Arjun Sharma

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Education

California Institute of Technology — Pasadena, CA

Bachelor of Science in Computer Science — *Expected graduation: May 2028*

- Relevant coursework: Intro to Programming, Intro to CS Research, Single and Multi-Variable Calculus, Linear Algebra*, Programming Methods (Data Structures & Algorithms)*, Software Design*, Signal Processing*

*: scheduled coursework

The Shri Ram School, Moulsari — Delhi NCR, India

*Valedictorian (2×); sole recipient of IBDP Icon Award; IBDP 43/45; IGCSE 10/10 A** — *May 2024*

- IB Extended Essay: Signal processing paper about Fast Fourier Transforms for audio recognition; implemented Python program to hash & identify 10-second clips; achieved 96.9% accuracy (83% with 1:1 background noise)
- President of Computer Club: school hackathon team captain (won 4 events, developed apps with Python, Django, & Flutter); organized ShriTeq 2022: intl. technology competition with 1000+ participants & 51 schools across 14 events; proposed & implemented new ranked-choice voting system for 17+ biannual student government elections

Experience

Machine learning & radio astronomy first-author research — June 2023 – July 2024

Supervised by Dr. Vinesh Maguire Rajpaul (University of Cambridge)

- Identified for the first time the applicability of positive and unlabelled machine learning techniques to study repeating fast radio bursts; flagged 66 (18 new) repeater candidates in the CHIME/FRB catalog
- Presented findings at the 2023 Massachusetts Institute of Technology URT Conference (IEEE); expanded paper published in the Monthly Notices of the Royal Astronomical Society, arXiv:2408.11436
- Trained, optimized five PU classifiers; improved recall by 4.62% and outperformed past work on key PU metrics

Machine learning & full-stack software engineering intern — June 2022 – Dec. 2022

BAM.money Inc. — *Remote / New York City*

- Developed four new features for a Python natural language processing webscraper that extracts market insights from 200k+ news articles/day; deployed to containerized Linux systems using Docker and AWS ECR; implemented interfaces for features with NodeJS, React, and AWS EC2
- Implemented rapid offline extractive text summarization using TF-IDF for all news articles; refactored algorithm to filter articles and identify buzzwords with `spaCy` and `nltk`; enhanced weighting of articles and authors with machine learning regression algorithm to penalize biased language
- Developed object-oriented program to asynchronously identify terms driving daily market sentiment for F500 stocks

Awards

ISEF Team India: 1 of 20 projects from 22200+ submissions selected for the Intl. Science & Engineering Fair 2024

Gold Medal, UK Mathematics Trust Senior Math Challenge 2023: Top 6% of test-takers worldwide

Global Finalist, EY Sustainability Challenge, 2023 World Series of Innovation: 1 of 10 finalists; pitched prototype and market plan for a Django biodiversity management application to auto-generate QR codes about local flora

Projects

EduDaan | *Python, Django, Django REST Framework, Dart, Flutter, AWS S3* — GitHub

- Developed full-stack app with Django and Flutter mobile app to connect students & schools to volunteer tutors
- Built REST API for serializing & transmitting PostgreSQL data to mobile app, JSON Web Token (JWT) authentication management, real-time chat with Firebase Firestore, autogenerated meetings with Zoom API
- Won Govt. of India Smart India Hackathon 2022: 1 of 5 national winners in the education category; 1 of 50 winners from 3000+ submissions; $300 funding from Indian Ministry of Education

TSRS Puzzle Hunt Web Platform | *Python, Django, TailwindCSS, PostgreSQL* — GitHub

- Developed online platform to host annual collaborative puzzle-solving event; served 300+ simultaneous users 3x for 72+ hours; logged 15k+ submissions in SQL database; implemented synchronisation between clients, anti-cheating, moderation tools; automatic switching between four game modes; API calls from embedded hardware devices

Skills

Languages: Python, JavaScript, Rust, Dart, Java, Bash, Julia, Wolfram Language, HTML/CSS

Technologies: Tensorflow, Keras, PyTorch, scipy, Django, Flask, Flutter, AWS, Docker, SQL, TailwindCSS, Git