**Kanad Shende**
**Computer Science & Engineering**
**Indian Institute of Technology Bombay**

**210050078**
**B.Tech.**
**Gender: Male**
**DOB: 26/07/2003**

| Examination | University | Institute | Year | CPI / % |
|---|---|---|---|---|
| Graduation | IIT Bombay | IIT Bombay | 2025 | |
| Intermediate | State Board, Maharashtra | Dnyanganga Education Trust | 2021 | 90.67% |
| Matriculation | State Board, Maharashtra | Thane Police School | 2019 | 94.60% |

Pursuing **Minor** in Machine Intelligence and Data Science

## Scholastic Achievements

- Secured All India Rank **124** in Joint Entrance Examination **(Advanced)** among 1,50,000+ students *(2021)*
- Secured All India Rank **1842** in Joint Entrance Examination **(Mains)** among 10,00,000+ students *(2021)*
- Secured All India Rank **142** among 90,000+ students in **KVPY-SX Stream**, held by IISc, Bangalore *(2020)*
- Secured All India Rank **524** among 90,000+ students in **KVPY-SA Stream**, held by IISc, Bangalore *(2019)*
- Awarded the National Talent Search Examination **(NTSE)** Scholarship by NCERT, Govt. of India *(2019)*

## Olympiads and Scholarships

- Passed **RMO** and qualified for Indian National Mathematics Olympiad(**INMO**) **2 times** *(2017,2019)*
- Passed **NSEA** and qualified for Indian National Astronomy Olympiad(**INAO**) *(2020)*
- **Rank 2** in Primary Maharashtra **Scholarship** examination out of 400000+ students, held by MSCE *(2017)*
- **Rank 4** in Secondary Maharashtra **Scholarship** examination out of 400000+ students, held by MSCE *(2013)*
- Secured **Silver Medal** in the **Homi Bhabha** Bal Vaigyanik Competition, held by MSTA *(2017)*

## Work Experience

**Indoor Positioning System** | *Internship at MapIT.ai, Lightstone Technologies* *(May-July 2023)*

- Development of a robust and accurate **Indoor Positioning System** that can be used in various indoor environments
- Implemented a **Step Detection** algorithm by leveraging **Fast Fourier Transform(FFT)** to smoothen velocity curves to optimize pedestrian movement tracking after conducting comprehensive research
- Prediction of object coordinates by using **Kalman Filtered RSSI** readings from BLE Beacons with the help of a **Deep Learning TFlite model**. This method employs **tri-lateration** and **dead-reckoning** for optimal accuracy

## Key Projects

**Stock Prediction with RNN** | *Self Project* *(April 2023)*

- Deployed **Stacked LSTM** model within an **RNN** framework to create a predictive model for stock market trends
- Obtained multiple datasets from **Tiingo API** to validate the model's performance under various market conditions
- **Time Series Forecasting** is used to model complex temporal dependencies with **statsmodels** to visualize results

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**Cartoon Face Generator** | *Self Project* *(April 2023)*

- Implemented a cartoon face generator as a practical application of **GAN** developed on dataset with 20000+ images
- Inspired from the original implementation of **DCGAN**, the model employs **unsupervised learning** in **Keras**
- **Batch Normalization** was performed for stability of networks with **Leaky-Relu** as major activation function

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**PCA Application and Image Generation** *(October 2022)*
*Prof. Suyash Awate* | *Course Project : Data Analysis and Interpretation* *IIT Bombay*

- Using **Principal Component Analysis(PCA)**, generating sampled random images through top eigenvectors processed from a given data set of various fruits and performed **dimensionality reduction** and hyperfitting on it
- Observing how people write a certain digit by analysing various modes of variations through PCA by using the **MNSIT database** to train from 60000 examples of images of handwritten digits
- Analyzing images as 28×28 pixels and optimally reducing the dimensionals to 84, then reconstructing the images

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**Railway Journey Planner** *(August-November 2022)*
*Prof. Supratik Chakraborty* | *Course Project : Data Structures and Algorithms Lab* *IIT Bombay*

- **Data Structures** application to create a railway planner to guide passengers according to requirement
- Scheduling of train journeys using **dictionary** for storing journey details and appropriate linking
- Used various algorithms like **KMP**, **quicksort** for storing and utilising data effectively
- User reviews **prioritised** by using **Heap** for filtering reviews, are sorted using **quicksort** in **Trees** for each train

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## Other Projects

**CineHub** *(November 2022)*
*Prof. Kavi Arya | Course Project : Software Systems Lab* *IIT Bombay*
- **CineHub** is a web-development project, displaying basic features of a wide range of movies/TV content along with reviews from different sources, working on the lines of **IMDB, Rotten Tomatoes, Metacritic**
- **HTML, CSS, JavaScript** is used for portal designing and **Web-Scraping** for data extraction from other websites
- For back-end management of website and handling of multiple clients and servers, the **Django** framework is used

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**Object Detection with CNN** *(April 2023)*
*Self Project | A part of Deep Learning course on Computer Vision* *IIT Bombay*
- Employed the **YOLO**(You Only Look Once) algorithm for real-time object detection developed with **Keras**
- The model is based on the **GoogleNet** architecture and makes use of the **MSCOCO dataset** for transfer learning
- Verified the model using **Precision-Recall(PR)** curves and **Saliency Maps** to identify the focus areas of the model

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**Random Walkers Simulation** *(September 2022)*
*Prof. Suyash Awate | Course Project : Data Analysis and Interpretation* *IIT Bombay*
- Simulated N Random Walkers **Python** and obtained the **Gaussian Distribution** of their final locations on a graph.
- Verified **Law of Large Numbers** by proving the equality of empirical, theoretical Mean and Variance at infinity

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**Cache Heirarchy Analysis** *(March 2023)*
*Prof. Biswabandan Panda | Course Project : Computer Architecture* *IIT Bombay*
- Compared various Cache Hierarchies like Inclusive, Non-inclusive for analysis in Graph Workloads bottlenecks
- Implemented many replacement policies like **LRU, LFU** in **ChampSim** simulator across various hierarchies
- Improved **IPC** values in graph algorithms like bfs, dfs by taking a hybrid of Inclusive and Exclusive hierarchies

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**SAT Puzzle Solver** *(March 2023)*
*Prof. Ashutosh Gupta | Course Project : Logic For Computer Science* *IIT Bombay*
- Engineered a solution to solve sliding puzzles, to achieve a target matrix configuration by shifting rows and columns
- Devised boolean encodings to formulate a SAT problem and leveraged the **z3 solver** in Python to find solutions

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**Unreal IIT-B** *(May-July 2023)*
*Seasons of Code | Web and Coding Club* *IIT Bombay*
- Developed a **Fortnite-style** game and a 1:1 model of the IIT Bombay in Unreal Engine 5 in **Blueprint scripting**
- Leveraged technologies like **Lumen** and **Nanite**, to achieve real-time ray-traced lighting and geometric detail

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**Othello Game** *(April 2022)*
*Prof. Rushikesh K. Joshi | Course Project : Abstractions and Paradigms for Programming Lab* *IIT Bombay*
- Implemented a two-player Othello game with the help of **FLTK (Fast Light Toolkit)** widget library and C++
- Implemented an algorithm to efficiently update the squares accordingly, while provided an attractive interface to user

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## Technical Skills

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|---|---|
| **Programming** | C++, C, Python, Java, Bash, Sed, AWK, FLTK, Prolog |
| **Python Libraries** | Numpy, Pandas, Matplotlib, BeautifulSoup, MySQL Scipy, Plotly, Tensorflow |
| **Softwares & Tools** | LaTeX, Django, HTML, JavaScript, Bootstrap, Doxygen, Sphinx, Git, GDB, Wireshark |

## Courses Undertaken

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|---|---|
| **Computer Science** | Discrete Structures, Data Structures and Algorithms (and Lab), Data Analysis and Interpretation, Software Systems Lab, Abstractions and Paradigms for Programming, Design and Analysis of Algorithms, Computer Networks and Lab, Logic for Computer Science, Digital Logic Design and Computer Architecture and Lab, Cryptography and Network Security, Automata Theory*, AI and ML*, Operating Systems* |
| **Deep Learning** | Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning Regularization and Optimization, Convolutional Neural Networks (Coursera) |

*(*to be completed by December 2023)*

## Extracurricular Achievements

- Selected in a state-level **Athletics** competition in Maharashtra in 400m event. *(2013).*
- Participated in **Inter-IIT** meet held in Delhi as a part of **Athletics** contingent (Only person from CS branch)
- Winner of **Essay-writing** competition held by Hindustan Times and received **50000/-** for it. *(2015).*
- **Grade A** in both **Elementary** and **Intermediate** Drawing Examinations held by DoA, Maharashtra. *(2015)*