Penta kusuma kumari | **190050081**
Computer Science & Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Female**
DOB: 2/22/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	CBSE	Narayana Junior College, Visakhapatnam	2019	91.60%
Matriculation	CBSE	Narayana Group of Schools, Visakhapatnam	2017	10

Scholastic Achievements

- Achieved **All India Rank 62** in **JEE Mains** out of 1 million candidates *(2019)*
- Secured **All India Rank 581** in **JEE-Advanced** out of 1,70,000 candidates *(2019)*
- Attained **State Rank 41** in **Andhra pradesh EAMCET** out of 200 thousand students *(2019)*
- Received **KVPY fellowship** with All India Rank **115** in written and interview examination *(2018)*
- Ranked among **Top 1%** across the nation in **NSEC** (National Standard Examination in Chemistry) and appeared for the **INChO** (Indian National Chemistry Olympiad) conducted by IAPT *(2019)*
- Acquired a position in National **Top 1%** in **NSEJS** (National Standard Examination in Junior Sciences) and appeared for the **INJSO** (Indian National Junior Science Olympiad) conducted by IAPT *(2015)*
- Scored **390/450** in **BITSAT** (Birla Institute of Technology and Science Aptitude Test) *(2019)*

Key Projects

Notify me – *Android App Development* *Course Project*
Prof. Amitabha Sanyal *Autumn 2020, IIT Bombay*

- Developed an app to create a **Centralized Notification System** for students using **Android Studio**
- Built a Dashboard through **Angular frontend** where professor can add students to a particular group, set deadlines, send prioritized notifications and also able to see the list of students who acknowledged it
- Developed a backend server using **Django** to store the information of the students and professors and retrieved it using **JWT Token** which was obtained by the login authentication
- Worked on Android application where students get to login and see their dashboard of courses, get prioritized notifications for deadlines and updates from corresponding courses

Image Reconstruction through PCA – *Data Analysis and Interpretation* *Course Project*
Prof. Suyash Awate *Autumn 2020, IIT Bombay*

- Performed **multivariate Gaussian fitting** to the given dataset, and identified the modes of variation by **PCA**
- Using the measure of closeness as the **Frobenius norm of the difference**, devised an algorithm to find the closest representation of each image in the dataset as a linear combination of the top four eigenvectors added to the mean
- Sampled random images to **generate new images** representative of the dataset, using the modes of variation

SAT solvers – *Logic for Computer Science* *Course Project*
Prof. Ashutosh Gupta *Spring 2021, IIT Bombay*

- Used Python and Z3 to implement **Davis-Putnam-Logemann-Loveland (DPLL)**, an efficient, backtracking-based algorithm to find a valid solution to the n-queens problem and solve or generate Sudoku puzzles
- Created player two for the **Mastermind** game by encoding the game conditions as CNF boolean expressions
- Built the player two tolerant to unreliable player one by **conflict-driven clause learning (CDCL)** optimisations

Network Simulations – *Computer Networks* *Course Project*
Prof. Vinay Ribeiro *Spring 2021, IIT Bombay*

- Simulated various versions of **hidden terminal problem** using ns3, implemented the **IEEE 802.11 CSMA/CA** protocol and analysed results with and without **virtual carrier sensing** (RTS/CTS)
- Experimented on TCP flows of Reno, Cubic for different throughputs and packet losses using **Socket Programming**

Other Projects

Quad Trees – *Data Structures and Algorithms* *Course Project*
Prof. Ajit A Diwan *Autumn 2020, IIT Bombay*

- Created a **quadtree** class, a tree data structure to represent binary images with effecient usage of memory
- Implemented **image union and intersection** on quadtrees by recursively subdividing it into four quadrants

IITB-Proc – *Digital Logic Design* *Course Project*
Prof. Virendra Singh *Spring 2021, IIT Bombay*

- Designed a 16 bit multi-cycle processor in vhdl which performs based on **Run Length Encoding**
- Developed an **FSM** which include an ALU and other set of Instructions like Load, Store, Jump and BEQ

Levitt′s Metric – *Software System lab* *Course Project*
Prof. Amitabha Sanyal *Autumn 2020, IIT Bombay*

- Computed the **H(t) metric** on **Covid-19** deaths by fetching the data from given url using python modules
- Plotted the linear fit of H(t) by appropriate **line regression** model using **scipy** module
- Estimated an approximate end of the pandemic in India by extending the linear fit over H(t) metric

Dependency measures – *Data Analysis and Interpretation* *Course Project*
Prof. Ajit Rajwade *Autumn 2020, IIT Bombay*

- Constructed **joint** and **marginal histograms** by integrating joint histogram from original and shifted images
- Calculated the **correlation coefficient** and **Quadratic mutual information** from the histograms and inferred the relation between the dependence measures and alignment of images by plotting the graphs

Technical Skills

Programming	C++, C, Python, Bash, Java, SQL, VHDL
Web Development	HTML5, CSS, Angular, Bootstrap, javascript, Django
Data Analysis	MATLAB, Tensor Flow, Numpy, Scipy, Pandas, Matplotlib
Softwares	Git, LaTeX, Android Studio, SOLIDWORKS, AutoCAD, Quartus

Courses Undertaken

Computer Science	Data Structures and Algorithms + Lab, Software Systems Lab, Discrete Structures, Computer Networks + Lab, Logic for Computer Science, Design and Analysis of Algorithms, Digital Logic Design + Lab, Computer Programming and Utilization, Abstractions and Paradigms in Programming + Lab, computer Architecture + Lab*, Operating Systems + Lab*
Data Science	Data Analysis and Interpretation, Foundations of Intelligent Learning Agents*, Artifical Intelligence and Machine Learning + Lab*
Mathematics	Calculus, Linear Algebra, Differential Equations

** To be completed by November 2021*

Extracurricular

- **XLR8** app-controlled bot | **Electronics and Robotics Club**, IIT Bombay *(2019)*
  Explored **bot mechanics** and **electrical part** as a team of 4 members
  Designed, built and optimised bot for stable simulation on runway controlled by **Bluetooth enabled device**
- Completed a one year course under the **National Service Scheme** in Sustainable Social Development *(2019-20)*
- Worked under the project **Plastic Shredder Machine** in collaboration with Time Zero Waste as a part of Sustainable Social Development(**SSD**) in National Service Scheme(**NSS**) *(2019-20)*
- Ascended the **Kalsubai** the highest peak in Maharastra in the trek organised by **NCC**, IIT Bombay *(2019-20)*
- Organiser at **Mood Indigo** (Asia′s largest College Cultural Fest), IIT Bombay *(2019)*
- Active participant in online coding platforms codeforces and **codechef** with rating **1637**