

EDUCATION

- **Indian Institute of Technology Bombay** Mumbai, India
Bachelor of Technology in Electrical Engineering; CPI: 9.62/10 (2017-2021)
Pursuing minor in **Computer Science and Engineering**

PUBLICATIONS

- **Generalized Fractional Ambiguity Function and Its Applications**
Peeyush Sahay, Izaz Ahamed Shaik Rasheed, Pranav Kulkarni, Shubham Anand Jain, **Ameya Anjarlekar**, P. Radhakrishna Vikram M. G. Generalized Fractional Ambiguity Function and Its Applications. Circuits Syst Signal Process 39, 4980–5019 (2020)
- **Generalized Fractional Matched Filtering and its Applications**
P. Sahay, **A. Anjarlekar**, S. A. Jain, P. Radhakrishna and V. M. Gadre, "Generalized Fractional Matched Filtering and its Applications," 2020 National Conference on Communications (NCC), Kharagpur, India, 2020, pp. 1-6, doi: 10.1109/NCC48643.2020.9055991

INDUSTRIAL EXPERIENCE

- **Video Compression for efficient Remote Support video storage and retrieval** Daikin Industries
Guide: Mr. Hari Prasad, Mr. Kumata Toshiaki (June 2020)
 - Achieved around **70% video data compression** by developing a **Hitomi Camera**-inspired algorithm
 - Devised a video reconstruction algorithm by exploiting the spatial as well as temporal redundancy through **DCT** basis or a **learned dictionary**. The reconstructed video achieved a **PSNR** of around **24**
 - The video compression algorithm is **data independent** (when DCT used) and quality of reconstructed images is significantly improved (around 3-4 PSNR) by replacing DCT basis with learned dictionary

RESEARCH AND TECHNICAL PROJECTS

- **Sensing Matrix Design with Weighted Mutual Coherence** IIT Bombay
Guide: Prof. Ajit Rajwade (August 2020 - Present)
 - Designed sensing matrices by minimizing weighted (determined from training data) **mutual coherence**.
 - Proposed an approach to design weights to handle rotation, scaling and translation of images
 - Currently working on designing efficient sparse binary sensing matrices through weighted mutual coherence minimization. The sensing matrix is designed for use in group testing for **COVID 19**
- **Compressed Sensing with Deep Image Prior** UC San Diego
Guide: Prof. Piya Pal (July 2020 - Present)
 - Working to develop **Deep Image Prior** based compressed sensing approach for the case of limited data
 - Proposed a **rectified sparse Bayesian** based learning technique for training of the model
- **Generalized Time-Frequency Transform in Radar** IIT Bombay
Guide: Prof. V.M. Gadre, Dr. Peeyush Sahay(Senior Scientist DRDO) (April 2019 - May 2020)
 - Proposed **Generalized Frequency Ambiguity Function** for parameter estimation of chirp signals
 - Developed **Generalized Fractional Matched Filter** by which object parameters like acceleration and velocity can be more accurately estimated using Generalized Time-Frequency Transform
 - Received **IRCC Honorarium** for excellent R&D work in Radar Signal Processing
- **Image Reconstruction for Parallel MRI** [\[Doc\]](#)[\[Code\]](#) IIT Bombay
Guide: Prof. V.M. Gadre (September 2018 - June 2019)
 - Implemented a modified version of **GRAPPA** algorithm on **Xilinx Zynq-7000 FPGA Board** for image reconstruction used in the indigenous MRI machine at IIT Bombay
 - Awarded **Undergraduate Research Award** (URA-01) by IIT Bombay for this contribution

- **Supervised Detection of Tennis Ball from Camera Stream** [[Doc](#)][[Code](#)] IIT-B Mars Rover Team
University Rover Competition(URC 2019) (Aug 2018 - Dec 2019)
 - Completed the **ball detection** task required in the **autonomous** operations of the rover
 - Devised an algorithm for the task which comprises of first pre-processing the test images, then using **transfer learning** by which we re-train an already trained Alexnet model on our generated dataset
 - Each test image was pre-processed using **circular hough transform** to extract features regarding shape

Course Projects:

- **Use of Residuals for Image Denoising (Guide: Prof. Ajit Rajwade):** Implemented a denoising algorithm using the residual image. Also, studied and implemented metrics for quality of image denoising without the use of the reference image. Report can be found [here](#)
- **Blind Compressed Sensing (Guide: Prof. Ajit Rajwade):** Reviewed various theoretical derivations of Blind Compressed Sensing and implemented the corresponding algorithm for joint estimation of dictionary and images. Report can be found [here](#). Mathematical analysis is provided [here](#)
- **Target Parameter Estimation from Compressive Measurements (Guide: Prof. Vikram Gadre):** Estimated parameters of a rotating target through Doppler and Micro-Doppler estimation of corresponding radar signal from its compressive measurements. Report can be found [here](#).

ACADEMIC RESPONSIBILITIES

Department Academic Mentor

- Part of a team of **35** mentors after rigorous rounds of extensive peer reviews and interview
- Mentoring **6** sophomore students by providing academic guidance and help in other non-academic issues

Teaching Assistant

- Responsible for conducting tutorial sessions and evaluations for courses **PH 108** (Electricity and Magnetism), and **MA 108** (Differential Equations I)
- Head teaching assistant for the course **MA 207** (Differential Equations II) and responsible for conducting doubt solving sessions, paper setting and evaluations

Instructor: Machine Learning Bootcamp

- Conducted sessions on Deep Learning, K-Means, EM algorithm, Bayesian Models and Decision Trees

SCHOLASTIC ACHIEVEMENTS

- Awarded the 'Institute Technical Special Mention' for contribution to technical sphere in the institute [2020]
- Secured an **AP** grade (awarded to less than 1% students) in course on differential equations (MA 207) [2018]
- Secured an All-India Rank **132** in **JEE - Advanced** and an All-India Rank **215** in **JEE - Main** [2017]
- Awarded fellowship by the Indian Institute of Science (IISC), Bangalore for securing an All-India Rank of **243** in **KVPY** (Kishore Vaigyanik Protsahan Yojana) out of around 80,000 students [2017]
- Among the top **500** students of the nation to be selected for the **Indian National Maths Olympiad** [2015]
- Secured the nationwide top **1%** position in **NSEP** (National Standard Examination in Physics) conducted by IAPT (Indian Association of Physics Teachers) [2016]

KEY COURSES TAKEN

- **Probability and Statistics:** Data Analysis and Interpretation, Probability and Random Processes
- **Computer Science:** Introduction to Machine Learning, Design and Analysis of Algorithms, Data Structures and Algorithms, Digital Image Processing, Advanced Image Processing, Reinforcement Learning (edX), Theoretical Machine Learning, Introduction to Programming
- **Mathematics:** Real Analysis, Linear Algebra, Differential Equations(I and II), Complex Analysis
- **Electrical Engineering:** Signals and Systems, First Course in Optimization, Microprocessors, Wavelets, Digital Communications, Network Theory, Digital Communication, Digital Signal Processing

EXTRA-CURRICULAR ACHIEVEMENTS

- Volunteered career counseling drive organized by Abhyuday (Social service body of IIT Bombay) [2017]
- Completed **NCC** (National Cadet Corps) training and attended its **Annual Training Camp** [2017]
- Responsible for conducting fine arts competitions for Mood Indigo, annual social fest of IIT Bombay [2017]

Extended CV can be found [here](#).