Anirudh Vajpeyi

Pursuing PhD (Robotics surgery) from Western University, London, ON, CA
Cell: (+1)2269772207, email: vajpeyianirudh@gmail.com, avajpeyi@uwo.ca,

OBJECTIVE

Contribute original work to bridge the gaps in the engineering and scientific community, and cultivate feasible, sustainable, and environment-friendly engineering solutions for the problems of the society.

EDUCATION

PhD Sep 2018 - present
Western University, London, ON, CA London, ON, Canada

Master of Technology in Mechatronics and Robotics June 2015
Indian Institute of Engineering Science and Technology (formerly BESU), Shibpur Howrah, India
Cumulative score (GPA equivalent): 84/100
Thesis: *Real-time target recognition in a multi-sensor scenario*

Bachelor of Technology in Electronics and Instrumentation June 2012
West Bengal University of Technology Kolkata, India
Cumulative GPA: 8.13/10

RESEARCH EXPERIENCE

Project Assistant April 2017 – August 2018
CSIR-CSIO Chandigarh, India

- Worked on an, '**Elephant detection system in the vicinity of railway tracks through forests to avoid the train-elephant collision**'. Approaching the problem **through several seismic and acoustic modalities with a central processing node,** which spans over an area. **Many** such **nodes** together **form a network** to monitor a **larger area** for elephant activities. **Any detected activity** is then confirmed by **classifier and segregated among elephant and others**. The alert generated for **confirmed detection** of elephant is **communicated** to the concerned authority **over a server** with its geographical location. Moreover, there is a provision for an **SMS alert** too. This is achieved with **sbRIO and GSM modem through RS-232** serial communication with **LabVIEW**.

  My Role: The **off-line analysis of the acquired signals** was performed on **MATLAB then subsequently implemented the detection algorithm and used machine learning techniques** for the classification along with the alert generation on sbRIO, to be displayed over the server.

Senior Project Fellow January 2016 – March 2017
CSIR-CSIO Chandigarh, India

- Worked on the project, '**Vehicle Detection and Classification System**', to develop an autonomous system for **detection of vehicle** with the help of **acoustic and seismic sensors**. Upon the detection, it is **classified as** a **tracked or wheeled vehicle** and an **image detection module** is **powered on** for **Infrared vision-based detection and confirmation.** Using the **direction of arrival** algorithm **(DOA)** on **acoustic modality**, the arrival at **zero-degree line of sight of system** is calculated**.**

  My Role: Developed an **application specific modified CFAR detector** for the system on LabVIEW using NI hardware, **cRIO, and sbRIO**. **Implemented k-NN and Maximum Likelihood** algorithms on LabVIEW and used **Neural Networks** for the **classification**.

- Worked on action recognition to **classify walking and running of persons** through their **seismic signatures** with the help of **machine learning** techniques.

Research as a part of M.Tech project thesis July, 2014 – June, 2015
Central Scientific Instruments Organization Chandigarh, India

- Individually worked on **Automatic Target** (vehicles: bus, truck and a tractor) **Recognition** using **Constant False Alarm Rate (CFAR)** algorithm to **detect and classify** passing vehicles using geophones and microphones with the help of **machine learning** techniques such as **k-NN and Maximum Likelihood**. Developed the algorithm on **LabVIEW**, the characteristic signatures were acquired from the frequency domain features of the signals and the targets were classified into above mentioned vehicle classes.

- Developed a **program in C#** to automatically **send a customized SMS and an email notification** to the user upon detection of earthquake, using a **PC and a GSM modem**. This has been incorporated in an **EarthQuake early Warning System (EQWS)** installed in Delhi Metro, India.

Short term research as internship January 2014 – May 2014
Central Mechanical Engineering Research Institute Durgapur, India

- Designed the circuit and developed an algorithm to **use Electroencephalogram signal**, captured by the Neurosky Mindwave headset and **transfer it to the circuit via the Bluetooth module BC-05 to show the relaxation and concentration states of the human brain, via LEDs**.

Short term research as a part M.Tech curriculum August, 2013 – December, 2013
Indian Institute of Engineering Science and Technology Howrah, India

- Wrote **PBASIC** code to **control the walking** pattern of a hexcrawler.

Research as a part of B.Tech project August, 2011 – April, 2012
Gurunanak Institute of Technology Kolkata, India

- Designed the circuit to **detect the arrival and departure of train** with **IR transmitters and receivers**, and also wrote an **assembly code on 8051** microcontrollers to automatically control gates at unmanned railway level crossings.

INDUSTRIAL TRAINING

Summer Training (during B.Tech) June 25, 2011 – July 24, 2011
Hindustan Aeronautics Limited Lucknow, India

- Worked on the Computer Numerical Control machines for manufacturing of screws and nuts used in the wheels and brake system of an aircraft.

COURSES AND SKILLS

- **Computer languages:** Proficient in **LabVIEW, real-time application with cRIO-9082 and sbRIO-9627, assembly language**, and MATLAB with some experience in **C, C#**.
- **Subject of interests: Digital Electronics**, **Digital Image Processing, Robotics and Control**, **Machine Learning**, **Signal processing**.

PATENTS AND PUBLICATIONS

- Filed a **patent f**or **'Method and System for Activity recording, visualization and analysis for identified segments of forest'** in November 2018**.**
- Submitted a paper titled **'Performance evaluation of a real-time seismic detection system based on CFAR detectors'** in IEEE Sensors Journal in January 2019.

ACHIEVEMENTS AND ACTIVITIES

- **TOEFL iBT** score as on 16 Sep 2017: **103/120**
  (Reading: 24, Speaking: 26, Listening: 29, Writing: 24)
- The team working on **'Seismic Detection System for Target Recognition Application'** got **awarded with Skoch Order-Of-Merit** for qualifying amongst **Top-30 Transformational Innovation Projects in India** among approximately 4000 entries.
- Presented a student paper on **'Automatic Railway Level Crossing Gates for Double track system'** at 'Abhivyakti' at National Institute of Technology – Durgapur in January 2011
- Winner of school level competition 'Science Fair' held in 2006.