Siddharth Satyam

+91-8252290725 ssatyam@ucsd.edu linkedin.com/in/sidsa siddharth130500.github.io

Education

University of California San Diego **Sept 2022 - April 2024**
MS in ECE, Machine Learning and Data Science *San Diego, California*

IIT Kanpur **CPI - 9.4/10**
Bachelor of Technology in Mechanical Engineering *Kanpur*

Work Experience

ACES Lab **Aug '22 – ongoing**
Research Volunteer *UC San Diego*

- Working on untargeted Backdoor attacks on Physics-guided Deep Learning models in Turbulence modelling.

Lenek Technologies **May '22 – Ongoing**
Data Science Intern *Remote*

- Built a Unet model to perform segmentation of Left Ventricle in cardiac ultrasound images with fIoU of 95%.
- Used a R2+1D pytorch architecture to create a Ejection Fraction prediction model with 5.91 test MAE.
- Currently working on Swin Transformer, a Vision Transformer architecture to denoise ultrasound images.

Larsen and Toubro Infotech [presentation] **June '21 – July '21**
Software and ML Engineer Intern *Powai, Mumbai*

- Worked on a regression service to predict carbon footprint in supply chain processes of Chevron client.
- Used SAP Document Information Extraction services to use the data for the prediction analysis application.
- Integrated data from HANA in-memory relational database to the web application using OData services.

Publications

- **Energy-Efficient Implementation of GANs on Passive RRAM Crossbar Arrays**
  Submitted to: IEEE Transactions on Neural Networks and Learning Systems **[arXiv]**
- **Long Short-Term Memory Implementation Exploiting Passive RRAM Crossbar Array**
  IEEE Transactions on Electron Devices, doi: 10.1109/TED.2021.3133197 **[arXiv]**

Research Projects

Spectrum Based Fault Localization using GNNs | *Prof. Subhajit Roy, IIT Kanpur* **Sept '21 - April '22**

- Implemented spectrum based fault localization as a graph network of test cases and program components.
- Created a graph neural network model to learn node representations for program components.
- Used the node representations to generate bug suspicion probabilities through feed forward networks.
- Evaluated results with respect to SOTA metrics for fault localization such as Ochiai and Tarantula. **[report]**

Vanilla GAN — Neuromorphic computing | *Prof. Shubham Sahay, IIT Kanpur* **Nov '20 - April '21**

- Implemented Generative Adversarial Networks to synthesize realistic looking images of the MNIST dataset.
- Performed a simulation of fixed amplitude training by in-situ computations on passive RRAM crossbar arrays.
- Evaluated energy efficiency and accuracy considering the effects of RRAM device-to-device variations.
- Performed a detailed study on the effects of noise inputs to the generator from random sampling by pseudo random noise generators and noise from true random noise generators on the accuracy of the output images.

LSTM — Neuromorphic computing | *Prof. Shubham Sahay, IIT Kanpur* **[code]** **Nov '20 - April '21**

- Performed a time series analysis using LSTM networks for the prediction of airline passenger dataset.
- Simulated a fixed amplitude in-situ training and evaluated effects RRAM device-to-device variations.
- Performed a comparative study to predict the enhanced accuracy and energy efficiencies of LSTM implementation in passive over active 1T-1R crossbar arrays.

Technical Skills

Languages: Python, C, C++, MATLAB, FORTRAN

Software: VS Code, Cloud Foundry, SAP Business Application Studio, Ansys, SolidWorks

Libraries: NumPy, Pandas, Matplotlib, scikit-learn, SciPy, Keras, Tensorflow, Pytorch, DGL, OpenCV, scikit-image, NLTK

Relevant Coursework

Programming: Deep Learning **ME698**, Data Structures and Algorithms **ESO207**
C Programming **ESC101**, Cryptology **CS641**, Numerical Methods **ME685**

Mathematics: Linear Algebra and ODE **MTH102**, Partial Differential Equations **MSO203**
Tensor Algebra **ME321**, Complex Analysis **MSO202**, Real Analysis **MTH101**

Electronics: Introduction to Electronics **ESC201**, Power Electronics **ESO203**, Control Systems **ME354**

Cognitive Science: Cognitive Neuroscience **CGS609**, Psychology of Language **PSY499**
Applied Psychology **PSY152**

Certifications

- **Probability Theory, Statistics and Exploratory Data Analysis**: Higher School of Economics
- **Getting Started with Data Science (Edition 2021)**: OpenSAP
- **Understanding Deepfakes with Keras**: Coursera

Achievements

- Merit certificate Awardee in Indian National Mathematical Olympiad 2016 conducted by HBCSE.
- Received offer at University of Technology of Troyes for their semester exchange program in 2020.
- Received a Pre-Placement Offer from Larsen and Toubro Infotech in the SAP Business unit.
- National Talent Search Examination NTSE scholarship awardee conducted by Indian Govt. in 2016.
- KVPY SX fellowship awardee, conducted by IISc Bangalore in 2017, securing rank 1010 in India.
- Secured 4^{th} rank at Regional Mathematical Olympiad RMO 2015 and 11^{th} rank at RMO 2014.

Extracurricular Activities

Tabla: Received Senior Diploma and placed in first division by Prayag Sangeet Samiti, Allahabad in 2011-12.

Company Coordinator, Students' Placement Office IIT Kanpur: Coordinated with the companies and students to ensure smooth conduction of two weeks long Placement Drive 2019.

Secretary, Ritambhara 2019: Assisted in the management of the fashion event at the cultural fest Antaragni.

Student Guide, IIT Kanpur: Mentored 6 freshmen to ensure smooth transition to campus life.

Secretary, Fine Arts Club IIT Kanpur: Supervised and participated in performances and exhibition events.

Talks: Neural Correlates of Emotional Responses to Music, Endsemester talk for the course CGS609A **[Link]**