

Anand Gokhale

Indian Institute of Technology Madras

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EDUCATION

*: AS OF SEPTEMBER 2020

Indian Institute of Technology Madras, Chennai, India

July 2017 - May 2022

- Bachelors and Masters in Technology in Electrical Engineering
- Specialization in Control Systems

CGPA : 8.90/10*

CGPA in control system related courses : 9.59/10*

PROFESSIONAL EXPERIENCE

Stanford Cognitive and Systems Neuroscience Laboratory, Stanford Medicine

Aug 2020 - Present

- Guide : Prof. Vinod Menon
- Developing simulation based models for brain dynamics, and implementing learning methods on brain data

Electrical and Computer Engineering Department, University of California San Diego

May 2021 - Sept 2021

- Summer Intern, Guide : Prof. Behrouz Touri
- Developing Distributed optimization methods resilient to noisy and quantized networks

Dynamics and Control Lab, IIT Madras

Aug 2020 - Present

- Dual Degree Student, Guide: Prof. Ramkrishna Pasumathary
- Developing theories for network controllability, and attempting to model brain dynamics

Department of Electrical Engineering, IIT Madras

Jul 2021 - Nov 2021

- Teaching Assistant for Linear Dynamical Systems
- Conducted classes, Created Assignments, Question Papers for graduate level course on Linear System Theory

Internship In Automated Driving Team, Mercedes Benz R&D India

May -July 2019

- Intern, Lane Fusion Team
- Designed novel algorithms for safety systems in ADAS enabled cars, robust to various disturbances in multiple sensors

RESEARCH EXPERIENCE

Master's Thesis : A study on Brain networks

August 2020 - Present

- Guide : Prof. Ramkrishna Pasumathary, IIT Madras, in collaboration with Prof. Vinod Menon, Stanford Medicine
- Developed and identified algorithms to optimize controllability metrics for target controllability
- Studied nonlinear network models, including the Hopf model and the Wilson Cowan model, and developed theories for controllability under these models
- Developed Deep learning models to predict gender based on fMRI data
- Developed methods to identify the regions of the brain, and the connections within the brain which explain the output of the model

Distributed optimization under noisy/lossy communication

August 2020 - Present

- Guides : Prof. Behrouz Touri, UC San Diego, Prof. Soheil Mohajer, University of Minnesota
- Worked on a two time scale gradient descent approach for distributed optimization for time varying noisy networks, and networks involving quantized systems
- Identified and derived sufficient conditions for almost sure convergence to the optimal solution for the distributed optimization problem under lossy/noisy channels
- Currently Preparing a manuscript for submission to Transactions on Automatic Control

Online distributed optimization with Adversaries

May - Sep 2021

- Guide : Prof. Rachel Kalaimani, IIT Madras
- Developed an algorithm for Distributed Online optimization against Byzantine Adversaries
- Defined a notion of regret for an online optimization problem in an adversarial setting
- Currently Preparing a manuscript for submission to American Control Conference, 2022

PUBLICATIONS

- **A Gokhale**, MV Srighakollapu, RK Kalaimani and R Pasumarthy, "Optimizing controllability metrics for target controllability", Indian Control Conference, 2021, [Accepted]
- S Sahoo, **A Gokhale**, and RK Kalaimani, "Distributed Online Optimization with Byzantine Adversarial Agents", American Control Conference, 2022, [Submitted], Preprint available on arxiv

RELEVANT PROJECTS

Developing Freespace estimation model for Indian Road using unlabelled data

Oct - Nov 2019

- Built a self supervised neural network to identify freespace for ADAS systems on unlabelled data
- Implemented and trained AdapNet, Multimodal Semantic segmentation network on unlabelled data from the Indian Driving Dataset using an existing network trained using KITTI Dataset

Course Project; Geometry & Photometry-based Computer Vision

Apr - Aug 2020

- Implemented Realtime sparse stereo odometry using python, by estimating motion between consecutive frames
- Benchmarked this approach against S-PTAM and Stereo DSO using Kitti Odometry Dataset, and identified limitations of proposed algorithm

Development of a Compiler for a Systolic Accelerator

Jan - Jun 2020

- Guide : Prof. Pratyush Kumar, RISE Lab, IIT Madras
- Developed Compiler for in house developed Systolic Accelerator as a peripheral to Shakti Processor
- Developed Autotuning algorithms for optimal runtime of Deep Learning Models on a custom systolic accelerator

RELEVANT COURSEWORK

- | | |
|--------------------------------------------|----------------------------------------|
| • Linear Dynamical Systems | • Distributed Optimization for Control |
| • Networked Control Systems | • Optimal Control |
| • Convex Optimization | • Stochastic Control |
| • Systems Engineering for Deep Learning | • Applied Linear Algebra |
| • Geometry, Photometry for Computer Vision | • Probability Foundations |
| • Deep learning for Imaging | • Computer Organization |

POSITION OF RESPONSIBILITY

Head- Computer Vision and Intelligence Group, Centre for Innovation

Apr 2019-Feb 2020

- Undertook and mentored several projects in pattern recognition, autonomous mapping and navigation, reinforcement agents, etc.
- Conducted sessions and workshops for a 200+ audience on topics involving machine learning and artificial intelligence

SCHOLASTIC ACHIEVEMENTS

- Secured **AIR 1716** in JEE Advanced 2017 (out of about **220,000+ candidates**)
- Secured **AIR 3724** in JEE Mains 2017 (out of about **1,200,000 candidates**)
- Awarded **KVPY Scholarship** (top 1% out of 10,000 applicants) and **offered fellowship** in 2017

EXTRA CURRICULAR ACTIVITIES

- Senior Diploma in Hindustani Classical music for playing a keyboard/piano.
- Selected for NSO-Soccer, and trained with institute soccer team for a year.