Rayan Upadhyay

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Rayan is a Grade 12 IBDP student with a deep interest in the intersection of AI, machine learning, and linguistics. With a track record for research publications, he has built full-stack applications and applied ML systems to build tech solutions driving business growth and social impact.

Research & Publications

Fairness and fidelity in synthetic loan data

- Investigated the ethical and technical risks of synthetic data in automated loan approvals, using German credit data. Developed a custom "dependency preservation score" to quantify structural fidelity across methods
- Findings concluded that original data with fairness-aware pre-processing outperforms synthetic alternatives
- Awarded individual Gold CREST Award by British Science Association.
- Published in the National High School Journal of Science (NHSJS) subsequently - https://nhsjs.com/2026/fairness-and-dependency-preservation-in-synthetic-credit-data/

Emotions at the gate -Emotion-specific neuron clustering in LLMs

- Built a custom dataset of ~16000 Chinese texts to understand how LLMs interpret six emotions. Mentored by an IISC Bangalore Ph.D. scholar on the research
- Findings revealed that LLM processed emotions systematically -negative emotions relied on smaller consistent groups of neurons, while positive ones used flexible context-dependent pathways
- White paper was submitted to S.T. Yau Awards Asia 2026 and subsequently published in Journal of High School Science (JHSS) - https://jhss.scholasticahq.com/article/175619-emotion-associated-representations-in-the-feed-forward-gates-of-a-language-model

Applications (Tech for Good)

AgriBridge (Multilingual android app for small-holdings farmers)

- Engaged with farmers to understand needs and developed a use-case to get them access to government schemes, produce specific market opportunities and credit information in vernacular
- Raised INR 1,23,000 through a fundraiser to fund the development of the app and chat-bot
- Validated features with NABARD, Farmer Producer Organisations (FPOs) and Seva Kendras to improve awareness and acceptance
- Currently testing the app with 100 farmers in 4 languages- English, Hindi, Marathi and Kannada
- Presented project at the 64th UN Commission for Social Development (New York) as 1M1B Changemaker and invited to share the journey at the 10th 1M1B Impact Summit, Geneva

Mandalink (www.mandalink.org)

- A tool that helps learners master 5000 Chinese radicals using interactive flashcards, timed challenges, animated and audibles stroke-order, customisable practice sheets and engaging leaderboards. Schools can track student progress with Free Lifetime Access
- Full-stack development and App owner. **Received TISB Principal's Commendation for the effort**

Work Experience : **Machine Learning intern** at Volo Health (Dec 2025 to Mar 2026)

- **Under the guidance of their CTO and technology team, evaluated coding approaches, developed some code and tested, solutions for three key use-cases:**
    - **Document Classification and checking claims' completeness** using LLM approaches
    - National **ID extraction** using OCR to support Central Know Your Customer (CKYC) needs
    - **Document masking (Aadhar privacy)** to support regulatory compliance using Python-based computer vision and image-processing libraries

Academics

- Pursuing **IBDP Diploma (Grade 12)**: Mathematics AA, Physics, Chemistry at Higher Level (HL) and Economics, English Language & Literature and Chinese B at standard Level (SL)
- **Cambridge IGCSE (Grade 10)**: Additional Mathematics, Physics, Chemistry, Biology , Computer Science, Mandarin, Economics, English Literature, Language and Drama.
- **AP Computer Science A (Java)**: Score5

Technical Skills, Certifications & Enrichment Programs

- **Languages & Tools:** Python, Java, Streamlit, pandas, NumPy, OpenCV, PyTesseract, TensorFlow, Keras, scikit-learn, matplotlib, seaborn, Figma, OCR, LLM workflows, computer vision, data analysis.
- **Completed three Pierian training** (60+ hrs) **certifications** in Python, ML and , Computer Vision. Attended two -week AI program by Inspirit AI with trainers from MIT and Stanford.
- **Attended residential programs** in Business and Economics at NUS Singapore and International Schools Theatre Association's symposium held at Chiang Mai, Thailand.

Leadership & Extracurricular

- **Website Design and Development** for TISB **MedCon 2026,** India's first student led medical conference - https://medcon.tisb.org/
- Member of **TISB Swim team** (since Grade 3) with medals in IMs , backstroke and relay
- **School Tech Magazine (Bash) Co-owner** : Authored articles on AI and emerging technologies
- **School Hackathon**: 4th place in TISB hackathon, middle school
- **Robotics**: Youngest Rookie Team at FIRST Tech Challenge in Grade 7, runners-up for Innovative Robot Design in Grade 8