# Ajay Ramesh Ranganathan

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## EDUCATION

**Bachelor's/Master's Dual Degree in Electronics and Communication Engineering** — Aug 2017 - July 2022

International Institute of Information Technology - Bangalore (IIIT-B)

- Specialization: Artificial Intelligence and Machine Learning
- CGPA : **3.59 / 4.0** — transcript

## EXPERIENCE

**The MathWorks, Inc.** — Jan 2022 - Jun 2022

Intern - Engineering Development Group

- Worked on Quality Engineering for hardware support packages. This mainly involved the development of automated tests for robotics and embedded systems.
- Developed a generic software component to enable simulation and testing accross various embedded hardware.

**The University of Alabama at Tuscaloosa, USA** — Jun 2020 - Nov 2020

Research Internship — Prof. Edward Sazonov

- Developed a computer-vision system to aid in automatic food intake monitoring from a wearable camera.
- Built an ensemble of YOLO object detection networks to localize food items in an image.
- Explored data augmentation techniques to improve detection on real-world data.
- Integrated the normalized graph-cut and K-Means algorithms to segment the parts of food post detection.

**Indian Institute of Science (IISc)** — May 2019 - Jul 2019

Summer Internship — Prof. M M Nayak

- Built an analog laser communication and vibrometer system.
- Designed circuits for optical modulation and demodulation of audio signals using a 5mW laser diode and solar cell.
- Demonstrated the use of the designed circuitry as also a vibrometer system capable of detecting low-frequency surface vibrations. — Report

## SKILLS

- **Programming Languages**: Python, C++, C, MATLAB
- **Machine Learning**: Numpy, Tensorflow, PyTorch.
- **Embedded Systems**: Arduino, RaspberryPi.
- **Others**: Linux, OpenCV, Git, docker, Simulink, LaTeX

## PROJECTS

**Surgical Tool Characterization from Neurosurgical Videos** — Aug 2020 - Feb 2020

Surgical and Assistive Robotics Lab IIIT-B & NIMHANS — Prof. Madhav Rao

- Developed a neurosurgical tool detection and characterization system using deep learning for the estimation of surgical skill from videos.
- Trained an object detection network to detect and localize four different surgical tools and implemented a bounding box matching and bilinear interpolation technique to improve frame-wise tool detection in videos.
- Computed the following parameters to characterize tool usage of a surgeon: usage frequency, total usage time, and motion trajectory. — Paper

**Tactile Educational Kit for Students with Visual Impairment** — Oct 2018 - Mar 2019

Surgical and Assistive Robotics Lab IIIT-B — Prof. Madhav Rao

- Developed a tactile-audio device to assist visually impaired students in studying tactile diagrams. The design involves a capacitive sensor array to localize touch, which is integrated with audio content delivery and RFID identification systems. — Paper