



**Advaid Deepak**  
**Computer Science & Engineering**  
**Indian Institute of Technology Bombay**

**20D070006**  
**B.Tech.**  
**Gender: Male**  
**DOB: 03/06/2002**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	██████
Intermediate	CBSE	Placid Vidya Vihar	2020	98.20%
Matriculation	CBSE	Devagiri CMI Public School	2018	98.00%

Pursuing Honors in Computer Science

## SCHOLASTIC ACHIEVEMENTS

- Achieved a **Change of Branch** to the department of **Computer Science & Engineering** from Electrical Engineering among **16** out of **1300+** students owing to excellent academic performance ('21)
- Secured **AP grade** (advanced performer) in **5 courses** (**12** out of **1300+** students) - **Linear Algebra, Biology , Basics of Electricity and Magnetism, Economics , Introduction to Numerical Analysis** ('21)
- Secured All India Rank **95** in **JEE Mains** among 11.7 Lakh candidates with **99.994** percentile and bagged the position of **State topper** from Kerala in both January and September sessions ('20)
- Secured All India Rank **749** in **JEE Advanced** examination among 1,50,838 candidates ('20)
- Qualified to appear for **Indian National Chemistry Olympiad (INChO)** (top **802** out of **49644**) ('19)
- Selected to appear for the **National level Saksham Quiz Competition** conducted by the Petroleum Conservation and Research Association(**PCRA**) representing my state Kerala at Doordarshan, Delhi ('18)
- Awarded the **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship for **All India Rank 86** in Aptitude test conducted by the Indian Institute of Science,Bangalore among 50000 candidates ('20)
- Recipient of the **National Talent Search Examination (NTSE)** scholarship by NCERT, Government of India which is given to 1000 out of 0.9 million aspirants from all over India ('18)

## RESEARCH & INTERNSHIPS

### Hardware Timestamps for BSD Sockets | Software Internship

(May '23- July'23)

Quadeye Securities , Gurugram

- Added a feature to an existing Sockets acceleration library to populate **hardware timestamps** for **TCP** sockets
- Created a buffer field within **TCP** state to store the timestamp of each segment after acquiring it from hardware
- Optimized the handling of **out-of-order segments** by creating separate **deques** within **user** and **kernel** space

### Analysis of Business Reports | RnD Project

(Jan '23- Apr'23)

Guide: Prof.Suyash Awate, Department of Computer Science & Engineering

- Trained **Glove** on the entire corpus of annual & quarterly reports of various companies to create word embeddings
- Selected certain **seed** words and phrases , used their corresponding **Glove** vectors to find similar words based on the distance between the words in vector space forming a consolidated list of words/phrases for analysis
- Predicted the profit margin by training **LASSO** on these **Glove** vectors , their frequency and **TFIDF** values

### Pollen Grain Classification | Research Internship

(May '22- July'22)

Guide: Prof.Nathan Swami, University of Virginia

- Working on classifying pollen grains based on their optical and electrical properties using **Support Vector Machine**
- Automated** the **segmentation** of images to be further used for acquiring optical features

### Analysis of Patent Data | BTech Project

(Aug '23- Present)

Guide: Prof.Suyash Awate, Department of Computer Science & Engineering

- Vectorized papers of Indian patents from 2007 to 2013 using **Distributed Memory Model of Paragraph Vectors**
- Using the document vectors to **cluster** papers based on distance in vector space allowing easier **search**

## KEY PROJECTS

### Out-of-Distribution Detection | Course Project

(Mar'23- Apr '23)

Guide: Prof.Sunita Sarawagi, Department of Computer Science & Engineering

- Implemented a paper on Out-Of-Distribution (**OOD**) detection method for Conditional Language Models (**CLMs**)
- Demonstrated its effectiveness on abstractive summarization on both encoder-decoder and decoder-only architectures
- Performed **Selective Generation** using the **OOD scores** , abstaining whenever OOD score is very high

### Facial Expression Recognition with Keras | Self Project

(July '22)

Guide: Snehan Kekre, Coursera Project Network

- Developed a facial expression recognition model in **Keras** by training a **convolutional neural network**
- Applied the model on live stream using **OpenCV** after recognizing the face using a pre-trained model

## Time Series Database | Course Project

(Mar '23- Apr '23)

Guide: Prof.S Sudarshan, Department of Computer Science & Engineering

- Implemented a database from scratch , specialized for storing time series data handling basic **CRUD** queries
- Exploited the **temporal nature** of time series data to optimize insertion and storage in our file system
- Attributes of the same table & time-interval are stored in the same file , using bitmaps to indicate non-null attributes

## Robust video denoising | Course Project

(April '22- May '22)

Guide: Prof.Ajit Rajwade, Department of Computer Science & Engineering

- Implemented a patch-based video denoising algorithm to remove heavy Gaussian noise mixed with Poisson noise and Impulsive noise , achieiving nearly **100%** increase in Peak signal-to-noise ratio (**PSNR**) value
- Grouped similar patches in spatial and temporal domain to make it a **low rank matrix completion problem**
- **Fixed point iteration** was used to efficiently solve the resulting nuclear norm related minimization

## Fake News Detection | Course Project

(Oct '22- Nov '22)

Guide: Prof.Abir De, Department of Computer Science & Engineering

- Implemented a Vectorizer using **Glove** along with an **LSTM** Network and compared it with **TFIDF** vectorizer
- Inferred that Glove + LSTM provides concise but powerful representation of the text that is consistent across classifiers producing around **16%** improvement in accuracy than that of TFIDF on restricting the size of output

## Social Media/Networking Android Application | Course Project

(Oct '21- Nov '21)

Guide: Prof.Amitabha Sanyal, Department of Computer Science & Engineering

- Developed a Frontend android based social networking application using **Android Studio** in Java
- Set up **PostgreSQL** Database and implemented backend scripts using **Django REST Framework**
- Developed features like login,registration,news feed,one-to-one chat along with user authentication using tokens

## Peer to Peer Network | Course Project

(March '22- April '22)

Guide: Prof.Kameshwari Chebrolu, Department of Computer Science & Engineering

- Designed an original **File Transfer Protocol (FTP)** in a decentralized Network using Socket Programming
- Implemented File Transmission with **MD5** encryption using **OpenSSL**, sends files in fragments along with offset

## FMX Rendering and Animation | Course Project

(Nov '22)

Guide: Prof.Parag Chaudhuri, Department of Computer Science & Engineering

- Rendered a rider on a bike in an FMX track using **OpenGL** allowing both recording and playback
- Added lighting using a per-pixel shader and enabled multiple viewing positons by modifying the look-at matrix

## IITB-RISC-22 | Course Project

(April '22- May '22)

Guide: Prof.Virendra Singh, Department of Computer Science & Engineering

- Developed a pipelined processor that allows predicated instruction execution and multiple load and store execution with three machine-code instruction formats (R, I, and J type) and a total of 17 instructions using **QUARTUS**
- Optimized for performance with hazard mitigation techniques like **forwarding** and **branch prediction**

## POSITIONS OF RESPONSIBILITY

### Dept Academic Mentor | Dept Academic Mentorship Program

(June '22 - Apr '23)

- Selected as **DAMP** Mentor via a rigorous procedure consisting of SOP, peer reviews and interviews
- Mentoring a group of **6** students to boost their academics and provide **guidance** and general **counsel**

### Teaching Assistant | Calculus

(Dec '21- Jan '22)

Prof Mayukh Mukherjee, Dept of Mathematics

- Preparing to mentor **40+** students with weekly **tutorials** on the material covered as well as doubt clearing

## TECHNICAL SKILLS

Programming	C++, Java, Python, Javascript ,Prolog ,Bash, Sed, Awk, VHDL
Software	Git, L <sup>A</sup> T <sub>E</sub> X, MATLAB , Quartus, Keil, Flex , Bison
Development	HTML, CSS, PostgreSQL, Django, Android Studio , NodeJS , React
Libraries	Keras, Python-Numpy, Python-Scipy, Python-Matplotlib, Pandas , PyTorch

## KEY COURSES UNDERTAKEN

Computer Science	Artifical Intelligence and Machine Learning, Data Structures and Algorithms, Discrete Structures, Computer Networks,Computer Architecture, Advanced Image Processing, Software Systems Lab, Computer Programming and Utilisation, Operating Systems, Advanced Machine Learning ,Database and Information Systems
Maths	Calculus, Linear Algebra, Differential Equations, Introduction to Numerical Analysis

## EXTRACURRICULAR ACTIVITIES

Sports	Underwent one year of formal training under the <b>National Sports Organisation(NSO)</b> at IIT Bombay ('21)
Music	Awarded <b>Distinction</b> in Graded Examination in Rock and Pop in <b>Initial Keyboards</b> by <b>Trinity College of London</b> ('15)