Akash Cherukuri | **190050009**
Computer Science & Engineering | **B.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
DOB: 16-11-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	9.35
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**
Pursuing a **Minor** in **Entrepreneurship** from Desai Sethi Centre for Entrepreneurship

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*
- Selected for **INChO** and **INAO** along with 300 students for each olympiad *2019*
- Secured **All India Rank 192** in **JEE-Mains 2019** amongst 935,000 candidates *2019*
- Awarded the prestigious **Kishore Vaigyanik Protsahan Yojana** scholarship *2018*
- Secured **Rank 21** in **TS EAMCET** out of 220,000 candidates conducted by TSCHE *2019*
- Secured **Rank 96** in **AP EAMCET** out of 220,000 candidates conducted by APSCHE *2019*

Research Projects

Chemical Catalysis using Machine Learning *Ongoing*
Prof. Raghavan B. Sunoj | Indian Institute of Technology, Bombay

- Analyzing various **NLP techniques** for use in chemical space for **evaluating performance** of a chemical reaction
- Implemented a **bi-directional transformer architecture** for gauging the performance with real-time lab data
- Researching effectiveness of algorithms with limited data to expedite the discovery of catalysts for chemical reactions

Dynamic Difficulty Adjustment via Reinforcement Learning *Ongoing*
Prof. Frank Glavin | National University of Ireland, Galway

- Developing a **novel methodology** for a reinforcement learning agent to **dynamically** change its behaviour based on the performance of its adversary utilizing the **experience catalogued** in the past
- Programmed a **SARSA** Agent with **eligibility traces** to gauge performance in a complex dynamic environment
- Fine-tuning hyper parameters and state-space definition for improving performance and the total accumulated reward

Key Projects

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

- Implemented **VGG-Net** and **ResNet** for MNIST digit classification with **99%** accuracy and a **Generative Adversarial Network** for automatic digit generation to demonstrate the importance of neural networks
- Trained a **Conditional GAN** utilizing **U-Net architecture** for generator and **PatchGAN** based discriminator on the COCO Dataset by **optimizing L1 Loss** for **effective colorization** of black-and-white images

L.A.M.A. AI using Reinforcement Learning *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

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

- Implemented a modified version of **Latent Semantic Analysis** along with language specific **pre-processing functionality** for ignoring syntax to focus on raw code to be able to yield **highly reliable results**
- Expanded client side functionality by integrating **Django user authentication** and Angular secure routes to enable downloadable analysis of results as a **heatmap** containing pairwise similarities of input code files

MRI Images Analysis | *Prof. Ajit Rajwade* *Academic Project | Autumn 2020*

- Analysed multiple magnetic resonance images by comparing **correlation coefficients**, **histograms** and **QMI**
- Interpreted the relationship between these **dependency measures** with the **relative alignment** of the images

Quad-Trees | *Prof. Ajit A. Diwan* *Academic Project | Autumn 2020*

- Implemented **quad-tree** data structure to store and operate efficiently on black and white images
- Programmed efficient **resizing** and **extraction** methods, **overlap** and **intersection** of different images

Other Projects

Theory of Machine Learning *Self Project | Winter 2020*
- Studied the theory of machine learning from *Understanding Machine Learning: From Theory to Algorithms*
- Covered criteria for a hypothesis class to be **PAC Learnable** and use of **VC Dimensions** for measuring complexity

Image Processing | *Prof. Amitabha Sanyal* *Course Project | Autumn 2020*
- Explored and applied various clustering and classification algorithms such as **SVM**, **KNN** and **PCA** to images
- Implemented **Kmeans++** algorithm to images to limit number of colors and observed results with different limits

Levitt's Metric on COVID Data | *Prof. Amitabha Sanyal* *Course Project | Autumn 2020*
- Applied Levitt's metric on real-time COVID Data and estimated the approximate end of the pandemic in India
- Showed that it is independent of population and robust to different regions having different capacities

Tetris Agent using PyGame *Self Project | Autumn 2020*
- Programmed a complete playable game of Tetris in Python3 with the official **7-Bag Algorithm**, using **PyGame**
- Implemented a bot in this environment which takes the best possible move at present state to maximize score

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 various TCP protocols

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

Course Visualizer and Analyzer | *Prof. Amitabha Sanyal* *Course Project | Autumn 2020*
- Programmed a **course organizer** using awk and sed to visualize semester data with a **color coded scheme**
- Provided options to efficiently organize courses semester-wise, arrange by course tag and calculate CPI and SPI

Internships and Responsibilities

Teaching Assistant - Physics *Spring 2021*
- Mentored a batch of **38 freshmen students** in **PH107 - Quantum Physics and its Applications**

Summer of Science Mentor *Summer 2021*
- Mentored a batch of freshmen students interested in **Data Structures and Algorithms** throughout the summer

Research Editorial Team *Ongoing*
- Contributing to development of **CSE Research Website** to serve as a repository for research within the department

Academic Content Creator - Paathshala *Winter 2020*
- Worked with Paathshala Education as an Academic Content Creator to curate high-quality academic content in video form for over seventy questions with detailed solutions in Physics across different chapters.

Courses Undertaken

Machine Learning	Artificial Intelligence and Machine Learning, Foundations of Intelligent and Learning Agents, Data Analysis and Interpretation
Computer Sciences	Data Structures and Algorithms, Design and Analysis of Algorithms, Abstractions and Paradigms for Programming, Software Systems Lab, Discrete Structures

Technical Skills

Software	MATLAB, LaTeX, Unity, Blender, Git, AutoCAD, SOLIDWORKS, Doxygen, VHDL
Web Development	HTML5, CSS, JavaScript, AngularJS, PHP, ReactJS, Django
Programming	C++, C, C#, BASH, Python, QBASIC, Java, Android-Studio
Libraries and Modules	PyTesseract, PyTorch, SkLearn, PyGame, Kivy, SciPy, NumPy, Pandas

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*
- Attended the science camp hosted by **KVPY** and recommended for scholarship at IISc, Bangalore *2018*
- Participated in **Capture The Flag** tournaments hosted by **CyberSecurity Club, IIT Bombay** *2020*