Yash Sanghvi

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Research Interests

Computational Imaging, Inverse Problems, Signal Processing, Compressive Sensing, Machine Learning

Education

- **Purdue University** *Aug.'19 - Present*
  Graduate Research Assistant
  Advisor: Prof. Stanley Chan
- **Indian Institute of Technology Bombay** *Jul.'13 - Jul.'18*
  Dual Degree (B.Tech. + M. Tech.) in Electrical Engineering
  CGPA: 9.12
  Thesis Title: "Application of Wavelets in Inverse Scattering"
  Advisor: Prof. Vikram M. Gadre

Academic Achievements

- Recipient of **Ross Fellowship** from School of Electrical and Computer Engineering, Purdue University *2019*
- Awarded **Certificate of Appreciation** for commendable performance of T.A. duty in the undergraduate course *Network Theory*, held in Autumn Semester *2017*
- Awarded **Undergraduate Research Award [URA-01]** for project titled *'Chirp Signal Parametrization using Particle Swarm Optimization'* *2015*

Publications

- Yash Sanghvi, Yaswanth Kalepu, and Uday Khankhoje, "**Embedding Deep Learning in Inverse Scattering Problems**", accepted, IEEE Transactions on Computational Imaging
- Yaswanth Kalepu, Yash Sanghvi, and Uday Khankhoje, "**Reconstructing dispersive scatterers with minimal frequency data**", submitted, IEEE Geoscience and Remote Sensing Letters

Selected Work and Research Experience

- **Embedding Deep Learning in Inverse Scattering** | Project Scientist
  Guide: Prof. Uday Khankhoje *Sep.'18-Present*
  Developing a deep learning based framework to solve the electromagnetic inverse scattering problem, building up on the existing iterative solutions and aimed at addressing the issue of imaging strong scatterers.
- **Wavelets in Inverse Scattering** | Master's Thesis
  Guide: Prof. V.M. Gadre *May'17 - May'18*

- Formulated iteratively reweighted variation of the joint ℓ_1-ℓ_2 regularization Born iterative method to obtain improved dielectric profile reconstructions.
- Developed a non-linear constrained optimization framework to solve inverse scattering problem. The local minima encountered are circumvented by a penalty function based approach to imposing physical constraints.

- **Real Time Beat Tracker** | IEEE Signal Processing Cup
  Guide: Prof. V. Rajbabu *Oct.'16 - Dec.'16*
  Formulated a novel real-time beat tracking algorithm with ability to account for time-varying tempo and implemented on a Raspberry Pi; achieved 55.13% accuracy on the test dataset
- **Texas Instruments, Bangalore** | Summer Intern
  Time-of-Flight Camera Team *May'16 – Jul.'16*
  - Developed novel metrology system to extract dimensions of objects from ToF images using classical computer vision based methods. The metrology system was integrated into *Voxel Viewer*, the in-house software for depth image visualization and camera-to-PC interface.
  - Formulated a novel calibration procedure for low resolution depth camera (60×80 and 240×320) which simultaneously estimated the camera parameters (optical center and focal length) and per-pixel phase offset.
- **Design Engineer** | IIT Bombay Racing
  Battery Management Subsystem *Mar.'15 – Apr.'16*
  - Designed and assembled 389V battery from lithium ion cells, along with auxiliary management system for voltage & temperature monitoring of cells
  - Designed an integrated PCB responsible for interfacing battery and motor controllers which included several smaller components such as pre-charge discharge circuits, energy monitoring

Teaching

- **Introduction to Machine Learning** | Teaching Assistant
  Instructor: Prof. Amit Sethi *Jan.'18 - Apr.'18*
- **Network Theory** | Teaching Assistant
  Instructor: Prof. V.M. Gadre *Jun.'17 - Nov.'17*
  - Awarded **Certificate of Appreciation** as recognition for commendable work as TA
- **Fundamentals of Wavelets** | Teaching Assistant
  Instructor: Prof. V.M. Gadre *Jan.'17 – Apr.'17*

Technical Skills

- **Languages**: C++, Python, MATLAB, LaTeX, Octave
- **Packages**: Numpy, Scipy, PyTorch, Tensorflow, OpenCV, OpenCL
- **Software / Hardware**: LTSpice, Eagle, Quartus, GNURadio, Arduino, ATMega AVR,