Ajay Ramesh Ranganathan

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EDUCATION

Integrated Master of Technology in Electronics and Communication Engineering — Aug 2017 - July 2022

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

- 9th Semester Student, CGPA : **3.51 / 4.0**

EXPERIENCE

Social Entrepreneur — Jan 2021 - Present

IIIT-B Innovation Centre

- Won the MEITY TIDE 2.0 ideation grant to develop a tactile audio device for students with visual impairments. Currently working on product development and accessibility. I am leading a team of two interns to design and develop new features for the product.

Summer Research Internship 2020 - Food Detection for Wearable Device — Jun 2020 - Nov 2020

The University of Alabama Tuscaloosa, USA — Prof. Edward Sazonov

- Developed a food detection system to aid in automatic food intake monitoring using egocentric wearable cameras.
- Built an ensemble of YOLO object detection networks to detect food items in the scene.
- Applied data pre-processing techniques such as blur rejection and extensive data augmentation to improve detection on real-world data, and integrated a segmentation pipeline using graph-cut to segment the parts of food on the plate post object detection.
- A full conference paper has been submitted.

Summer Internship 2019 - Analog Laser Communication and Vibrometer System — May 2019 - Jul 2019

Indian Institute of Science Bangalore (IISc) — Prof. M M Nayak

- Designed and built circuits for optical modulation and demodulation of audio signals using a 5mW laser diode and solar cell. Also, demonstrated the use of the designed circuitry as a vibrometer system capable of detecting low-frequency surface vibrations.

PUBLICATIONS

- A. Ramesh, N. Raj, T. K. Srikanth and M. Rao, "Design of a tactile audio gallery for visually impaired students," 2019 IEEE SENSORS, 2019, pp. 1-4, doi: 10.1109/SENSORS43011.2019.8956886.

SKILLS

Programming Languages and Embedded Systems: Python • C++ • C • MATLAB • Arduino • RaspberryPi

Libraries and Tools: Numpy • Tensorflow • Keras • OpenCV • Git • Simulink • LaTeX • Multisim • LTspice

PROJECTS

Surgical Tool Characterization from Neurosurgical Videos — Aug 2020 - Dec 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.
- Detection results were used to characterize tool usage based on the on-off time/frequency, tool usage time and tool motion trajectory.
- Applied an interpolation technique to improve framewise detection performance. A full conference paper has been submitted.

Malaria Parasite Detection in Thin Blood Smear Images — Oct 2019 - Dec 2019

Machine Learning Course — Prof. G Srinivasaraghavan

- Designed a machine learning and computer vision based system to automatically diagnose malaria from blood smear images.
- Engineered features using the SIFT algorithm and the Bag of Visual Words approach, combined with contour and blob detection.
- Classified the infected images using the SVM, Logistic Regression and Random Forest algoritms.
- Designed a Convolutional Neural Network and compared its results with the traditional techniques. Project

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

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

- Developed a low-cost tactile-audio device to assist visually impaired students in studying tactile diagrams.
- Designed a capacitive sensor array integrated with an audio content delivery system. I programmed the Arduino microcontroller to receive sensor data via I^2C protocol and integrated a real-time RFID identification system. Demo

For a complete list of my projects and courses, please visit my Portfolio