# Kashvi Ruparelia

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## EDUCATION

**Anand Niketan School** — **Ahmedabad, India**

***Indian School Certificate (ISC)*** | *Grades 11 (82%) and 12 – results pending* — *June 2025 – May 2027*
Subjects: Computer Science, Physics, Chemistry, Mathematics, English Language, English Literature, and Mass Media Communication

***Indian Certificate of Secondary Education (ICSE)*** | *Grades 9( 85% ) and 10 (96%)* — *June 2023 – May 2025*
Subjects: Computer Applications, Mathematics, Physics, Chemistry, Biology, English Literature, English Language, History and Civics, Geography, and Hindi

## AWARDS AND HONORS

- Crest Gold Award for the project **Integrated Assistive System for the Visually Impaired** **2026**
- Honorable mention: Internationa Mathematical Modelling Challenge - India version 2026 2026
- CISCE Interschool Robotics Competition (IRC) SubNationals (Mumbai) 2024
- Vivo Ignite SubNationals (Top 200 out of 4200 teams) 2023

## COMPUTER SCIENCE EXPERIENCES AND PROJECTS

**Internship - DRONA Cyber Solutions** — **Ahmedabad, India**
*Core Cybersecurity and SOC intern* — *May 2026 - June 2026*

- Completed a cybersecurity internship with hands-on exposure to Security Operations Center (SOC) operations and security workflows.
- Built a foundation in network security, Vulnerability Assessment and Penetration Testing (VAPT), and basic ethical hacking techniques.
- Explored multiple domains of digital forensics, including cloud, mobile, and memory forensics, and gained practical insight into threat detection and incident response.
- Developed an understanding of real-world security challenges and the tools and methodologies used to address them

**Low-Cost Brain State Classification - Brain Computer Interfaces and Machine Learning**
Published - *"Design and benchmark evaluation of a low-cost single-channel EEG framework for attention–relaxation classification"* - Journal of Engineering Research [**Q1, Elsevier**] *October - February 2026*

- Developed a sub-$35 wearable electroencephalogram (EEG) system, reducing hardware costs by over 94% versus standard commercial devices while capturing raw cognitive signals at 80-100 Hz
- Curated a dataset of 400 seconds from 10 participants, utilizing standard serial communication to log raw analog-to-digital signals directly without applying hardware offset corrections
- Evaluated five machine learning models on raw data to achieve 56% test accuracy, demonstrating a measurable 6-point improvement over random chance with 0.55 ROC-AUC values [published]
- Demonstrated practical feasibility by integrating the predictive models into an online car simulator, utilizing classified attention and relaxation states to control acceleration and braking dynamically

**Integrated Assistive System for the Visually Impaired – Applied Machine Learning and Artificial Intelligence**
Published - *"An Integrated Jacket–Helmet Assistive System for Visually Impaired Individuals Using YOLO-Based Object Detection, Depth Estimation, and OCR"* - American Journal of Computer Science and Technology *April – October 2025*

- Developed a custom Python pipeline on a Raspberry Pi 4B and implemented YOLOv8 after evaluating various models to deliver 93% accuracy and 15 frames per second for detecting surrounding objects
- Achieved under 0.5-second system latency by writing scalable code that integrated depth estimation, optical character recognition, and audio modules into a single edge device
- Secured a design patent for a paired jacket and helmet design, which is also low-cost, validating the system with visually impaired individuals to achieve an 84.6 System Usability Scale score during real-world navigation trials [published]

**Ongoing - Anatomically-Guided Deep Learning for Robust Brain Tumor Segmentation: Reducing False Positives via Prior-Informed Attention on the BraTS Benchmark**

- Building a 2D/3D U-Net baseline on the BraTS multi-modal MRI benchmark (T1, T1ce, T2, FLAIR), targeting standard segmentation metrics (Dice, IoU, Hausdorff distance) as a comparison point for subsequent architectures
- Designing a prior-informed attention module that incorporates anatomical structural priors into the network, aimed at reducing false-positive segmentation regions relative to the baseline
- Benchmarking the proposed model against advanced architectures (Swin-UNet, UNETR) and running ablation studies to isolate the anatomical prior module's contribution to performance

## PUBLICATIONS

1. K. Ruparelia, P. Parikh, P. A. Shah, and D. Roy, "Design and benchmark evaluation of a low-cost single-channel EEG framework for attention–relaxation classification," *J. Eng. Res.*, in press, doi: 10.1016/j.jer.2026.06.022.
2. K. Ruparelia, P. Parikh, and P. A. Shah, "An integrated jacket–helmet assistive system for visually impaired individuals using YOLO-based object detection, depth estimation, and OCR," *Am. J. Comput. Sci. Technol.*, vol. 8, no. 4, pp. 189–205, 2025, doi: 10.11648/j.ajcst.20250804.13.

## PATENT

**Integrated Assistive System for the Visually Impaired – Applied Machine Learning and AI**

- Recognized for innovation with a **granted patent from Intellectual Property India** for the system's design and methodology.

## LEADERSHIP AND EDUCATION

**Hyperbloom Hacks [website]**

*Founder* *September 2025 – Present*

- Founded a virtual hackathon initiative to address gaps in youth computer science education, scaling reach to 220 students across 19 countries through structured online and offline events
- Led a team of four to coordinate and conduct the events, securing 19,000 rupees in funding to incentivize participation and innovation focused on financial literacy and sustainability
- Invited industry professionals, including a senior Amazon engineer, to mentor participants and evaluate submissions, yielding impactful student projects like rural education tools and AI-driven debugging programs.

**TIDE Foundation Social Changemaker Fellowship**

*Fellow* *September 2025 – Present*

- Authored "Triangle Squad – Adventures in Trigonometry," an illustrated mathematics book designed to introduce students in Grades 5–8 to trigonometric thinking through real-world examples and storytelling before they formally encounter the subject in high school, helping them learn the concept intuitively rather than through only formulae.
- Interacted with Students from multiple schools before writing the book to understand common misconceptions and thinking patterns in students that I could address
- Applied evidence-based educational design principles—including scaffolded learning, inquiry-based learning, and contextual problem-solving—to strengthen conceptual understanding before introducing symbolic notation and formula-based methods.

**Senior Prefect- Anand Niketan** *2022-23*

## SPORT ACHIEVEMENTS

**National Soccer Player**

*CISCE National Games* *2023, 2024, 2025*

- secured runners up nationwide in 2024
- Consistently selected for 3 years as a part of the U17 girls team representing Gujarat-Rajasthan (NorthWest region) at the National level at the CISCE National Games

**Athletics Federation of India Certified Athlete**

- Recognised by AFI, one of the highest recognitions in India for track & field and javelin

**Khel Mahakumbh** (State level Multi-Sport Championship, Organized by Government of Gujarat) *2022*

- secured 3rd Position football

## ACADEMIC DEVELOPMENT

**New York Academy of Sciences – Junior Academy**

*Student Researcher* *September 2025 – December 2025*

- Selected for a highly competitive global program (~10% acceptance rate)
- Collaborated with a team of 6 high schoolers from across the world and developed a BIPV and floating solar based solution for the probelm statement " To design an innovative and scalable solution to improve electrical infrastructure and/or energy storage technology in order to make solar energy use more reliable, efficient, and economical for meeting the energy demands of technology and society."

Course: IIT Madras CODE - Introduction to Data Science and AI
Course: CodeLQ by IIT Bombay Techfest - Python Programming Beginner
Course: Harvard CS50 Computer Science
Course: Harvard CS50 Cybersecurity
Course: AI Essentials by The Innovation Story

## SKILLS & INTERESTS

**Technical Skills:** Java, Python, Data Science, Computer Vision, Robotics, Embedded Systems, AI/ ML

**Interests:** Cybersecurity, AI, ML, Brain-computer interface (BCI), LLM and NLP models

**Other Skills:** Harmonium, Flute [bansuri], Ukulele, Lawn Tennis, Soccer, Javelin Throw