

# Swarnabha Roy

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## EDUCATION

Degree / Certificate	Discipline	Institute	Board / University	Year of Passing	Aggregate % / CGPA
B.Tech	Computer Science & Engineering	Institute of Engineering & Management, Kolkata	MAKAUT	2021	<b>8.6/10</b> (up to 5 <sup>th</sup> semester)
12 <sup>th</sup>	Science	South Point High School, Kolkata	CBSE	2017	<b>90.6%</b>
10 <sup>th</sup>		South Point High School, Kolkata	CBSE	2015	<b>10/10</b>

## EXPERIENCE

**Indian Institute of Technology**, Roorkee, India

June 2019 - present

*Undergraduate Research Intern*

- Implemented the paper "A position and rotation invariant framework for sign language recognition (SLR) using Kinect" independently, achieving the same results as claimed by the experiment in the paper.
- The framework is capable of recognizing occluded sign gestures using Hidden Markov Model (HMM) and has been tested on a dataset of 2700 gestures.

**HelpAge India**, Kolkata, India

Dec 2018 – Jan 2019

*Intern*

- Worked with the caregivers and support team to analyze the situation and the problems of the elderly population in Kolkata, especially the suburbs.
- Documented the work-flow and prepared a presentation of my analysis along with detailed case studies.

## PROJECTS

### Java

- Flight Reservation System** - In this project, I have designed a Flight Reservation System for booking flights from any city in India to Singapore via another city in India. A sample data was parsed for the flight details. An interactive GUI was made using Swing for all user inputs and displays.

### AI (ML, Image Processing, Deep Learning)

- Controlling Electronic Devices using Hand Gesture Recognition and IoT** - In this project, we created a model that would successfully identify hand gestures from a pre-trained pool of gestures and perform different activities assigned with different gestures. It was then fitted into a Raspberry pi module and tested in a real-time scenario.
- Environment Perception For Self-Driving Cars** - In this project, I designed a system to extract useful scene information to allow self-driving cars to safely and reliably traverse their environment. Use the output of semantic

segmentation neural networks to implement drivable space estimation in 3D and for lane estimation. The output of semantic segmentation was used to filter errors in the output of 2D object detectors and the filtered 2D object detection results were used to determine how far obstacles are from the self-driving car.

- **Trigger Word Detection** - In this project, I constructed a speech dataset and implemented an algorithm for trigger word detection. For this project, our trigger word was "Activate." Every time the system hears the word "activate," it will make a "chiming" sound.
- **Smart Farmer** - In this project, I designed a basic Python app that would tell what kind of crops a farmer should choose based on the basis of the location of his field and its size. I used Tkinter for the interface and basic regression model for the prediction.
- **Handwritten Digit Recognizer** - In this project, I developed a system that takes handwritten digits as input and recognizes them with nearly 99% accuracy using various approaches like Random Forest, Feed Forward Neural Nets, CNNs, and GANs.

## ACHIEVEMENTS/ CERTIFICATIONS

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- Published a paper titled “**Intelligent Traffic Control System: Towards Smart City**” in the 2019 IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON).
- Won the **2<sup>nd</sup> prize in Diversion 2k18**, an inter-college undergraduate technical project competition organized by ACM Student Branch of IEM, Kolkata.
- Completed **Mathematics for Machine Learning Specialization** by Imperial College London on Coursera.
- Completed **Convolutional Neural Networks** course by deeplearning.ai on Coursera.
- Completed **Sequence Models** course by deeplearning.ai on Coursera.
- Completed **Visual Perception for Self-Driving Cars** course by the University of Toronto on Coursera.
- Took a course on **Machine Learning** by Prof. Dr. Andrew Park, Thompson Rivers University, Canada (part of IEM-UEM International Program ).
- Completed **Internet of Things** Summer training by Internshala.
- Completed **The Fundamentals of Digital Marketing** by Google EMEA and IAB Europe.

## SKILLS

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- Deep Learning & Computer Vision
- Artificial Intelligence & Machine Learning
- Formal Languages & Automata Theory
- Design & Analysis of Algorithms
- Database Management

**Programming:** C, C++, Java, Python, LaTeX, SQL

**Software:** TensorFlow, Keras, PyTorch, PacketTracer, MySQL

**Hardware:** Experienced in building and troubleshooting computers, embedded systems, and circuitry.

## ACTIVITIES/ HOBBIES

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- Served as the **General Secretary** of the IEM Quizzard Club from Sep 2018 to Jan 2020.
- Member of the **IEEE Computer Science** Student Branch from the Kolkata Section.
- Volunteer/ Organizing Committee member for college tech-fest “Innovación”, college cultural fest “IEMPACT” and events organized by IEEE throughout the year.
- Completed **Grade 8 in Electronic Keyboard** and **Grade 6 in Music Theory** from the London College of Music.
- Completed **Advance Senior Diploma in Creative Painting** from Vidyasagar Academy, Nehru Children Museum.
- Trained in Swimming and Table Tennis.