B.ANSHUMAN

3rd Year Undergraduate - Electrical Engineering

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2020 - Present	B.Tech	Indian Institute of Technology, Kanpur	8.9/10
2020	CBSE(XII)	Jawahar Vidya Mandir, Shyamali	97.4%
2018	CBSE(X)	Jawahar Vidya Mandir, Shyamali	96.5%

Scholastic Achievements

- Received **Academic Excellence Award 2021, IIT Kanpur** for the academic year **2020-21**
- Secured **All India Rank 651** in **JEE Advanced 2020** among 1,50,838 shortlisted candidates
- Among the top 0.2% of the 0.8 million applicants with **All India Rank 1638** in January **JEE Mains 2020**
- Secured **All India Rank 44** in **Indian Statistical Institute Admission Test 2020** in B.Math Programme
- **KVPY SX Scholar** in 2020, awarded by **IISc Bangalore**, under the Govt. of India
- **KVPY SA Scholar** in 2019, awarded by **IISc Bangalore**, under the Govt. of India
- **NTSE Scholar** in 2018, awarded by **National Council of Educational Research and Training**, New Delhi.

Work Experience

- **Few shot Learning | SURGE IITK, Prof. V. Arora** *May 2022 — Ongoing*
  - Studied various robust features used in statistical and Deep Learning models for time-series, especially human voice.
  - Successfully replicated the result of few-shot learning using ProtoNets on the Omniglot dataset.
  - Modelled the approach for sound event detection and tagging using ProtoNets and MAML, methods in few-shot learning.

Key Projects

Automatic identification of solar bursts | Inter IIT Techmeet 10.0 *Mar 2022 — Apr 2022*
- Solved the problem statement given by **ISRO** regarding automatic demarcation of solar bursts in timeline and their classification given an open-source X-ray light curve dataset
- Created a multi-filtering algorithm with outlier detection to improve performance, developed as a python package
- Secured the **Second position** out of 22 participating IITs, on the basis of performance and the presentation

Direction of Arrival Estimation | EE627 Course Project, Prof. R. Hegde *Feb 2022 — Apr 2022*
- Generated Spatial Room Impulse Responses using Image Method, which convolved with plain speech, gave directionality
- Treated Direction of Arrival estimation as a classification problem on a spherical grid having 684 points, with 5° resolution.
- Implemented a Convolutional Recurrent Neural Network on Pytorch that takes in first order Ambisonics-B intensity vector from the above generated speech signals, and predicts one of the 684 lattice points

MCMC in Julia | Stamatics, IIT Kanpur *Apr 2022 — Jun 2022*
- Implemented sampling techniques and estimators including inverse discrete/continuous transform, accept-reject proposal, and importance sampling estimator in JuliaLang.
- Analysed the importance of the proposal distributions by judging its bias and variance theoretically and simulation-based.
- Implemented MCMC methods including Metropolis Hastings algorithm and used that to perform Bayesian based regression.

Game of Blocks | Science and Technology Council, IIT Kanpur *May 2021 — Aug 2021*
- Understood principles of BlockChains, how a system succeeds to be trustworthy in an otherwise environment
- Applied learnt concepts on implementing dummy cryptocurrencies with proof of work mechanism
- Developed ETH Smart Contracts on IRV and Dutch Auction Mechanisms using Solidity

Numbers Made Dumber | Stamatics, IIT Kanpur *Apr 2021— Jul 2021*
- Based on understanding the principles of Number Theory, topics that were oriented towards Cryptography
- Implemented standard cryptographic algorithm RSA in Python from scratch

ML with Julia | Association for Computing Activities, IIT Kanpur *May 2021 — Aug 2021*
- Explored Linux system with CTFs and Exercism
- Explored the language Julia and implemented Regression Models and ANNs from scratch in that language
- Implemented mathematical operations as data structures including rationals, vectors and gradients in Julia

Computational Astrophysics | Science and Technology Council, IIT Kanpur *May 2021 — Jul 2021*
- Was introduced to Astrophysics and understood the usual conventions and patterns used throughout the field
- Worked with Python's Astronomy dedicated library Astropy
- Solved problems based on datasets from standard sites including Vizier and SDSS

CSRT Tracking | Aerial Robotics, IIT Kanpur *Aug 2021— Oct 2021*
- Developed a ROSCpp Package implementing the CSRT Tracker using OpenCV to track objects inside an ROI
- Implemented an algorithm for global pose estimation of Husky using camera feed and libraries including Eigen for coordinate transformations

Technical Skills

- **Languages and Utilities:** C, Cpp, Javascript, Python, Octave, Julia, Bash, LaTeX, CSS3
- **Software and Libraries:** ROS, Gazebo, Git, Pytorch, Adobe Suite (Ai, Ps, Ae), Vim, Docker

Positions of Responsibility

Team Head | Aerial Robotics, IIT Kanpur *Apr 2021 — Present*

- Leading a team that works on Autonomous Unmanned Aerial Vehicles.
- Involved in Inter IIT Techmeet 10.0 on the problem statement provided by **DRDO** on autonomous navigation of UGV in unknown terrain, securing **Second position**.
- Implemented ROS packages for autonomous landing on a moving platform and CSRT based tracking.
- Worked on implementation of the visual Simultaneous Localisation and Mapping for effective localisation and pose estimation.

Secretary | Programming Club, IIT Kanpur *Sep 2021 — Apr 2022*

- Conducted workshops on pillars of programming, mentored 20 freshers in a summer project on Information Security.
- Contributed to the Club's repositories based on deployable projects, directly affecting the campus community

Secretary | Design and Animation Club, IIT Kanpur *Jul 2021 — Mar 2022*

- Took part in Team based Rebranding event, the team securing 2nd position out of 9 teams of proficient designers.
- Position of Responsibility of holding workshops and introducing freshmen to the concepts of design

Senior Executive, Design | Udghosh, IIT Kanpur *Sep 2021 — Mar 2022*

- Involved in the regular creation of graphics for Udghosh, the Sports Festival of IITK
- Involved in the rebranding of the fest and took part in its theme creation and designing of Udghosh'22

Relevant Courses

Fundamentals of Computing	Linear Algebra	Differential Equations
Real Analysis	Physics I - Mechanics	Physics II - Electrodynamics
Introduction to Electronics	Signals and Systems	Complex Analysis
Speech Signal Processing	Control System Analysis	Probability and Statistics

Extra-Curricular Activities

- Mentored a project HackIT'22 under Programming Club IITK to introduce freshers to different aspects of Jeopardy based CTFs.
- Achieved 2nd position in a team based rebranding contest organised by Design and Animation Club IITK in 2021.
- Created the UI-UX of IITK-Coin, a project of centralised currency system customised for IITK, under SnT Council IITK.