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)

- 10th Semester Student, CGPA : **3.59 / 4.0** transcript

EXPERIENCE

The MathWorks, Inc. Jan 2022 - Jun 2022

Internship at the Engineering Development Group

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 the scene.
- 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

PUBLICATIONS

- **A. Ramesh**, V. B. Raju, M. Rao and E. Sazonov, "Food Detection and Segmentation from Egocentric Camera Images," 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 2021, pp. 2736-2740, doi: 10.1109/EMBC46164.2021.9630823.
- **A. Ramesh**, M. Beniwal, A. M. Uppar, V. V and M. Rao, "Microsurgical Tool Detection and Characterization in Intra-operative Neurosurgical Videos," 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 2021, pp. 2676-2681, doi: 10.1109/EMBC46164.2021.9630274.
- R. Doshi, **A. Ramesh** and S. Rao, "Modeling Influencer Marketing Campaigns In Social Networks", Accepted in IEEE Transactions on Computational Social Systems. Pre-print
- **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.
- N. Raj, **A. Ramesh**, T. K. Srikanth and M. Rao, "Live Demonstration : A tactile audio gallery for visually impaired students," 2019 IEEE SENSORS, 2019, pp. 1-1, doi: 10.1109/SENSORS43011.2019.8956527. Video

SKILLS

- **Programming Languages**: Python, C++, C, MATLAB
- **Embedded Systems**: Arduino, RaspberryPi, 8051 microcontroller.
- **Machine Learning**: Numpy, Tensorflow, PyTorch.
- **Others**: Linux, OpenCV, Git, docker, Simulink, LaTeX

VOLUNTEER WORK AND EXTRA-CURRICULAR ACTIVITIES

- **Teaching Assistant** for the Basic Electronics Lab Course (Aug 2020 - Nov 2020) and the Electronic Devices and Circuit Theory Lab Course (Jan 2021 - Apr 2021). My responsibilties included teaching basic concepts, clarifying doubts, and evaluating lab reports.
- **Co-organized an assistive technology exhibition as part of the I-STEM event at IIIT-B in 2019**: I drafted the structure and rules of the event and successfully invited companies across India to showcase their products at the event.
- **Volunteered** for the registration and logistics team at the IEEE HiPC 2018. HiPC
- I am a sports enthusiast and enjoy endurance sports; I successfully completed the Triathlon in Bangalore (400m swimming, 10km Cycling and 5km Running) in 73 minutes. Certificate

SELECTED PROJECTS

Surgical Tool Characterization from Neurosurgical Videos Aug 2020 - Dec 2020

Surgical and Assistive Robotics Lab IIIT-B 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 - suction, cusa, bipolar, and dissecting forceps.
- 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.

Diagnosis of Malaria using Machine Learning Oct 2019 - Dec 2019

Machine Learning Course Project Prof. G Srinivasaraghavan

- Designed a machine learning 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.
- Designed a Convolutional Neural Network and compared its results with traditional classification techniques. Project

Modelling Influencer Marketing Campaigns in Social Networks Aug 2020 - Dec 2020

Research Project Prof. Shrisha Rao

- Built an agent-based model to simulate the dynamics of influencer advertizing campaigns and study advertizing strategies.
- Simulations were performed on real-world datasets and our results reveal the importance of different kinds of influencers (e.g. micro-influencers and celebrities) in varying circumstances of advertizing.
- This work has been submitted for publication. Pre-print

Tactile Audio gallery 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.
- Designed a capacitive sensor array to localize user touch, integrated with an audio content delivery system.
- Won the MEITY TIDE 2.0 ideation grant of INR 400,000 to develop the device
- Actively participated in the field-testing of the device. Demo

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