Vedant Saraswat

 vedantiitkgp | pitess100 | vedantntpc@gmail.com | +91.9647098953

SUMMARY

Graduate student of Mechanical Engineering Dept. IIT Kharagpur and Amateur Software Engineer skilled in the area of ML, NLP and Software Development solving problems and creating wonders with AI.

EDUCATION

Indian Institute of Technology Kharagpur   July 2017 - Apr 2021

– B.Tech(Hons.) in Manufacturing Science and Engineering (CGPA : 8.00/10.0)
– Minor Courses in **Computer Science** - Programming and D. Structures, Algorithms, Social Computing, Image Processing, Probability and Statistics, Advanced calculus, Computational Number Theory
– Awarded **RK Bramha Cup** for the Best final year(Tech) and an **appreciation letter** from Director.
– Department rank 3

WORK EXPERIENCE

Software Development Engineer   June 2021 - present
MX Player (Web & Games Team)   Link to Website

– Built **India's most viewed OTT app**, MX Player, completely from scratch with a customized workflow approach. for various web platforms (mobile/desktop) and operating systems (LG/Samsung).
– Worked with the **VideoJs library, Widevine license, and Dynamic Ads Insertion (DAI)** to create a core HLS Streaming Player with inbuilt DRM protection and multi-layer ads.
– Created a User Authentication and subscription flow along with Rest API support on Java and **payment service Just-pay** for user management on the platform.
– Proposed and programmed an adaptive **machine learning recommendation system** that handles functionalities such as Continue Watching and Content Recommendation.
– Constructed a large number of internal games modules that handle continuous integration and deployment (CI/CD) of Games correlating their versions with GitHub API

Tech Stack - Frontend (Typescript, React), Backend(NextJs, Java), DevOps(Jenkins, NewRelic), ML

INTERNSHIP/RESEARCH EXPERIENCES

Software Development Intern (TCDA Sable TPS Estimation)   Apr 2020 - June 2020
Amazon Transportation Tech team - Mr Shreekant Mandke   Link to Website

– Developed a back-end module in **Spring** for improving errors for clients joining the platform in fleets.
– Handled multiple databases and client sheets of Sable using **Postgres Database** to monitor and display discrepancies between container and Database API Calls on front-end built using JSP and Vanilla JS.
– Designed an algorithm to assimilate the TPS parameters and decreased the latency for **TCDA** portal.

Data Analytics Intern (VOIP workflow error prediction)   May 2019 - June 2019
Tech Mahindra IBUTUS team - Mr Sandeep Agarwal   Link to Website

– Visualized 100 advanced features from 3 lakh+ instances using pandas extracted from their cloud server.
– Correcting the **Label Imbalance problem**: Implemented both label and label-powerset specific oversampling and under-sampling algorithms that decreased the value of the IRlbl and CVIR per label.

- Used Cost-sensitive learning methods to improve Label Concurrence issues, achieving a **15% decrease in SCUMBLE** value per instance.
- Incorporated ML-ENN, REMEDIAL, and ML-SMOTE algorithms working on the multi-label implementation of the **Imbalanced-learn** library.
- Contrasted different Keras and Sk-multi learn models improving precision and recall of neural networks by 35% using Ensemble and Data Enrichment Techniques

Machine Learning Intern (Grain Quality Assessment)   Dec 2018 - Jan 2019

AgNext Research Lab - Proff Mrigank Sharad   Link to Website

- Deployed Open CV for removing Background Noise and improving edges with foreign matter using **Otsu thresholding and RCNN** for 50 sheets per category for 4 categories of maize.
- Tuned **Mobilenet CNN** model on Keras Framework using the concept of Transfer Learning with a 45:2:2 layer approach for developing the workflow.
- Improved Model recall and F-score from **60 % to 86 %** using data augmentation and Blob detection techniques during preprocessing .

IOT Researcher (Development of Smart IOT Environment)   June 2021 - July 2021

University of Bari Aldo Moro - Proff Guiseppe Desolda   Link to Website

- Researched in areas of **task automation systems (TAS)** while configuring the tile-card systems and programming smart devices for the development of a smart IoT environment.

ACHIEVEMENTS

- Secured a AIR 3625 in IIT-JEE Advanced : Under **0.3% out of 1.5 million students** .
- **Silver Medallist** in Mathematical olympiads across colleges and Bronze Medallist in **Open-IIT Maths Olympiad** with the syllabus on lines of **IMO**.
- Qualified for Indian National Physics and Maths olympiads (INPHO, INMO) by being **among top 500 students** in India.
- Received the **KGP Innovation cup** for exemplary performance in Product design and Data Analytics competitions in General Championship.
- **National Finalist** in AbInbev Maverick, IBM, and American Express Machine Learning Hackathons.
- Recipient of **KVPY** and **Vigyan Paheli Scholarship** from the government of India in 2017.

PROJECTS

Electricity Demand Forecasting, Fractal Analytics   Link to Repo

- Performed exploratory data analysis linking over 3 meters of consumption Data for each building in Delhi NCR and experimenting new features through statistical t-tests.
- Tested various statistical and Deep learning model pipelines improving Evaluation Metric scores from 45.82 to 19.9 using **ARIMA and GRU stacking**.
- Prepared a Data-driven report of the energy forecast on 5 corporate buildings over a long period.

Smart Chat Assistant, AB InBev   Link to Repo

- Developed a **multi-client proactive chatbot** that suggests and assists users in daily activities and enabled news integration aiming at Nudge Marketing.
- Scaled on the professional front for handling numerous low-risk business affairs from workforce planning to logistic optimization in a COVID-19 scenario.
- Built an interactive interface and implemented **webhook service** deploying API with **Dialogflow** fulfilling multiple use cases by identifying context.

Personality type and Suicidal prediction, Bachelor Project (Dr Pawan Goyal) Presentation

– Researched different personality/suicidal ideation detection models and reviewed literature on analyzing personality using types various social media platforms..

– Extracted various multi-modal characteristics like Linguistic, Visual, and Social Network features creating a database and correlated their personality with Facebook profiles of My Personality Dataset.

– Deployed **Time aligned LSTM + Transformer network** on self-extracted college student social media dataset estimating their Big-Five Scores and assesing them on parameter of Neuriticism.

Doctor's Prescription Scanner Link to Repo

– From the scanned version of the prescription, a handwritten character recognition will capture the data (name of the patient, symptoms, findings, prescription of medicine, tests etc.) written by the doctor.

– Created a 5-layered system comprising model processes from Image segmentation **(Tesseract OCR)** to **sloppy handwriting correction** and assembled a web interface in the docker environment.

Driver Drowsiness Detection Link to Repo

– Used OpenCV Computer vision for the detection of drivers' drowsiness with help of **Eye Aspect Ratio (EAR) and YAWN** values .

– Proposed approach with **GAN and Haarcascade library** that does not rely on any meta-data about the race or ethnicity of individuals denying algorithmic unfairness or bias.

Bio-mechanics and Mechanics of Composites - Term Project Paper — Link to Repo

– Studied the **inverse dynamics estimation of musculoskeletal forces** and produced a python code that gives us the reaction forces, moments, and angular acceleration along with the associated plots.

– Created a series of simulations routines on composites based on **Classical Lamination Theory** also running checks with Hashin failure criterion to test onset damage of laminates.

INNOVATION/PRODUCT DESIGN EXPERIENCES

Green Droid - Autonomous Lawn Mower Link to Report

– Designed an autonomous lawn mower and seed-sowing robot with a Deep learning model for **abnormal grass growth detection** and dumping waste at specified loactions.

– Integrated various sensors and actuators using **Raspberry PI and the Robot Operating System** with programming waypoint generation and path-finding algorithms.

Pharmassist - Medical Dosage Stamper Link to Report

– Multipurpose medical dosage printing device that fills in the literacy gap between pharmacist and patient using compelling symbols on the medicine envelope.

ReCPRation - Auto CPR Equipment Presentation

– Lightweight Mechanical equipment that delivers life-saving CPR in a combination of gear-pulley system and suction device under critical situations of heart attack or failure (Working on this Patent).

Vendelay - Snake Bite First Aid Presentation

– Post snake bite device with inbuilt **Pressure immobilization** that prevents the flow of venom directly to the heart, meanwhile absorbing multivalent anti-venom and **Nitrous oxide** on the affected area.

PUBLICATIONS

Saraswat, Vedant and Atharva Aggarwal (Nov. 2023). "Driver Drowsiness detection using AI". In: *IJCV* 99.18, pp. 2200–2300. URL: https://some-link.com.

ACTIVITIES & LEADERSHIP

Technology Transfer Group, IIT Kharagpur - Coordinator [Certificate]
- Technology Transfer Group (TTG) is a students' initiative under the aegis of Sponsored Research & Industrial Consultancy, IIT Kharagpur, which believes in the potential of the Institute as a premier Research & Development center.
- We act as a link between the industry and the academia to facilitate the transfer of industry-ready technologies and represent IIT Kharagpu
- Working as a bridge between professors and students of IIT Kgp, created a **UG Portal** for projects.
- Successfully organized multiple workshops on **patent rights and IPR** intellectualizing the students.
- Lead a team of 10 members spearheading Publicity and Logistics for **TEDx IIT Kharagpur** 2019.

CRY, IIT Kharagpur - Volunteer [Website]
- We, under the IIT Kharagpur Volunteer Chapter, have taken some initiatives like the Mid-day meal project, **Barrier-Free IIT Kharagpur project**, etc.
- Taught over 3 months subjects like Maths and EVS to small underprivileged children of KV Kharagpur.
- Conducted multiple **RTE campaigns** to promote the Education act and other education policies.

Chess and Table tennis
- Table Tennis: **State-level player** and one of the top players in my university team securing multiple victories in intra-college tournaments.
- Chess: Master of **Ruy Lopez** and the **London System**, achieved an ELO rating of **1800** in 2022.

Technology Events Secretary - RP Hall [Certificate]
- Managed a Budget of INR. 30,000 across various technical events under echnology General Championship securing 1st position for the Hall.
- Captain of Data Analytics, Maths Olympiad, and Product Design Team was awarded **Hall Blue**.

Carboncopies Foundation - Part-Time Researcher [Website]
- Worked with Dr. Randal Koene on the **Braingenix project** to build a distributed computational neuroscience platform that explores the possibility of the whole brain emulation.

SKILLS

Languages/Scripts	C, C++, Python, Go, Java, Javascript, Typescript, Octave, Matlab, HTML, Bash
Libraries	OpenCv, Numpy, Pandas, React, NextJs, Tkinter, Spacy, NLTK, Beautiful soup
Frameworks	Tensorflow, PyTorch, ROS, Selenium, Flask, Django Spring, NodeJs
Databases	MySQL, PostgreSQL, Cassandra, MongoDB
Operating Systems	Windows, Ubuntu, Kali, Mac, Arduino, Raspberry Pi, Samsung Tizen, LG Web OS