# Rakhul Kumar B

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## Summary

I am an Electronics and Instrumentation Engineering undergrad at Anna University, MIT Campus. My interests span a broad cross-section of areas such as Embedded Systems, IoT, Computer Vision, Artificial Intelligence, Machine Learning, PCB Design, Physics, Music, and Debate. I immensely believe in the complementary nature of these diverse areas. I'm highly motivated and constantly on the lookout for opportunities to improve.

## Education

**Madras Institute of Technology, Anna University** **Aug 2019 - Present**
***B.E in Electronics and Instrumentation*** *Chennai, Tamil Nadu*
- **CGPA:** 9.18 (up to 5th Semester)

**Maharishi Vidya Mandir Senior Secondary School** **Jun 2017 - Mar 2019**
***Grade 11 and 12, Major in Computer Science*** *Chennai, Tamil Nadu*

- **C.B.S.E:** 93.8% in All India Senior School Certificate Examination 2019

**Padma Seshadri Bala Bhavan Senior Secondary School (PSBB)** **Jun 2008 - Mar 2017**
***Primary Schooling and Grade 10*** *Chennai, Tamil Nadu*

- **C.B.S.E:** 98% in All India Secondary School Certificate Examination 2017

## Intern Experience

**IoTIoT** **Jan 2023 – Present**
***Intern – Edge AI Applications*** *Remote*
- **Implemented** a Pose Estimation Model using PoseNet framework on BrainyPi, a proprietary development board of IoTIoT foundation
- **Currently** working on developing a DL model that can classify a rice grain based on its variety
- **Skills:** Computer Vision, Deep Learning.

**Indian Institute of Technology, Madras** **Mar 2022 – Present**
***Research Intern*** *Chennai, Tamil Nadu*
- **Designed** an FSR-based smart boxing shoe for analyzing the footwork of a boxer during a bout. And **embedded** a microcontroller chip inside the insole which could connect to any mobile device and transfer data using Bluetooth
- **Programmed** an Android application which can connect to the shoe and download EEPROM data. The application can display the player's performance statistics and present a video analysis of the foot.
- **Developed** a Computer Vision algorithm that can perform the same function as the Smart Shoe
- **Currently** working on creating an AI-assisted framework for analyzing the performance of swimmers using videos recorded underwater.
- **Skills:** Product Designing, C++, Memory allocation and management, Embedded System Designing, Computer Vision, Data Communication Protocols

**Microleaf Software Technologies** **Aug 2021 – Oct 2021**
***Research & Development Associate*** *Chennai, Tamil Nadu*
- **Developed** an IoT-enabled Mobile Warehouse locker software for a Singapore-based supply chain management company using QT
- **Skills:** QML, C++, Raspberry Pi programming, Python, Arduino programming

**IoTIoT** **Jun 2021 – Sep 2021**

***Intern - Embedded GUI Developer*** *Remote*

- **Designed** User Interfaces for Shunya OS (Embedded Linux)
- **Developed** a user interface for a **Point-of-Sale System** using QML and C++ and **programmed** a dashboard UI for Power Consumption management
- **Skills:** Qt, QML, OpenCV, C++

## Projects

**INDIAN NATIVE VEHICLE DETECTION USING COMPUTER VISION** **Jan 2023 - Present**

- **Currently** working on developing an optimized DL model for detecting native vehicles on Indian roads.
- **Funded** by Greater Chennai Traffic Police (GCTP), Tamil Nadu Government.

**ANALYZING THE FOOTWORK OF A BOXER DURING A BOUT USING COMPUTER VISION TECHNIQUES** **Nov 2022- Jan 2023**

- **Conducted** an extensive study on the different foot movements of a boxer during a bout and **developed** a computer vision algorithm to determine the foot placement/position to determine player engagements
- **Generated** a custom dataset, and applied transfer learning to an object detection model to detect the foot position.

**HOSPITAL RECORDS DATABASE MANAGEMENT SYSTEM** **May 2022- Jun 2022**

- **Created** a database management system using MySQL for managing hospital records such as patient records, doctor details, patient appointments, pharmacy details, departments and blog posts.
- **Designed** an interactive website using PHP, HTML and CSS as a frontend for the database.

**MOVEMENT OF MOUSE CURSOR IN CONJUNCTION WITH LASER DOT** **Oct 2021 – Dec 2021**

- **Worked** on making the mouse cursor of a computer to follow a laser pointer's mark using Image Processing and Convolutional Neural Networks.
- **Implemented** this using PyTorch, OpenCV, SciKit-image, and PyAutoGUI libraries on a RaspberryPi

**MODELLING OF A CONICAL TANK AND IMPLEMENTING A CONTROL SCHEME USING MATLAB AND SIMULINK** **Oct 2021 - Nov 2021**

- **Modeled** a conical tank system in Simulink and **implemented** a suitable control scheme for the system to maintain the desired level
- **Computed** the Transfer Function and State Space Model analytically and verified the simulated results

**AI HANDWRITTEN DIGIT CLASSIFICATION USING RASPBERRY PI** **Apr 2021- Jun 2021**

- **Trained** a Convolution Neural Network using the MNIST dataset and PyTorch library for recognizing handwritten digits
- **Deployed** the CNN on a RaspberryPi using SciKit-image, OpenCV and PiCamera libraries

## Skills and Interests

**Programming Languages**: C++, Python, MATLAB, QML(Qt)

**Software and Libraries**: Proteus, Keil µVision, KiCAD, Simulink, Arduino, RaspberryPi, Xilinx ISE, and Microsoft Office packages

**Soft Skills:** Team building and Leadership, Time Management, Positive Attitude, and Critical Thinking

**Interests**: Music Composition, Financial Planning, Entrepreneurship

## Achievements and Certifications

- **All India Rank 1** in National Engineering Olympiad 4.0, Jul 2021.
- **Arduino Platform and C Programming** from the University of California, Irvine
- **Interfacing with Arduino** from the University of California, Irvine
- **The Raspberry Pi Platform and Python Programming for the Raspberry Pi** from the University of California, Irvine
- **Artificial Intelligence and Machine Learning** from the Entrepreneurship-Cell IIT Madras
- **Python Programming and Data Structures** from the University of Michigan
- **Machine Learning in MATLAB** from Mathworks
- **Mathematics for Machine Learning: Linear Algebra** from the University of London
- **Grade 1 Plectrum Guitar (Practical)** from Trinity College, London

## Leadership Positions

**MIT Robotics Association**

***Head of Marketing and Promotion*** **Nov 2022 - Present**

***Joint Secretary*** **Jun 2021 – Nov 2022**

- **Established** the social media pages of the club and **orchestrated** marketing campaigns to create more user engagement by **mentoring** a team of 10 members
- **Raised** ₹2.3 Lakhs funding for the club's national level technical symposium through sponsorship deals

**Youth Red Cross of MIT**

***General Secretary*** **Jul 2022 – Nov 2022**

***Event Coordinator*** **Jun 2021 – Jul 2022**

- **Organized** weekly talk sessions on different topics related to healthcare for 300 members of the club.
- **Instrumental** in conducting the 7-day Annual Camp 2022 based on the national theme of Azadi Ka Amrit Mahotsav. Supervised the camp activities by conducting competitions to engage the volunteers

**MIT Quill, Literary Club of MIT**

***Head of Event Planning*** **Jul 2022 - Present**

***Senior Event-Planning In-charge*** **Jul 2021 – Jul 2022**

***Content Editor*** **Jul 2020 – Jul 2021**

- **Publicized** the social media presence of the club by drafting and posting various articles on the club's official Instagram page
- **Supervised** a team of content writers and headed a column that focused on stories about people's experiences in uncommon situations
- **Organized** INITIUM 2.0, a 3-day inter-college event for 150 students and Quillantine 3.0 for 3000 social media followers

**Personality Development Association of MIT**

***Treasurer*** **Oct 2021 – Aug 2022**

- **Allocated** funds for the club's yearly activities and **maintained** the club's financial books by keeping track of all the expenses

**Instrumentation Department, Madras Institute of Technology**

***Student Representative and Class Committee Member*** **Dec 2019 – May 2022**

- **Coordinated** with faculty members and students, by acting as a prime official channel of communication between them and **ensured** that students' views on academic matters were heard by the faculty members of the department.