

# PRATYUSH SINGHAL

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## EDUCATION

Neerja Modi School, Jaipur

2014 - Present

### Grade 9 & 10 IGCSE

**Grades: 9 A\* and 1 A** (1 of 5 students to take 10 subjects)

**Coursework:** Physics, Chemistry, International Math, Additional Math, Computer Science, Economics, Global Perspectives, English Language, English Literature, Hindi

### Grade 11 & 12 IBDP

**Coursework:** Math Analysis and Approaches HL, Economics HL, Physics HL, Chemistry SL, French AB Initio SL, English Language A: Language and Literature SL

## STANDARDIZED TESTS & APs

SAT - **1570** (Evidence-Based Reading & Writing: **770**; Math: **800**)

AP Computer Science A - 5

## ACADEMIC HONORS & AWARDS

*School:*

- Received **Academic Excellence** (2021-2024) - Top 5% of 436 students
- **Subject Topper** for Chemistry, Physics, Computer Science, and Hindi in IGCSE Grade 10
- **Subject Topper** for Physics HL and French ab Initio SL in IBDP Grade 11
- **Leadership in Innovation Award (Top 1 of 436):** Honored for dynamic leadership and transformative contributions to the school community

*International:*

- Secured **Rank 85 among 3 million+ participants** at the ICode Global Finals 2024
- **All India Rank 3 and Finalist** in the American Invitational Mathematics Examination 2023 and 2024 respectively
- **All India Rank 38** in Annual Sir Isaac Newton Exam by the University of Waterloo (2024)
- **Distinction & Bronze Group** in Fermat Math Contest by the University of Waterloo (2024)
- Awarded **Silver medal** at Singapore Mathematics Competition (2022)

## ENGINEERING & TECHNOLOGY EXPERIENCES

*Innovation:*

**Founder, LeafPulse** ([Link](#))

2023 - Present

- Built an AI model that uses microscopic leaf images to determine crop water needs and optimize irrigation decisions with >92% accuracy. Collected a primary dataset of 100+ micrographs and collaborated with local agricultural research centers to use my model on trial, helping 50+ farmers
- Presented at the International Conference on Science, Engineering and Advanced Technology (ICSEAT2024). Publishing in SpringerLink. Top 12 in India Innovation Challenge 2023. Featured in national news media

**Product Developer, PestID** ([Link](#))

2024 - Present

- Built a computer vision model for crop pest detection. Installed in IoT networks across 30+ farms in Chhareda village for real-life validation
- Tweaked dense blocks, transitional blocks, and compression factor to improve the DenseNet 121 model. Leveraged ESP32, Raspberry Pi, and OV5467 camera module for hardware setup. Patent published in India.

**Project Assistant, Aatmanirbhar Bharat** ([Link](#))

2020 - Present

- Collaborated with the village council to build 300+ farm ponds. Developed digital elevation and ML-based rainfall prediction models to optimize pond location and size. Visited rural regions of India as part of exploratory trips to understand India's problem landscape
- Raised \$100,000 as CSR from Hero MotoCorp and increased farmers' incomes twentyfold

**Co-Founder, ArtInnovate** ([Link](#))

2023 - Present

- Partnered with traditional artisans to showcase their paintings on a global scale. Leveraged ML and web-scraping for art appraisals to ensure fair prices. Collaborated with three art galleries for 10,000+ images in training dataset. Partnered with 16 artists to sell 400+ art pieces, generating \$5,000 in sales.
- Ranked in the top 3 startups by The Indus Entrepreneurs (TiE) Rajasthan, leading to funding. Recognized by the Government of India as one of the top 500 startups out of 180,000 entries at Youth Ideathon 2024

**Innovator, AquaConnect at World Robotics Olympiad (WRO) Nationals** ([Link](#))

2023

- Prototyped a novel method to transport ships over elevated topography through water level control chambers, utilizing servo motors, ultrasonic sensors, Arduino boards, and hydraulic actuators.
- Secured All India Rank 10 & Silver Badge at WRO Nationals 2023

- Co-Founder & CEO, Hetok ([Link](#))** 2021 - 2022
- Created a compact, portable sterilizer for utensils in local hospitals and restaurants during COVID-19
  - Awarded the Best Pitch by TiE Rajasthan 2022
- Inventor, Filament Maker** 2023
- Designed an auto-peel device to convert plastic bottles into 3D-printable filaments, learning about circular economy
- Research ([Link](#)):**
- ‘Advanced Sentiment Analysis and Topic Modeling on Indian Union Budget 2024’** 2024
- Created a novel dataset of 4,500+ budget-related tweets, analyzing public sentiment and identifying key issues using six different ML models to provide actionable insights for policymakers.
  - Under review at IEEE ICSC 2025
- ‘Enhancing Security and Privacy in Large Language Model-based Approaches’** 2023 - 2024
- Enhanced security and privacy in large language models by fine-tuning Llama-2 on a custom dataset with 500+ prompts to automatically respond with 'I can't answer this question' for personal data inquiries.
  - Published in International Journal for Multidisciplinary Research (IJFMR)
- ‘Inner Product Approach to Generalize the Notion of Pythagoras Theorem for Normed Spaces’** 2023 - 2024
- Conducted research on applications of Pythagoras theorem beyond right-angled triangles and its generalization in higher dimensions, using concepts like vector spaces, norms, and orthogonality.
  - Published in International Journal of Advanced Engineering, Management and Science (IJAEMS)
- Material Science Student Research Intern under Dr. Rahul Patwa** 2024
- Prepared reduced graphene oxide by Hummer's method and examined its efficacy in water pollutant removal
  - Applied advanced instrumentation techniques (FTIR, SEM, TEM, AFM) to analyze structural, thermal, and chemical properties of graphene

## INTERNSHIPS

- Policy Making under Mr. Yash Agarwal, CEO of Public Policy India** 2023
- Learned the fundamentals of policy construction and evaluation methods. Presented a water consumption policy proposal to 50+ students, tackling the issue of water scarcity in rural parts of India.
- Business Consultant Intern at Accenture ([Link](#))** 2022
- Worked for 12 hours under supervision of Mr. Sumit Gupta to investigate the Indian pharma industry
  - Prepared a consulting deck for SunLife Pharma to optimize the allocation of its 400+ medical representatives
- Digital Marketing Intern at The Blunt (Indore, Madhya Pradesh)** 2023
- Selected by the Indian Institute of Management, Ahmedabad (IIMA) for a one-month digital marketing internship program. Designed 30+ social media posts, enhancing content engagement by 10%

## MENTORING & OUTREACH

- Deputy Head Boy, Student Council at Neerja Modi School** 2024 - Present
- Led a team of 60+ to oversee 5,000+ students. Organized \$4,000 fundraiser to support workshops on precision agriculture
  - Facilitated 4 exchange programs, promoting cultural exchange and leadership development among students
- Co-President, Computer Science Club at Neerja Modi School** 2023 - Present
- Mentored 100+ students on foundational AI principles, focusing on NLP, CNN models, and neural networks, while conducting hands-on workshops on binary computing, SQL, and data structures
  - Hosted ‘Code for Good’, a national hackathon with over 300 participants from 17 schools, focusing on applications of artificial intelligence to solve real-world problems. Secured \$2,000 in sponsorship funds
- Co-President, Engineering and Innovation Club at Neerja Modi School** 2023 - Present
- Mentored 80+ students in design-thinking workshops. Created an innovative solar desk for school fields, providing shade, electricity, and lighting to create functional outdoor workstations
  - Organized the NMS STEM Fair, engaging 100+ participants to showcase sustainable engineering projects
- Co-President, Science Scape** 2023 - Present
- Led five-member team to manage a scientific journal, publishing 10+ original research papers across diverse topics, including genetic engineering, music theory, and machine learning
  - Engaged peers in latest discoveries and science topics through 30+ podcast episodes
  - Designed a curriculum blending art and music to teach complex STEM topics in an engaging manner
- Advocater, Algorithmic Bias Podcast ([Link](#))** 2024
- Launched a campaign for awareness on data bias impacts through a 12 episode podcast series, interviewing experts and analyzing 8+ case studies to explore root causes and solutions to mitigate data bias in real-world contexts

## **VOLUNTEERING**

### **Co-Founder, Project Amaya ([Link](#))**

2022-2023

- Launched an NGO to combat period poverty and promote feminine hygiene, reaching 200+ middle school girls through 10+ impactful online and offline workshops
- Led \$500 fundraising, gathered 100+ petition signatures, and collected 200+ survey responses to successfully install a pad machine in school

### **Umang**

2023 - 2024

- Assisted in skill development for children with mental disabilities. Extended the Filament Maker project to create 3D-printed sensory toys and tools from recycled plastic filaments

## **EXTRACURRICULARS**

### **Columbia Symposium**

2024

- Engaged in a 3-week symposium by Columbia University, analyzing *Mencius*, *Agamemnon*, and *Life of Buddha* through cross-cultural discussions that highlighted the universal themes in ancient wisdom.
- Gained a deep appreciation for global perspectives through cross-world and cross-text analysis

### **Guitar**

2018 - Present

- Trained under a professional for 5+ years, performing in 3 school orchestras for audiences of over 500
- Created a student-study playlist to enhance focus on IB sciences and math, helping my school community.

## **SKILLS**

- Proficient in English and Hindi
- Coding in Python, Java, C++; Familiar with Arduino IDE, Tensorflow, and Keras
- Proficient in academic writing and using tools like Google Scholar and LaTeX