

SUDHANSH PEDDABOMMA

+1 (858)-518-9808 @ sudhansh6@gmail.com sudhansh6.github.io sudhansh6 in sudhansh-peddabomma

EDUCATION

University of California San Diego

Master of Science in Computer Science and Engineering

Sep 2023 - Jun 2025

GPA 4.00/4.00

Indian Institute of Technology Bombay

Bachelor of Technology with Honors in Computer Science and Engineering, Minor in Entrepreneurship

Jul 2019 - Jul 2023

CPI 9.66/10

PUBLICATIONS

- > S. Peddabomma, S. Banerjee, R. Srivastava, A. Rajwade, **A likelihood based method for compressive signal recovery under Gaussian and saturation noise** in Signal Processing 2024 DOI : 10.1016/j.sigpro.2023.109349
- > M. Betcke, A. Hauptmann, W. Hong, E. Macneil, S. Peddabomma, K. Rullan, **“Learned Stochastic Primal Dual for large scale and fully 3D tomographic reconstruction”** Special Issue IOP 2023 (Manuscript under preparation)

RESEARCH PROJECTS

3D PERCEPTION FOR HOME ROBOTS

SEPTEMBER 2023 - PRESENT

Graduate Student Researcher, Supervised by Prof. Henrik Christensen

- > Implemented dense SLAM algorithms with **NeRFs** and **Gaussian Splatting** for real-time 3D scene reconstruction
- > Developing a robust mesh-completion algorithm for 3D object detection during manipulation of items

3D TOMOGRAPHY WITH PRIMAL-DUAL NEURAL NETWORKS

MAY 2021 - JUN 2023

Supervised by Prof. Marta Betcke, University College London

- > Developed a stochastic neural-network architecture of primal-dual algorithm for **online reconstruction of 3D volumes** from tomographic scans and obtained **99.6% structural similarity** in challenging low-dosage conditions
- > Built a Python library with custom network layers in Tensorflow for reconstruction using cone-vector tomography

LIKELIHOOD MAXIMISATION FOR SATURATED COMPRESSED SENSING

JUL 2021 - MAY 2023

Supervised by Prof. Ajit Rajwade, IIT Bombay, [REPORT]

Bachelor Thesis Project

- > Proposed a novel likelihood maximization technique to recover **signals, images, and audio** from compressed measurements and obtained **20% lower RMSE** over the state of the art methods even with high saturation effects
- > Established robust performance guarantees with statistical methods and published a journal paper on this work

PERMUTATION NOISE IN COMPRESSED SENSING

JUL 2022 - MAY 2023

Supervised by Prof. Ajit Rajwade, IIT Bombay

Research and Development

- > Developed a noise model for **mislabelled measurements** in group testing of Covid-19 and designed a correction algorithm that rectified upto **15%** mislabeled measurements in the presence of Gaussian noise

EXPERIENCE

MAY 2022 - JUL 2022 Data and Applied Scientist Intern, MICROSOFT

- > Developed a **decision-tree ranker** for **Outlook** to suggest emails to users based on their past interactions
- > Engineered a dataset using user-dependent email attributes extracted from a large-scale data pipeline
- > Demonstrated an optimized ranking model using hierarchical feature sets, resulting in higher recall

JAN 2022 - APR 2022 Software Engineer Intern, FINIQ

- > Designed a parser to verify the format in email transactions, lowering the trade-discard rate **up to 15%**
- > Created a **markup language** with variable declarations, conditions, and table formatting for emails
- > Implemented a parser using Lex and Yacc for **segmenting scripts** with interleaved code from multiple languages, to develop programs with different scripts in a single file

NOV 2021 - DEC 2021 Software Engineer Intern, FINIQ

- > Enhanced the firm's trading platform by deploying **pricing models for options** and target redemption forwards, such as Black-Scholes and Heston Local Stochasticity models with **Monte Carlo simulations**

KEY PROJECTS

NAVICANE - SMART CANE FOR THE VISUALLY DISABLED

JAN 2023 - APR 2023

Proof of Concept Advanced, Entrepreneurship

- > Innovated a smart cane for the visually impaired with obstacle detection and real-time **navigational guidance**
- > Demonstrated a **working prototype (MVP)** powered by **Raspberry Pi** that delivers haptic and audio based alerts
- > Interacted with visually impaired individuals to identify challenges and incorporated their feedback in the design


AUGMENTED REALITY SUDOKU SOLVER

JAN 2023 - APR 2023

- > Created a real-time **Augmented Reality** Sudoku Solver application in Python, leveraging Keras and **OpenCV**
- > Optimized **Alexnet** for efficiency and ensured robust performance under various lighting conditions

IMAGE COLORIZATION

MAY 2021 - JUL 2021

Seasons of Code, WnCC IIT Bombay  [Web Application](#)

- > Developed and **deployed** a **Pix2Pix GAN** web-application to transform grayscale images to colored ones
- > Implemented a **U-Net architecture** for the generator and utilized **patch discriminator** for effective translation

MDP OPTIMIZATION WITH REINFORCEMENT LEARNING

AUG 2021 - NOV 2021

Supervised by Prof. Shivaram Kalyanakrishnan

- > Explored sampling algorithms such as **KL-UCB** and **Thompson Sampling** for stochastic multi-armed bandits
- > Designed a Markov Decision Process for anti tic-tac-toe with **Howard's policy iteration** for deriving the optimal policy
- > Implemented **SARSA** with linear approximation and tile-coding, and simulated the results using **OpenAI Gym**

RED FLAG - PLAGIARISM CHECKER

SEP 2020 - NOV 2020

Supervised by Prof. Amitabha Sanyal

- > Deployed a web application using **Angular** and **Django**, for verified users to conduct plagiarism checks on code files
- > Employed **Latent Semantic Analysis** and **TF-IDF**, with pre-processing for in-depth script similarity analysis

VIRTUAL KEYBOARD WITH COMPUTER VISION

MAY 2020 - JUL 2020

Seasons of Code, WnCC IIT Bombay

- > Developed an **Augmented Reality** Keyboard application that captures the user input from a camera using **OpenCV**
- > Employed techniques like thresholding and edge detection to extract keys and pointer location in real-time

OTHER PROJECTS

COMPILER FOR C LIKE LANGUAGE

JAN 2022 - APR 2022

Supervised by Prof. Uday Khedkar

- > Developed a compiler for a subset of C that supports **semantic analysis**, scope levels and **control sequences**
- > Explored concepts in compiler optimization and register allocation algorithms - **Chaitin-Briggs** and **Sethi-Ullman**

EDGE DETECTION USING SKELLAM DISTRIBUTION

MAR 2021 - APR 2021

Supervised by Prof. Ajit Rajwade

- > Explored Skellam distribution to model noise in images, enabling robust **edge detection** and **background removal**
- > Leveraged statistical techniques, including hypothesis testing to robustly identify edges in real-world data

LOGIC ENCODING USING Z3PY

JAN 2021 - APR 2021

Supervised by Prof. Ashutosh Gupta

- > Encoded a **robust Mastermind agent** to play against an unreliable opponent using first-order logic clauses
- > Developed a solver for extracting the **minimal set of edges** required to disconnect any two given vertices of a graph

STOCK MARKET ANALYSIS

MAY 2020 - JUL 2020

Maths and Physics Club, IIT Bombay

- > Authored a detailed report on Stock Markets, covering topics ranging from **Technical Analysis** to **Options Trading**
- > Acquired in-depth understanding of financial concepts such as Option Greeks, Dow Theory and Candlestick Patterns

XV6 OPERATING SYSTEM

SEP 2020 - DEC 2020

Supervised by Prof. Mythili Vutukuru

- > Built a Linux shell in C with support for parallel, background execution of processes, signal handling and system calls
- > Incrementally enhanced xv6 OS to facilitate **process and memory management** with custom system calls, along with **file system operations** to create, edit and delete files on an emulated disk

SCHOLARSHIPS AND AWARDS

2023	Secured the KC Mahindra scholarship of INR 500,000 for post-graduate studies
2019	Awarded Gold Medal for being in the Top 39 students in the Indian National Astronomy Olympiad
2019	Secured 3rd rank in Statistics Olympiad conducted by AIMSCS across India and Sri Lanka
2017, 19	Participated in Orientation-cum-Selection Camp (OCSC) for IOAA conducted by HBCSE
2019	Among top 300 selected for Indian National Olympiads in Mathematics, Physics, and Chemistry
2019	Secured All India Rank 178 in JEE Advanced and 424 in JEE Mains among 1.2 million candidates
2017, 18	Recipient of the prestigious Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship

POSITIONS OF RESPONSIBILITY

	Teaching Assistantships <ul style="list-style-type: none">> Quantum Cryptography, UC San Diego> Physical Chemistry, IIT Bombay	JAN 2024 - PRESENT MAR 2022 - MAY 2022
MAR 2022 - APR 2023	Team Leader, ExoFLY - Tech Team at IITB <ul style="list-style-type: none">> Led a 40-member team to design a safe and compact manned eVTOL aerial vehicle for short flights> Successfully secured funding by presenting goals and strategic plan, enabling team's development> Designed a controller on Simulink, including fail-safes and sensor fusion with Extended Kalman Filter	
MAY 2022 - MAY 2023	Senior Department Academic Mentor, COMPUTER SCIENCE <ul style="list-style-type: none">> Among the 11 senior mentors in a team of 34 responsible for mentoring sophomores	
MAY 2021 - JUL 2021	Summer of Science Mentor, MATH AND PHYSICS CLUB - IITB <ul style="list-style-type: none">> Mentored 2 freshmen students in Stock Market Analysis by providing resources and clearing doubts	

COURSES UNDERTAKEN

ARTIFICIAL INTELLIGENCE	Recommender Systems and Data Mining, Computer Vision, Intelligent and Learning Agents, Artificial Intelligence and Machine Learning
COMPUTER SCIENCE	Quantum Computing, Robotics, Game Theory and Algorithmic Mechanism Design, Network Security and Cryptography, Operating Systems, Advanced Image Processing, Design and Analysis of Algorithms, Computer Networks
MATHEMATICS & STATISTICS	Convex Optimization, Numerical Analysis, Calculus, Linear Algebra, Discrete Structures, Data Analysis and Interpretation

SKILLS

Programming	C++, C, Python, MATLAB, Java, Bash, VHDL, MIPS
Tools & Software	PyTorch,, ROS, OpenCV, TensorFlow, CUDA, Pandas, Matplotlib, scikit-learn, Git, \LaTeX
Development	HTML5, JavaScript, Angular, Django, Heroku, SQL, Kivy, Android Studio, Arduino
Expertise in	Computer Vision, Artificial Intelligence, Algorithms, Statistical Modeling, Image Processing

EXTRACURRICULARS

2022	Secured second position in Department Basketball tournament conducted by CSEA
2021	Participated in the Preview Program and the Estimathon competition conducted by Jane Street
2020	Participated in the cybersecurity CTF (Capture The Flag Tournament) conducted by CSEC
2020	Aided in forming associations with outreach partners for Eureka! , conducted by E-Cell IIT Bombay
2020	Successfully completed a year-long course under NSO in keyboard in the freshman year