Akash Cherukuri   190050009

Computer Science & Engineering   **B.Tech.**

Indian Institute of Technology Bombay   **Gender: Male**

DOB: 11/16/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	9.26
Intermediate	TSBIE	Sri Chaithanya Narayana Junior College	2019	97.70%
Matriculation	TSBSE	Narayana Concept School	2017	10

Pursuing an **Honours** in **Computer Science and Engineering**

INTERNSHIPS AND RESEARCH PROJECTS

Reactive Alarm Management Database   *Summer 2022*

Yash Mahajan, Samsung Korea   *Software Development Intern*

- Programmed a **reactive** application using **SpringBoot** and **Webflux** to plot query performance with database size
- Deployed the application to **Kubernetes** for containerization and effective load testing using **Apache JMeter**
- Implemented custom queries using sorting, pagination to compare reactive and non-reactive programming paradigms
- Offered a **Pre-Placement Offer** as a result of **outstanding performance** in the internship

Dynamic Difficulty Adjustment via Reinforcement Learning   *Summer 2022*

Prof. Frank Glavin, National University of Ireland Galway   *Research Publication*

- Extended a novel methodology called **Skill Experience Cataloguing** to fighting games which **dynamically changes any RL agent's skill** level to match the player's skill with minimal changes to its learning algorithm
- Programmed a **SARSA** Agent with **eligibility traces** to observe the performance of SEC against multiple opponents
- Publication accepted as **first author** to the conference **IEEE GEM 2022**

Network Security Analysis using Machine Learning   *Spring 2022*

Prof. Virendra Singh, Indian Institute of Technology Bombay   *Research Project*

- Examined the advantages and disadvantages of using **factor graph neural networks** to detect security breaches
- Implemented a **Time-Changing Decision Tree** to infer access control behaviour changes for a general environment

Chemical Catalysis using Natural Language Processing   *Winter 2021*

Prof. Raghavan B. Sunoj, Indian Institute of Technology Bombay   *Research Project*

- Analyzed usage of **LSTMs** and **RNNs** in NLP and studied on ways of extending NLP to the domain of chemistry
- Coded a **RoBERTa** network to predict yield of chemical reaction represented as a string with **SMILES** nomenclature

KEY PROJECTS

Skin Lesion Detection and Data Augmentation | *Prof. Suyash P. Awate*   *Course Project | Spring 2022*

- Implemented a **Generative Adversarial Network** with a **UNet** generator architecture to identify skin lesions
- Highlighted versatility of GANs by utilizing the same network to generate scans of eyes for **data augmentation**

Image Segmentation using GMMs | *Prof. Suyash P. Awate*   *Course Project | Spring 2022*

- Implemented **EM algorithm** using the concept of **Gaussian Mixture Models** to segment brain MRI scans
- Coded a **Fuzzy-C-Means** algorithm as well to compare segment quality obtained by both approaches
- Extended the theoretical EM framework to work when a **prior distribution** on the parameters involved is provided

L.A.M.A. AI using Reinforcement Learning   *WnCC Seasons of Code | Spring 2020*

- Programmed a **Q-Learning** driven AI, which takes logical decisions after analyzing the game's current state
- Achieved a win rate of approximately **70%** against a naïve agent, demonstrating agent's effectiveness

Image Colorization using Deep Learning   *WnCC Seasons of Code | Summer 2021*

- Trained a **Conditional GAN** with **PatchGAN** discriminator for effectively **colorizing** black-and-white images
- Implemented **VGG-Net** and **ResNet** for MNIST digit classification with **99%** accuracy

Red Plag: Plagiarism Checker | *Prof. Amitabha Sanyal*   *Course Project | Autumn 2020*

- Created a webapp using **Angular** and **Django** backend to allow users to check for plagiarism by uploading code
- Implemented **Latent Semantic Analysis** with **TF-IDF** and pre-processing to check similarities in uploaded code
- Expanded client side functionality by integrating **Django user authentication** and Angular secure routes

Mastermind Solver | *Prof. Ashutosh Kumar Gupta*   *Course Project | Spring 2021*

- Implemented a **SAT solver** using Python z3 module to make the best guess utilizing previous information
- Designed a solver to guess best possible sequence taking **unreliability of provided information** into account

Scholastic Achievements

- Secured **All India Rank 40** in **JEE-Advanced 2019** amongst 246,000 candidates   *2019*
- Awarded a **Gold Medal** and a **Certificate of Merit** in **NSEC-INChO** olympiads   *2019*
- Secured **Rank 21** in **TS EAMCET** out of 220,000 candidates conducted by TSCHE   *2019*
- Provisionally shortlisted for the **KVPY scholarship** amongst 50,000 candidates   *2018*

Other Projects

Compiler for C-Like language | *Prof. Uday Khedkar*   *Course Project | Spring 2022*
- Developed a **compiler and evaluator** for a subset of C, supporting functions, scope levels and control sequences
- Used Lex for tokenizing, Yacc for parsing to construct the **Abstract Syntax Tree** and the **Three Address Code**

Music Streaming and Mixing App   *Self Project | Summer 2022*
- Created an app in **Android Studio** which lets the user to **stream and mix** music from different playlists at once
- Utilized **services** to ensure the music plays in background even when the application is minimized for user convenience

IPL Monitoring Webapp | *Prof. Umesh Bellur*   *Course Project | Spring 2021*
- Implemented a webapp using **Angular** frontend, **Node.js** backend and a connected **PostgreSQL** database
- Added functionality to display match statistics as graphs **dynamically** and to also let the user query the database

Transactions on Database Emulator | *Prof. Umesh Bellur*   *Course Project | Spring 2022*
- Created a query language to interact with database emulator using **Lex and Yacc** to scan and parse inputs
- Implemented transactions with rollback capability and **concurrency** using **locking** and conditional wait

Enhanced xv6 Operating System | *Prof. Mythili Vutukuru*   *Course Project | Autumn 2021*
- Extended functionality by implementing **new system calls** and **fork** variants to better suit use cases
- Improved **memory** allocation to be **on demand** to ensure physical page allocation is done only when needed by OS

Network Simulations | *Prof. Vinay Joseph Ribeiro*   *Course Project | Spring 2021*
- Generated numerous environments using **ns3** to simulate **information transfer** between various pairs of nodes
- Analyzed performance in different cases to interpret the importance and drawbacks of different TCP protocols

Courses Undertaken

Machine Learning	Foundations of Intelligent and Learning Agents, Artificial Intelligence and Machine Learning, Medical Image Computing, Data Analysis and Interpretation
Algorithmic Trading	Python and Statistics for Financial Analysis, Introduction to Trading & GCP
Computer Sciences	Operating Systems, Database and Information Systems, Computer Networks, Data Structures and Algorithms, Design and Analysis of Algorithms

Positions of Responsibility

- **Teaching Assistant**
  - Data Analysis and Interpretation (CS215)   – *Prof. Suyash P. Awate*   *Ongoing*
  - Operating Systems Bootcamp (CSERL)   – *Prof. Puru Kulkarni*   *Summer 2022*
  - Quantum Physics and its applications (PH107) – *Prof. C V Tomy*   *Spring 2021*

- **Summer of Science Mentor**, Data Structures and Algorithms (MnP)   *Summer 2021*

Technical Skills

Deep Learning	PyTorch, Keras, TensorFlow, PyTesseract
Programming	C++, Java, C, C#, Android-Studio, BASH, Python, QBASIC, VHDL
Web Development	JavaScript(+ TypeScript), SpringBoot, NodeJS, AngularJS, Django, PostgreSQL
Software Skills	Git, MATLAB, OpenCV, GNU Make

Extracurriculars

- Awarded with a **Special Mention for Exemplary Volunteering Work** by **NSS, IIT Bombay**   *2020*
- Participated and completed **Hacktoberfest 2020** presented by **Digital Ocean**   *2020*