Curriculum Vitae – Anwesh Mohanty

Contact Information

Anwesh Mohanty
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Education

Indian Institute of Technology Bombay *July 2017-Present*
B. Tech in Electrical Engineering, GPA : 9.49/10

Research Experience

SincNet for Keyword Detection University of Tuebingen, Germany *April 2020-Present*
Advised by Prof. Oliver Bringmann

- Implemented SincNet, a convolutional neural network, in PyTorch for small-footprint keyword spotting based on the paper "Sinc Convolutions for Small-Footprint Keyword Spotting
- Increased the efficiency in the model efficiency of the model by reducing the number of computations and the total number of weights, and at the same achieving the same final accuracy compared to the original SincNet model
- Conducted an extensive benchmarking under several noise conditions, where the proposed model outperformed the state-of-art TC-RESNET 8 model

PCMO Reset Transient Analysis IIT Bombay, India *May 2019-July 2019*
Advised by Prof. Udayan Ganguly

- Designed a LTSpice model to verify the lumped model temperature behavior of the PCMO device
- Developed a physical and corresponding quantitative MATLAB model to compare the effects of electrical field and temperature on the reset transient of the device
- Calibrated the MATLAB model parameters to give accurate results for various devices

Zero-shot Knowledge Distribution IIT Bombay, India *May 2019-July 2019*
Advised by Prof. Biplab Banerjee

- Performed an extensive literature review on techniques used in knowledge distillation, and implemented knowledge distillation on the MNIST dataset with 99% final accuracy
- Crafted data impressions using the teacher model for zero-shot training on student model using the hyper-spectral remote sensing dataset
- Designed and trained the teacher and student model on the required dataset to complete zero-shot knowledge distillation and achieved high accuracy

Technical Projects

Eigen Faces vs Fisher Faces *July 2019-Nov 2019*
Course Project in Digital Image Processing supervised by Prof. Suyash Awate

- Implemented and compared two popular face recognition algorithms, fisher faces and eigen faces
- Analyzed the differences in performances of the algorithms on the Yale Face Dataset which has sufficient variations in lighting and facial expressions
- Provided a mathematical basis to explain the difference in performance of the algorithms

Image Compression using k-Means Clustering *July 2019-Nov 2019*
Course Project in Machine Learning supervised by Prof. Biplab Banerjee

- Implemented k-means clustering algorithm to achieve image compression with significant decrease in size while still retrieving the important image attributes
- Designed a CNN in Keras to implement a basic classification task
- Compared the accuracies achieved using the compressed and original image datasets to show that important information is still preserved in the images

Transient Thermal Feedback Model for PMO RRAM *July 2019-Nov 2019*
Course Project for Nanoelectronics supervised by Prof. Udayan Ganguly

- Studied several research papers and gave a talk on the conduction mechanism in PMO devices
- Explored the role of self heating in PMO DC I-V characteristics by developing a thermal feedback based model in MATLAB, and verified the experimentally observed hysteresis
- Obtained the thermal transients to explain the DC I-V hysteresis on varying the ramp rates and the step response of the device

IITB-Proc, a multi-cycle RISC Processor Designing *July 2019-Nov 2019*

Course Project for Digital Systems supervised by Prof. Virendra Singh

- Developed a 16-bit, 8-register processor to solve general complex problems
- Implemented the design of Register File, Datapath, Finite State Machine, ALU and other relevant components, and included operations like add, load, store and jump
- Used VHDL for description of the hardware design of various components and integrating them along with the controller FSM using suitable select pins

Hand Gesture Controlled 3-D Hologram *May 2018-July 2018*

Technical Project under the Electronics and Robotics Club

- Created models and animations in Unity, and basic model operations like rotation, scaling and changing to other models were incorporated using standard model libraries
- Constructed a self-designed IR sensor board to record the input in the form of hand gestures
- Utilized an Arduino MEGA to provide the interface between the Unity game and IR sensor board, and the final output was presented in form of a 3-D hologram

Miscellaneous Achievements

- Achieved All India Rank of 77 in JEE Main among 1.2 million candidates
- All India rank of 108 in JEE Advanced out of 220,000 shortlisted students
- All India Mathematics topper in both JEE Main and Advanced securing full marks in both
- Awarded the KVPY Fellowship (Kishore Vaigyanik Protsahan Yojna, conducted by the Government of India) with a rank of 73 among 100,000 candidates
- Awarded the Advanced Performer (AP) grade in Network Theory and Engineering Drawing

Mentoring & Tutoring

Coordinator, Department Academic Mentorship Program *April 2020-Present*

Mentor, Department Academic Mentorship Program *April 2019-Present*

- Co-headed a team of 35 hand-picked mentors who guided over 160 students including over 20 academically under-performing students
- Mentored a group of 12 sophomore students over a span of two years
- Contributed articles and course reviews to the D-AMP blog of the EE Department

Teaching Assistant, Differential Equations - I and II *Autumn '19 & Spring '20*

- Conducted weekly tutorials for a group of over 30 students aimed at addressing conceptual doubts and problem solving
- Involved in design and correction of examinations for a class of 150 sophomore students

Coursework & Programming Skills

- **Electrical Engineering** : Digital Communications, Information Theory, Digital Signal Processing, Control Systems, Microprocessors, Digital Systems, Analog Circuits, Nanoelectronics, Network Theory, Electronic Machines and Power Electronics, Power Systems
- **Mathematics & Statistics** : Data Analysis and Interpretation, Probability and Random Processes, Complex Optimization, Linear Algebra, Complex Analysis, Differential Equations
- **Computer Science** :Machine Learning (Basic and Advanced), Digital Image Processing, Data Structures and Algorithms, Computer Vision, Operating Systems
- **Programming Languages** : C++, Python, MATLAB/Octave, VHDL, Unity Scripts(C#)
- **Softwares** : Arduino, LaTeX, AutoCAD, SolidWorks, GNU Plot, ngSpice, LTSPice, Xcircuit

Extra-Curriculars

- Qualified and appeared for ICPC Amritapuri Regionals, selected among 1500 teams
- Attended Vijyoshi Camp, which serves as a forum for interactions between bright young students and leading researchers in fields of Science and Mathematics
- Demonstrated a self-designed remote-controlled bot and line follower bot successfully as part of the Electronics and Robotics Club, IIT Bombay
- Completed a two-semester course in Table Tennis conducted by the National Sports Organization

References

Prof. Oliver Bringmann
Mail
CSE, University of Tuebingen

Prof. Udayan Ganguly
Mail
EE, IIT Bombay

Prof. Vikram Gadre
Mail
EE, IIT Bombay