Shrugal Vinod

AI/ML Student Developer · Climate & Aviation AI · Football Intelligence

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Grade 9 student at Indus International School, Bengaluru, who builds and ships AI systems end to end. Team lead of **STRATUM**, a satellite-checked climate tool now in the **Conrad Challenge Innovation Stage**, and creator of **MatchMind AI**, a football tactics platform presented across the MIT and Boston ecosystem. National champion in Under-14 football.

SELECTED HONORS

Conrad Challenge 2026–27: advanced to the Innovation Stage · team lead, STRATUM — Oct 2026
AI Fellowship for Young Global Innovators, Boston Immersion, Cohort 2026 · The Innovation Story — Jul 2026
Certificate of Excellence, AIF Project Studio (AIFGYI 2026) · with IIT Delhi's Technology Innovation Hub (IHFC) — Jun 2026
Recognized, MIT Lemelson Program — 2026
69th National School Games 2025–26, Football Under-14 Boys · Umaria, Madhya Pradesh — Dec 2025
1st Position, ISSO National Games 2025–26, Football Under-14 Boys · Indore — Sep 2025

PROJECTS

STRATUM · Climate & aviation AI · team lead, team of four — Oct 2026 – present

stratum.aerospaceonyx.workers.dev · github.com/ShrugalVinod/stratum

- Forecasts the long-lasting aircraft contrails that warm the climate over India, from ERA5 weather data and contrail physics, and gives **live altitude advice** to avoid them.
- Built a satellite contrail detector in PyTorch (pre-trained on Google's OpenContrails, fine-tuned on DLR expert-labelled Meteosat scenes): **pixel Dice 0.64**, against about 0.72 for a single human expert.
- Matched Meteosat-9 contrails to the flights that made them (wind drift, parallax correction, two-image rule), measured chance matches with a wrong-day test, and **pre-registered** every hypothesis.
- The learned model ranks contrail risk far better than physics alone (**AUROC 0.65–0.83 vs 0.42–0.66**). Live site with real-time advice, a 3D sky replay and a daily forecast report card, automated with GitHub Actions on Cloudflare Workers.

MatchMind AI · Football tactical intelligence — 2026

matchmind-ai.onrender.com

- Full-stack web app (React, Node.js/Express) that turns one uploaded match video into a complete tactical report: formations, pressing, individual player performances and coaching recommendations, using a multimodal AI model.
- **~2.5 min** average analysis, automatic 3-key failover and streaming uploads; presented to researchers, founders and professors in Boston in 2026.
- Separately prototyped an offline detection-and-tracking pipeline (RF-DETR fine-tuned on SoccerNet-Tracking, with a custom tracking layer).

HelixForge · Computational biology — 2026

huggingface.co/spaces/Shrugal/helixforge-demo

- Generates new antimicrobial peptides and screens them for activity and toxicity (ESM-2, PyTorch, scikit-learn), checked with **homology-disjoint evaluation**; runs entirely in the browser (ONNX Runtime Web, Transformers.js).

Earlier: MediQuick AI (healthcare chatbot) · NutriTrack AI (calorie tracking and personalised diet plans)

MENTORSHIP & EXPOSURE

Presented MatchMind AI during the 2026 Boston Immersion to **Ramesh Raskar** (MIT Media Lab), **Vladimir Bulović** (MIT.nano), **Ed Moriarty** (MIT Edgerton Center), **John Werner** and **Abhishek Mehta** (Tresata), among others.

STRATUM work shared with university contrail researchers, who gave detailed technical feedback.

ATHLETICS & LEARNING

Football: national champion (ISSO, U-14); competed at SGFI and KSFA tournaments; school team.

Tennis and horse riding: developing.

Python Using AI Workshop, AI For Techies, Feb 2026.

SKILLS

Languages	Python, TypeScript, JavaScript
Machine learning	PyTorch, computer vision (segmentation, detection, tracking), multimodal AI / LLM integration, protein language models (ESM-2), scikit-learn
Data & science	Satellite and weather data (Meteosat-9, ERA5), geospatial analysis, pre-registered experiments, bootstrap statistics
Web & deployment	React, Preact, Node.js/Express, Three.js, MapLibre, Cloudflare Workers, GitHub Actions, Render, Hugging Face, Git