



Kushal Natani

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Academics

EDUCATION

- **Undergraduate Studies – Indian Institute of Technology, Kharagpur**
 - B. Tech (Hons.), Computer Science and Engineering (2018-2023)
 - GPA - 8.9/10
- **Intermediate / +2 – Jayshree Periwal High School, Jaipur**
 - CBSE, New Delhi, India (2018)
 - Percentage – 91.2%
- **Matriculation – Jayshree Periwal High School, Jaipur**
 - CBSE, New Delhi, India (2016)
 - GPA - 10/10

SCHOLASTIC ACHIEVEMENTS

- Achieved **Rank 285** in JEE Advanced 2018 among top 1.5 lakh students across India.
- Achieved **Rank 503** in JEE Mains 2018 among 13 lakh students across India.
- Recipient of the **KVPY** Fellowship by Govt. of India, with **Rank 348** across India.
- Bagged Gold medal for selection in top 35 in India for **International Astronomy Olympiad**.
- Awarded **top 1% in India**, certificate for National Standard Examination in Physics (conducted by IAPT).
- Awarded **top 1% in India**, certificate for National Standard Examination in Chemistry.
- Awarded the **Gold** Certificate for selection in **top 50 teams** across India for **Technothon (IIT Guwahati)**.
- Awarded the prestigious **NTSE** scholarship by National Council of Education, Research & Training.

Internships and Research Experience

Autonomous Ground Vehicle

April 2019 – July 2019

AGV - Research Group, IIT Kharagpur

- Participated in **27th Intelligent Ground Vehicle Competition (2019)** and secured **2nd Position in the AutoNav Challenge** and **3rd in the overall challenge** amongst **25 other** renowned universities across globe.
- Implemented **A*** algorithm for global path planning and **TEB** local planner for dynamic path planning and collision avoidance.
- Implemented **openCV** based approaches for solving problems like Lane and dynamic obstacle detection along with **LIDAR** input.
- Localized robot's position using **gps** and **odometry** sensors and governed robots motion **using PID controller**.
- Applied **K-means** clustering to cluster points of each lane and approximated shape of lanes to second degree curves by **ransac**.
- Integrated all modules through the **ROS** interface and tested the modules on **Gazebo** simulation.

Guide: Prof. Debashish Chakravarty, IIT Kharagpur

Virtual Reality Simulation Development

Jan 2019 – July 2019

Virtual Reality Simulation Development

Developed a car track dynamics simulation game and its environment with **Unity** and integrated it with **Virtual Reality** headset to record the average reaction time of different age groups.

Guide: Prof. J. Maiti, IIT Kharagpur

Software Development Intern

Winter 2018

Aryabhatiya - Jaipur, Rajasthan

- Developed web based platform for their StartUp (<https://aryabhatiya.ml>). Set up web based educational games on computer science, game theory, politics, economics etc.
- Got certificate for best intern and contributed to other ongoing project development (<https://creator.aryabhatiya.ml>).

Guide: Mr. Pratik Jaisansaria - CTO, Aryabhatiya

Selected Development Projects

Simultaneous Localization and Mapping (SLAM) - Self

- Studied and applied Feature matching, point triangulation and 3-D map reconstruction over images from webcam and internet.
- Applied Bundle Adjustment to handle large datasets and Extended Kalman Filter to reduce the error of 3-D reconstruction by including data from lidar, gps and odometry sensors.

Game Development using PyGame Library – Code Club, IIT Kharagpur

- Developed a shooting game with moving obstacles and dynamically changing environment using pygame library.

Social Networking and big graph analysis – Self

- Using SNAP library in python, programmatically analysed structural properties of real world networks.
- Generated subgraphs per different properties and determined its properties like size, connected components and connectivity.
- Computed various centrality matrices like degree, closeness, and between centralities for the graphs across internet.

Technical skills

LANGUAGES, SOFTWARES & TECHNOLOGIES

- Programming Languages: **C, C++, C#, Java**
- Scripting Languages: Python, Shell Scripting (Linux), PowerShell (Windows)
- Web Technologies: **HTML, PHP/MySQL, CSS, JavaScript**
- Software Tools: **Auto-CAD, LaTeX, Unity, Google SketchUp, Visual Studio**
- Platforms: **Microsoft Windows, Mac OS, Linux**

Extra-Curricular Activities

Co-ordinator- Code Club, IIT Kharagpur

July 2018 - Present

- Conducted event up.AI about the awareness and scope of AI with speakers from Capillary Technology, JIO CoE etc and with over 300 attendants in every event.
- Conducted Various workshops related to programming like Competitive programming, Python introduction etc.

Organizing Team Member- Game Theory Society, IIT Kharagpur

July 2018 – Present

- Conducted events relating to **game theory and optimal planning** in IIT Kharagpur, IIT Bombay, Delhi Technical University, XLRI Jamshedpur, and NSIT Delhi.

Member – District Level Handball Team, Jaipur

December 2013

- Played for the district level handball team of Jaipur from Jayshree Perival high school

Social Service

- EDUCATIONAL MENTOR | SOS CHILDREN'S VILLAGE | MAY, 2018 - PRESENT
- VOLUNTEER | NATIONAL SERVICE SCHEME (NSS) | JULY, 2017 - PRESENT

Achievements

- Bagged gold medal for being in **top 20 participants** all across nation in Rankethon (IIT Kharagpur) ,2015.
- Part of **bronze winning** team in Stage Play Competition, General Championship, 2019.
- Part of **silver winning** Presentation Team for Inter-Hall Illumination Competition, Diwali 2018.

Relevant Coursework

Course	Code	Course	Code
Programming and Data Structures(PDS)	CS21001	PDS Lab	CS19001
Algorithms-1	CS21003	Algorithms Lab	CS29003
Discrete Structures	CS21001	Formal Language and Automata Theory*	CS21004
Software Engineering*	CS20006	Software Engineering Lab*	CS29006
Switching Circuits and Logic Design*	CS21002	Switching Circuits Lab*	CS29002

* indicates the course is running