



Abhinav Azad | Graduate Researcher



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I am a multipotentialite, passionate about product design, mixed-media and VR/XR based behavioural research in extended reality. Let's engineer sustainable technologies that enrich our collective human consciousness.

Education:

Feb 2020- Feb 2021	Semester Exchange Program (6th & 7th Sem) - Czech Technical University in Prague
	I was selected for the semester exchange program from IIT Madras to pursue specialisation courses in Biomedical Engineering at CVUT in Prague, one of the largest universities in the Czech Republic and the oldest school of technology in Central Europe.
Jun 2017- July 2022	Bachelor's & Master's in Engineering Design - Indian Institute of Technology Madras
	This course offered me an interdisciplinary curriculum of Electrical and Mechanical sciences with the essence of Design Thinking and a master's specialisation in Biomedical Eng. CGPA: 8.14/10
	IIT Madras is rated the best educational & research institute in India for the 5 th time in a row by the National Institutional Ranking Framework (Source). IITs have an acceptance rate of less than 0.5%.

Projects and Professional Experiences:

July 2021- Present	Graduate Researcher Guide: Prof. Giuseppe Riccardi - SIS lab, University of Trento
	<ul style="list-style-type: none"> Leading the project for realising augmented point of care with virtual agents & robots in Virtual Reality. Designing an acquisition system of video, speech and bio-signals data for behavioural study in VR. Emphatic personal health agents using conversation AI and affective computing in Virtual reality.
July 2021- May 2022 (Master's thesis)	IITM Dual Degree Project Guide: Prof. Nirav Patel and Prof. Manivannan - IIT Madras
	<ul style="list-style-type: none"> OBJECTIVE: VR Training module for minimally invasive neurosurgery & operation planning on 3D Slicer. Realised Virtual reality simulation on Oculus HMD, VR-based cross-platform Patient registration module across Unity and 3D-Slicer using Server DLL and OpenIGTLink. [Project Thesis] Designed and formulated an immersive behaviour study experiment for this HMI System validity in VR. Characterisation of Kuka IIWA and motion planning using various IK solvers on Unity and ROS.
Feb 2020- April 2021	Data Analyst internship in Cerner Intelligence Group - Oracle Cerner Intelligence
	<ul style="list-style-type: none"> OBJECTIVE: Chest X-rays image analysis identifying abnormalities for COVID identification Our pipeline involved CXR pre-processing, Lung RoI extraction using Unet-based segmentation, Ensemble Deep learning and feature visualisation using GradCam for effective AI Explainability. We achieved 98.3% precision in UNet Lungs Segmentation and over 0.98 AUC for covid detection on CXRs with cross-Val. We published a manuscript titled "<i>WE-Net: An Ensemble Deep Learning Model for Covid-19 Detection in Chest X-ray</i>", Chaudhuri, R., Nagpal, D., *Azad, A., Pal, S. (ICACDS 2022).
July-Oct 2020	Research Internship in Robot & Machine Perception Group - CIIRC, CVUT Prague
	<ul style="list-style-type: none"> OBJECTIVE: Real-time detection of miniature parts in Human-Robot interaction assembly line on Nvidia Jetson Nano microcontroller and Intel Realsense dept camera 435i. [Project link] With ROS as backbone, we optimised detection time(61x faster) of tiny objects in the workspace by selectively feeding slices of HD stream to the YOLOv5. Guide: Vaclav Hlavac
May-July 2019	Summer Internship at Nagaoka University of Technology, Japan Guide: Prof. Okazaki M
	Qualified among top 3 students for NUT Summer Industrial internship in Fastening solution at Saima.

2019	Mind wandering project at Rehabilitation Bioengineering Group - IIT Madras
	<ul style="list-style-type: none"> • OBJECTIVE: Detection of Cognitive stress and attention during virtual driving simulation. • Artefact removal, pre-processing and feature extraction from high-frequency Alpha & Beta brainwaves. • Machine learning classifiers based on P1 & N1 ERPs on the acquired EEG and HRV from ECG signals.
Nov-Dec 2018	Hand-held grain detector and analyser at infyU LABS, - IIT Gandhinagar
	<ul style="list-style-type: none"> • OBJECTIVE: To develop a handheld device grain analyser to predict rice types. Segmenting and separating overlapping rice grain samples to increase sampling efficiency on Raspberry Pi. • METHOD: Computer vision to detect overlapping grains using convexity criteria on the rice grain contours and separate the contours to increase samples for learning and averaging.

Awards and Achievements:

July 2022	<u>Dronnadula Nagaratam Reddy Award</u> - For the student with the best academic record in GN 5001-Self Awareness course during IIT Madras Convocation ceremony 2022.
Feb 2021	<u>Ram Shriram Merit</u> – Education scholarship awarded to 14 students based on overall performance.
Dec 2018	<u>Gold Medal Winner: 7th Inter IIT Tech Meet</u> - Among the 16 IITs across India in ' <u>BETiC³</u> nationwide Medical Innovation Challenge'. [Project link]
Sept 2015	<u>International Math Olympiad</u> - Secured 86 th rank Internationally in 8 th IMO by SOF
Aug 2015	<u>Winner at JIGNYASA Science Fair</u> - Inexpensive testing kit and organic treatments for soil
Feb 2013	<u>National Bal Shree Honor 2013</u> - Received India's most prestigious honour for youngsters in the field of 'Scientific Innovations.'

Position of Responsibilities:

2018 -19	<u>Legislator of Narmada Hostel, Student Legislative Council</u>
	<ul style="list-style-type: none"> • I was elected as the legislative representative among the 380+ students of Narmada hostel, IITM. • Policies formulations and involvement in Student Governance influencing nearly 10K students.
2019-20	<u>Strategist, Physics & Astronomy Club of IIT Madras</u>
	<ul style="list-style-type: none"> • As part of the oldest clubs of IITM, conducting various events, seminars, and observation sessions • Facilitating & guiding students to pursue projects in physics and astronomy as a part of CFI⁴

Relevant Coursework and Skills:

• Computer Vision	• Medical Image Analysis	• Geometrical Modeling	• Computational Neuroscience
• ML/DL	• IoT	• Digital Signal Processing	• Forms & Aesthetics
• Mechatronics	• Probability	• Creative Design	• Design of Medical Devices
• Unity & VR development	• Human Machine Dialogue*		

My hobbies and Extracurricular Activities:

Fine-Arts	<ul style="list-style-type: none"> • Earned the recognition of the institute's "Best Artist Award-2018" in IIT Madras. • I have proficiency in various mediums: Oil painting, Watercolor, Acrylics, Sculpting, and Paper Mache.
Sports	<ul style="list-style-type: none"> • We Stood 3rd in Inter-Hostel Men's Water Polo among the Sixteen Hostels in IIT Madras. • I have been practising Weightlifting, running marathons, Swimming, Tennis, and Badminton.
Astronomy	<ul style="list-style-type: none"> • Participated in a week-long professional Astrophotography workshop at Kausani, Himalayas. • I headed the Kilkari Science & Astronomy Club in Patna and conducted various star-grazing sessions.

(1) HTIC: Healthcare Technology Innovation Centre (3) BETiC: Biomedical Engineering Technology & Incubation Centre, IIT Bombay

(2) CIIRC- Czech Institute of Informatics and Robotics (4) CFI: Centre of Innovation, IIT Madras [BLUE TEXT is Hyperlinked](#) *On-going Courses