



**Sakshi Heda**  
**Electrical Engineering**  
**Indian Institute of Technology Bombay**

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**B.Tech.**  
**Gender: Female**  
**DOB: 17/11/2002**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Vidhya Sagar Sr. Sec. School	2020	97.20%
Matriculation	CBSE	St. Anselm's Sr. Sec School	2018	97.80%

Pursuing Minor in Computer Science and Engineering and Honors in Electrical Engineering

## SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 434** among **1.1 million** candidates in JEE Mains [2020]
- Achieved **All India Rank 580** among **150,000+** candidates in JEE Advanced [2020]
- Awarded certificate of merit for being placed in the **top 1.5%** among **49000+** candidates in NSEC[2019]
- Recipient of **KVPY** fellowship awarded by IISc Bangalore, with **AIR 609** in SA Stream [2018]

## PROFESSIONAL EXPERIENCE

### Google India Pvt. Ltd. | Hardware Engineering Intern

[May '23 - Jul '23]

#### Automated Hardware Programming Sequence Generation

- Developed a tool to streamline chip verification at both **IP and SoC levels** improving overall efficiency
- Automated generation of **SystemVerilog** and **C** programming sequences for standard IP functionalities
- Revamped **over 75%** flowchart sequences and validated them with **250+ test cases** to ensure accuracy
- Implemented a **scalable architecture** for the tool, thus enabling its adaptation to numerous use-cases

## TECHNICAL PROJECTS

### Best Arm Identification

[Aug '23 - Present]

#### BTech Project | Prof. Sharayu Moharir

- Analysed **5+ algorithms** to identify the arm with best cumulative reward from fixed number of attributes
- Performed literature survey on **sampling algorithms** like action elimination and upper confidence bounds
- Devising an algorithm with a set **minimum expected** reward constraint for an attribute, analyzing regret

### Multiple Play Stochastic Bandits

[Apr '23]

#### Course Project | Online Learning and Optimisation | Prof. D Manjunath | Prof. J.K. Nair

- Implemented **orchestrative exploration algorithm** for maximization of the reward from shareable arms
- Formulated **sound lower bounds** for sub-linear regret and verified the results using experimental data
- Adapted and enhanced the algorithm to **minimise overall regret by 75%** resulting in maximised rewards

### Clustering of Partially Observed Graphs

[Mar '23 - Apr '23]

#### Course Project | Optimization in Machine Learning | Prof. Ganesh Ramakrishnan

- Formed **disjoint clusters** with dense connections within clusters and sparse connections among clusters
- Utilized **RPCA** technique to minimize cluster formation disagreements post-exploration of **5+ methods**
- Performed **uniform sampling** followed by **degree-based sampling** to reduce computational complexity

### Image Segmentation and Restoration

[Jul '22 - Nov '22]

#### Course Project | Image Processing | Prof. Amit Sethi

- Trained **U-net model** for nucleus segmentation and modified baseline architecture to observe its MSE
- Analysed noise-contaminated images and implemented **Gaussian** and **Butterworth filters** for restoration
- Studied image **intensity transformations** and examined their applications in **histogram equalization**

### RFID based Detector

[Jan '23 - Apr '23]

#### Course Project | Electronics Design Lab | Prof. Siddharth Tallur

- Configured the **HTRC110** RFID reader IC to establish **communication** between antenna and RFID tag
- Designed **impedance matching RLC circuit** to maximize power transfer between reader IC and antenna.
- Developed a RFID detector using **ATtiny85** along with **C-based** coding to generate precise 125kHz waves which matches the tag frequency and retrieve data using effective **amplitude modulation** techniques

## Design Engineer | Smart Laundry

[May '22 - Aug '22]

InstiX | Institute Technical Council, IIT Bombay

- Worked on the **hardware design** to centralize the hostel laundry system by showing the availability of machines online and booking a **personalized slot** to **unlock machine access** specifically for the user
- Utilized **ESP-32 NODEMCU** to connect to the mobile app using **Bluetooth Serial Communication**
- Integrated the circuit with **ACS712 current sensor** for better analysis of power state of the machine

## Electrical and Controls Engineer | SPART IIT Bombay

[May '22 - Mar '23]

SPART is a technical team consisting of 40 members representing India in World Solar Airship Race, 2024

- Worked towards building a **solar-powered airship** to fly across South Atlantic, covering **6000+km** in autonomous flight using **Hydrogen** as lifting gas to promote **sustainable air transport** in the world
- Programmed Arduino Nano to design an airship controller based on the concept of **differential thrust**
- Utilized **Pixhawk 2.4.8** flight controller and successfully demonstrated the prototype at **E-Summit 2023**

## Spanning Tree Protocol

[Oct '21]

Course Project | Computer Networks | Prof. Varsha Apte

- Simulated the working of a spanning tree protocol for **networking** on a given LAN and bridge topology
- Programmed in **Python** to label bridge ports and facilitate **message flow analysis** through the network

## Computer Vision

[May '21 - Jul '21]

Reading Project | Summer of Science | Math and Physics Club, IIT Bombay

- Performed edge detection, contour detection and shape detection pertaining to **object detection** tasks
- Scrutinized **Gradient descent**, **Adam optimizer** as building blocks of deep learning algorithms
- Explored **Neural Networks** and application of Convolutional NN in Multi-class image classification

## Lasso Game

[Feb '21]

Course Project | Computer Programming and Utilization | Prof. Bhaskaran Raman

- Elevated a basic game of lasso of looping things to a more interactive experience using **C++ graphics**
- Introduced **3+ levels** in the game ,with each level progressively becoming more interactive and challenging
- Limited the number of **consecutive failed trials** and introduced an algorithm to fetch **negative points**

## POSITION OF RESPONSIBILITY

### Interview Coordinator | Institute Placement Team

[Nov '21 - Dec '21]

- Assisted in conducting tests for **10+ firms** during placement season and handling student queries
- Coordinated with the placement team for conducting interviews of **1800+ students** for the year 2022

## TECHNICAL SKILLS

**Programming Languages** C, C++, Python, LATEX, Octave, Embedded C, VHDL, SystemVerilog

**Softwares** MATLAB, Quartus, ModelSim, SimVision, Keil, EAGLE, Realterm

**Python Libraries** NumPy, Pandas, OpenCV, Pytorch, Scipy

## KEY COURSES UNDERTAKEN

### Computer Science

Data Structures and Algorithms, Design and Analysis of Algorithms, Computer Networks, Image Processing, Optimization in Machine Learning, Online Learning and Optimization, Introduction to Public Health Informatics\*

### Electrical Engineering

Information Theory and Communication, Markov Chains and Queuing Systems, Introduction to Number Theory and Cryptography\*

\* to be completed by November '23

## EXTRACURRICULARS

- Successfully completed one year of rigorous training under **National Cadets Corps** at IIT Bombay
- Developed a **line follower bot** in an event conducted by **Electronics and Robotics Club**, IIT Bombay
- Implemented a **security system** which is guarded by fingerprints using Arduino UNO, AS608 fingerprint sensor and a relay module as a part of **DIY Projects** organized by **Tinkerer's Lab**, IIT Bombay
- Represented SPART in the **Tech and Rnd Expo, 2022** to showcase Indoor Airship flying skills
- Volunteered in the **plantation drive** organized by Green Campus, National Service Scheme, IIT Bombay