Curriculum Vitae – Anwesh Mohanty

Contact Information

Anwesh Mohanty
Bengaluru, India
Email
LinkedIn
Google Scholar
Github

Industry Experience

Samsung Research Institute Bangalore (SRIB) *June 2021 - Present*
Computer Vision Research Engineer

- Train and deploy object detection networks for real-time AutoFocus camera feature in Samsung's flagship products ; enabling over 400 million users to click high-quality photographs
- Implement an inference engine with Android NDK and C++ to run detection networks within 10ms for real-time camera use-cases of Samsung smartphones

Education

Indian Institute of Technology Bombay *July 2017-May 2021*
B. Tech in Electrical Engineering, **CGPA : 9.57/10**
Honors in Electrical Engineering and **Minor** in Computer Science

Publications

- **A. Mohanty**, B. Banerjee, R. Velmurugan. **SSMTReID-Net : Multi-Target Unsupervised Domain Adaptation for Person Re-Identification**, under review at *Pattern Recognition Letters*
- S. Rakshit, **A. Mohanty**, R. Chavhan, B. Banerjee, G. Roig, S. Chaudhari. **FRIDA-Generative feature replay for incremental domain adaptation** published at *Computer Vision and Image Understanding, 2022*
- **A. Mohanty**, A. Frischknecht, C. Gerum, O. Bringmann. **Behavior of Keyword Spotting Networks Under Noisy Conditions** published at *International Conference on Artificial Neural Networks (ICANN), 2021*

Research Experience

Person Re-identification across Multiple Domains IIT Bombay, India *June 2020-May 2021*
Advised by Prof. Biplab Banerjee

- Proposed an end-to-end trainable model SSMTReID-Net to tackle the problem of person re-identification across domains, given a labeled source and multiple unlabeled target datasets
- Incorporated techniques like Elastic Weight Consolidation (EWC) and Information Bottleneck (IB) in model pipeline to ensure domain invariant features are learned while training
- Performed extensive benchmark tests on current reID datasets (Market-1501, CUHK03, DukeMTMC) to confirm superiority of SSMTReID-Net over other baselines

Multi-Target Domain Adaptation IIT Bombay, India *June 2020-May 2021*
Advised by Prof. Biplab Banerjee and Prof. Rajbabu Velmurugan

- Implemented state-of-the-art models like DANN, DADA, IADA, CUA, EWC and LWF for domain adaptation on digit, DomainNet, office-home and other such datasets
- Carried out detailed benchmark tests and ablation studies to compare the performance of our proposed model with other networks

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

- Implemented SincNet, a convolutional neural network, in PyTorch for small-footprint keyword spotting on Google's Speech Commands Dataset
- Enhanced the model efficiency by reducing the computation cost and the memory footprint without compromising significantly on the final classifying accuracy compared to the original model
- Conducted extensive benchmark tests under several noise conditions, where the proposed model outperformed the state-of-art TC-RESNET 8 model

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

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

Technical Projects

Continual Learning for Keyword Spotting *Jan 2021-May 2021*

Course Project in Automatic Speech Recognition supervised by Preethi Jyothi

- Implemented various regularization schemes like EWC, CUA and LWF for continual learning of new classes without losing information of old classes for keyword spotting
- Performed a joint keyword spotting and speaker verification task for an Interspeech challenge
- Awarded one of the best projects award (top 4 out of 40+ projects)

Efficient Neural Machine Translation *Jun 2020-Dec 2020*

Course Project in Natural Language Processing supervised by Prof. Pushpak Bhattacharyya

- Built a NMT model based on RNNSearch model with a smaller memory footprint and lower computation cost compared to state-of-the-art models
- Implemented an adversarial training mechanism to tackle overfitting on dataset
- Performed a detailed characterization of model performance and comparative analysis with a SOTA transformer to demonstrate our models' merits

Adversarial Attacks and Robust Transformations *Jun 2020-Dec 2020*

Course Project in Advanced Machine Learning supervised by Prof. Amit Sethi

- Implemented various adversarial attacks like CWLA, FGSM, PGD and Deep fool attack to show how baseline neural model, trained on MNIST dataset, misbehaves under such attack
- Presented a detailed characterization of few methods/transformations like K-Means, JPEG compression, Gaussian smoothing, TVM and VQVAE to counteract the adversarial noise
- Concluded that TVM and JPEG compression provide the best defense even in the presence of strong adversarial attacks as witnessed by their high accuracies

Electric Violin *Jan 2020-May 2020*

Course Project in Electronic Design Lab supervised by Prof. Mukul Chandorkar

- Implemented a circuit using ultrasonic sensors to measure variation in input distance and produce output in real time
- Constructed a schematic to simulate the working of the MSP430 family of microcontrollers
- Experimentally demonstrated working of sub-circuits and made corresponding PCB designs in Eagle

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 *Jan 2019-April 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 *Jan 2019-April 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 *Jan 2019-April 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-May 2021*

- Led a team of 35 mentors, after a rigorous 3-stage process of SOPs, peer reviews & interviews, to increase academic help outreach and guide 600+ students across 7 batches in the department
- Implemented Summer Improvement Program, ARP TA system & Mental Health Awareness Sessions for the first time in the department

Mentor, Student Mentorship Program *July 2020-May 2021*

- Part of a team of 108 mentors to facilitate the settling in of incoming freshmen into IIT Bombay
- Scrutinized 3 case studies based on the issues faced during an online semester and conceptualized plans to remedy them

Mentor, Department Academic Mentorship Program *April 2019-April 2020*

- Mentored 12+ sophomores over 2 years ; helping them with academic as well as personal challenges
- Contributed course reviews and articles to the D-AMP blog of the Electrical 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

Technical 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. Biplab Banerjee
Mail
CMInDS, IIT Bombay

Prof. Oliver Bringmann
Mail
CSE, University of Tuebingen

Prof. Rajbabu Velmurugan
Mail
EE, IIT Bombay