Prajwal Kishor Kalpande | **200070028**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 1/6/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	Maharashtra State Board	Pragnya Junior College	2020	90.15%
Matriculation	Maharashtra State Board	Swami Vivekanand Rashtriya Dnyanpeeth	2018	98.60%

Pursuing a **Minor** in **Computer Science and Engineering** from the Computer Science and Engineering Department

Scholastic Achievements

- Secured a percentile of **98.86%** in **JEE Advanced** examination out of **150 thousand** candidates *(2020)*
- Achieved **All India Rank 466** in **JEE Main** out of **1.2 million** candidates *(2020)*
- Awarded the **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship with **AIR 290** in the SX stream *(2019)*
- Ranked among national **top 1%** in **National Standard Examination in Chemistry** (NSEC) *(2019)*
- Secured **State Rank 5** in Stage 1 of **National Talent Search Examination** (NTSE) *(2017-18)*

Key Projects

Tech Points Portal *May'22 - Jul'22*

Seasons of Code| Web and Coding Club IITB

- Working on the frontend and backend of a website which will be used by students and Tech clubs at IIT Bombay **for distributing points** which can be used to **redeem prizes** using the **MERN** stack
- Successfully implemented **user authentication and authorization** via SSO login using **OAuth Protocol**
- Developing **RESTful APIs** for CRUD operations such as **fetching user data**, allowing students to **redeem prizes** using **earned points**, keeping track of **transaction history**, allowing clubs to **award points** and **upload prizes**

Artizaar - A Bazaar for Artists *Jun'22 - Jul'22*

Self Project| App Development

- Developing a **cross-platform** mobile **e-commerce app** using Flutter SDK in integration with **Firebase and MongoDB** where users can **connect** with each other and **buy/bid & sell artworks** online
- Designed and created a responsive user interface using **Dart and Flutter** with features to **upload artworks** for **sale**, save artworks, do **real-time bidding**, edit profile and **follow** other users
- Implementing the backend in **NodeJS** using ExpressJS to **update** the **server data** based on various actions performed by users, thereby keeping the **user feed** received by all users **synced** in real-time
- Integrating the frontend with backend in compliance with the **Model-View-Controller (MVC) architecture**

Algorithm Visualizer *May'21 - Jul'21*

Seasons of Code | Web and Coding Club IITB

- Studied **Data Structures**, ADTs and **Pathfinding Graph Algorithms** and their implementation in C++
- Designed and developed the user interface for a **responsive** web application using **React** which allows **visualization** of multiple **Pathfinding Algorithms** along with both manual and automated maze generation
- Implemented smooth **animations** using **JavaScript** along with **React Hooks and Classes** to demonstrate how chosen algorithm finds a **path** from **start node** to **end node** avoiding walls with feature to vary animation speed

RISC 16 bit Processor *Jan'22 - Apr'22*

Course Project| Microprocessors *Prof. Virendra Singh*

- Worked in a team to design an efficient, scalable **16 state FSM** for a 16-bit **multicycle** processor, eight registers and a RAM having an Instruction Set Architecture of **17 operations** with 3 instruction formats
- Synthesized and assembled **ALU**, **Memory unit**, **FSM controller** and **Datapath** using Quartus Prime in **VHDL**

Predictive Data Analysis of the Indian Premier League *Dec'21 - Jan'22*

Winter in Data Science | Analytics Club | IIT Bombay

- Performed **Exploratory Data Analysis** on IPL dataset(2008-2020) for **analyzing** the performances of players and teams using Seaborn/Plotly/Matplotlib in Python and gained useful insights for **feature selection**
- Trained and performed extensive hyper-parameter **tuning** on **Linear, Random Forest, Support Vector Machine**, **Neural Network** and **XGBoost regressors** to **predict final score** of an innings
- Implemented **Logit, SVM, Decision Tree, Neural Network and Random Forest classifiers** for predicting **match winner** along with **feature engineering** for current score and batsmen-bowler statistics
- Developed a **forecasting** model after pre-processing available data and achieved an accuracy of **99.67%** in **score prediction** and about **61.02%** on **winner prediction** and documented the entire workflow

Real-time Alphabet Recognition *May'21 - Jul'21*

Web and Coding Club IITB | PyCK

- Built an **interactive** and **real-time** alphabet recognition python application using **MLPs** and **CNNs**
- Integrated **Computer Vision** with trained **Convolutional Neural Network** to take input from user using webcam and allow user interaction with the feature of **movie/song suggestion** based on input

ATM with Authentication
Jan'22 - Apr'22

Course Project| Microprocessors Lab — *Prof. Saravanan Vijayakumaran*

- Developed an ATM in **Embedded C** by designing a **Finite State Machine**(FSM) which simulated user actions via key presses on a **keyboard connected to Pt-51 board** using **UART** and displays apt error/success messages
- Implemented user authentication by integrating **password feature** to perform various actions such as **viewing account balance** and **withdrawing cash** in minimum number of notes of **fixed denominations** of 500 and 100

Other Projects

Tinkerer's Lab (TL) Website
Apr'22 - Jul'22

Tinkerers' Laboratory | IIT Bombay

- Collaborated in a team to design and develop a responsive frontend of the **official website of TL** in React

Musical Tone Generator
Jan'22 - Apr'22

Course Project | IIT Bombay — *Prof. Saravanan Vijayakumaran*

- Utilized **Behavioural modelling** to design a **Finite State Machine**(FSM) on Quartus in VHDL that plays **musical notes** sequentially in a loop on Krypton board using a **clock divider circuit**
- Verified designs by performing simulations on all possible inputs using scan-chain on **Krypton board**

Autonomous Driving - Car Detection
Dec'21 - Jan'22

Winter in Data Science | Analytics Club | IIT Bombay

- Studied about the **YOLO algorithm** for **object detection** and studied its **implementation** in Python(**TensorFlow**)
- Implemented **Non-Max Suppression** using **IoU** to predict **accurate bounding boxes** and **class probabilities**
- Applied **Transfer Learning** on YOLO for **fine-tuning** the pre-trained **CNN** vehicle detection model on datasets

Tinkering Bootcamp
May'21 - Jul'21

TSS Tinkering Bootcamp course | Learner's Space

- Explored the working and applications of **Arduino, Communication Protocols, and Internet of Things (IoT)**
- Implemented a **rotating alarm** using **Arduino** which detects person using PIR sensor and notifies the user.
- Designed a **home security system** using an **ESP32 board** which alerts the owner using the **BLYNK app**

Finsearch
Jun'21 - Aug'21

Finance Club IITB | Research Project

- Studied **Portfolio Management**, **Cryptocurrencies**, importance of **Emotion Based Trading** in Covid 19 like situations and compared the differences between the effect of **Covid 19** and **2008 Global Financial Crisis**
- Analysed the **Indian Pharmaceutical Industry** and came up with an **investment portfolio** consisting of securities like **Indian Pharma Equities/Exchange Traded Funds** using **Portfolio Management** and **Risk Management** techniques

Technical Skills

Programming Languages	C++, Python, Dart, VHDL, Embedded C, Assembly (8051,8085)
Data Science	Numpy, Pandas, Matplotlib, Seaborn, TensorFlow, Keras, Sklearn, OpenCV
Web Development	HTML, CSS, JavaScript, React, NodeJS
Softwares	Git/Github, Flutter, Jupyter, LaTeX, Keil, Intel Quartus Prime, Eagle, LTspice

Positions of Responsibility

IIT Bombay Racing | Electrical Subsystem — *Feb' 21 - Feb'22*

*A 3-tier cross-functional team of 70+ students which builds an **electric race car** for international competitions such as **Formula Student UK** and **Formula Bharat** which is India's very own Formula Student competition*

Junior Design Engineer |*Motor Controller - Power Electronics* — *September 2021 - Present*

- Implemented **'GLV' protection circuitry** and performed **simulations** in **LTspice** to prove its functionality
- **Tested** individual components on LTSpice and completed the design of Power Electronic side of Motor Controller by **integrating** the Parent board, Gate Driver board and Control card after carefully mapping the connections

Trainee — *Feb' 21 - Sept' 21*

- Gained theoretical insights in the **Motor Controller, High Voltage** and **Low Voltage Safety** subsystems
- **Designed** and **simulated** various circuits using LTSpice and produced **PCB designs** for them on Eagle

Key Courses Undertaken

Computer Science	Data Structures and Algorithms, Design and Analysis of Algorithms*, Logic for Computer Science, Computer Programming and Utilization
Electrical Engineering	Microprocessors, Digital Systems, Probability and Random Processes, Control Systems, Electronic Devices & Circuits, Power Electronics
Mathematics	Linear Algebra, Differential Equations, Complex Analysis, Calculus

** To be completed by November, 2022*

Extracurriculars

- Conceptualized and created unique Artworks which were showcased in the **Kaladarshan** event organised by the **Photography and Fine Arts Club IITB** *(2021, 2022)*
- Participated in the **Doodle Designing Competition 'Art To Emancipate'** organised by Abhyuday as a part of 'Sangharsh: Conquering Covid' campaign in collaboration with **UNICEF** *(2021)*
- Attained **1st** rank in the **Energize Quiz** organized by the **Energy Club**, IIT Bombay *(2021)*
- Successfully completed **year long training** at **National Cadet Corps**, IIT Bombay *(2021)*