Dr. Puneet Mishra ; This is a [Department Of Biotechnology, Government Of India](#) Sponsored Project

BITS Pilani, India

August 2021 - Present

## Projects

### Image Denoising for UAV Imagery

SUPERVISOR : Dr. Meetha Shenoy RESULTS : [Github Link](#) | [Project Report](#)

- Reviewed various denoising, deblurring, super-resolution, marker detection methods using GANS and CNN's.
- Achieved comparable results without increasing the payload or cost
- Tools Used: TensorFlow, Keras, PIL, Wand

BITS Pilani

Jan 2021 - May 2021

### Automatic Tuning and Adaptation of PID Controllers

TERM PROJECT | Industrial Instrumentation And Control | INSTR F343 RESULTS : [Github Link](#) | [Project PPT](#)

- Attained a design-point on the Nyquist diagram and attain a required phase margin
- Implemented an adaptive control logic for automatic tuning of PID process controllers
- Tools Used: MATLAB, Simulink

BITS Pilani

March 2021 - May 2021

## Competitions

### E-Yantra Robotics Competition

FINISHED IN TOP 30 OUT OF 500 TEAMS | [Final Submission Video](#)

- Designed and Simulated a parcel distribution drone with Discrete PID Controller
- Successfully Executed Marker Detection, QR code-based scanning, path planning, obstacle avoidance, scheduling of delivery/pickup to maximize the revenue
- Tools Used: Python, ROS, Gazebo, Plotjuggler, OpenCV

IIT Bombay, India

Sept 2020 - April 2021

## University Physics Competition 2021

BRONZE MEDAL | [Certificate](#)

November 2021

- Researched about Asteroid's minimum mass to cause a substantial damage to a 1000 Km away coastal city
- Presented our findings in form of a Research Paper in a span of 48 Hours.

## IRDC(International Rover Design Challenge)

[Team Website](#) | [Certificate](#)

The Mars Society

July 2021- September 2021

- Helped in ideating Mars Rovers to explore of Martian Lava Tubes.
- Researched various computer vision and navigation algorithms

## Flipkart GRID 3.0 - Robotics

REACHED LEVEL-2 | [Problem Statement](#)

Flipkart, India

July 2021- January 2022

- Designing delivery bots for last step delivery
- Designing Multi-Robot Path Planning algorithms for collision avoidance and successful Pose estimation
- Contributing in Image Processing using MATLAB and ArUco Tag Detection.

## Relevant Coursework

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Linear Algebra | Probability And Statistics | Pattern Recognition | Image Processing | Neural Network And Fuzzy Logic | Deep Learning Specialization Online | Discrete Mathematics | Object Oriented Programming | C programming | Autonomous Mobile Robots| Industrial Instrumentation & Control | Control Systems | Transducers & Measurement Techniques | Control Systems Lab | Internet Of Things

## Technical Skills

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- **Languages :** Python, C/C++
- **Developer Tools:** Git, VS Code, Google Colab
- **Libraries:** Pandas, NumPy, Matplotlib, Wand, PIL, OpenCV
- **Softwares:** MATLAB, SIMULINK, Gazebo, ROS, Open Dynamics Engine
- **Frameworks:** TensorFlow, Keras, PyTorch

## Honors & Awards

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- 2018 96.07 percentile out of 0.15 million applicants, IIT Joint Entrance Examination Advanced, 2018
- 2021 Awarded INR 50,000 as UG Project Funding for Autonomous Odor Drone, AUGSD BITS PIALNI

India

BITS Pilani

## Other Experiences

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### Turtle Learn

MATHEMATICS CONTENT CREATOR | [Certificate](#)

BITS Pilani

Sept 2018 - Dec 2018

- Curated Mathematics video lectures for a eduTech startup
- Content created was aimed for students preparing for college entrance exam
- Got familiarized with the fast paced environment of a startup

### Madhyansh Cultural Association

PUBLICITY COORDINATOR | [Certificate](#)

BITS Pilani

May 2019 - August 2020

- Managed Publicity for events like institutional grub, Cultural Gatherings and Institute's Cultural day
- Designed pamphlets, managed social media handles and coordinated a group of 10 individuals to smoothen out the process

### LUDIFU(Let Us Do It For You)

SOCIAL MEDIA MANAGER | [Certificate](#)

Remote

July 2019 - August 2019

- Managed a team of 10 individuals for increasing the outreach of the company
- Handled various social media handles and decided upon strategies to increase user engagement on the website