Ashish Menon

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Objective

Passionate about leveraging machine learning, deep learning and computer vision knowledge to solve real-world challenges and problems across diverse domains focusing on research and innovation driven impactful solutions.

Education

- **International Institute of Information Technology** — Hyderabad, India
  Master of Science by Research; GPA:7.83/10.0 — *Aug. 2018 – Dec. 2021*
- **M S Ramaiah Institute of Technology** — Bengaluru, India
  Bachelor of Engineering in ECE; CGPA: 9.33/10.0 — *Aug. 2013 – June. 2017*

Experience

Qualcomm India R&D — Bengaluru, India
Senior Engineer — *Jan-2022 - Present*

Initial members of the Machine Learning (ML) Camera team, actively researching in ML based Image restoration, tone/color enhancement and interpolation tasks for mobile camera image signal processor (ISP)

- Core responsibilities
  - Proposing designing and implementing deep learning-based computational photography algorithms optimized for hardware constraints in real-time and snapshot use cases .
  - Proof-of-concept (POC) studies, initial image quality (IQ) assessments, and comparative analyses with existing ISP solutions sitting at sensor front end, mid stage or later in pipeline.
  - Actively involve in model development, training, inference, quantization, optimization, loss function brainstorming, debugging, tuning suggestions, and on device Image quality (IQ) anaysis.
  - Actively collaborating with hardware and image tuning team for new R&D milestones towards hardware constrained solutions.
  - Working with deployment teams for system-C implementations of delivered ML features, quantization teams for model quantization activities.
- Achievements
  - Delivered the first set of models demonstrating IQ improvements across tasks in the sensor front-end (**Bayer**) and deeper in the ISP pipelines, now implemented in Qualcomm-powered devices.
  - Co-designed first of its kind specialized h/w blocks meant for DL-based features on device. Use case involved working on **super image resolution** concepts where models operated on lower-resolution inputs and predict residues/maps that were parametrically upscaled and applied in a hardware-friendly way.
  - Novel idea of **Spatially Varying Learnable Kernels** for efficient denoising, was shortlisted among the top 12 Red-IP proposals from Qualcomm's Multimedia Organization, currently in the process of a US patent filing.
- Technical Knowledge: CNNs, Image-Denoising, Bayer Image analysis, Network compression, Knowledge Distillation (KD), Activation functions, loss functions, optimization, transformers, sensor dependent color space, fixed point implementations, Diffusion, GAN driven KD, Multi scale and Multi frame image processing.

Master's thesis Research

CVIT, IIIT Hyderabad — Hyderabad, India
Graduate Research Assistant — *Jan 2019 - Dec-2021*

Deep Learning towards Cancer Diagnosis using digitized images of biopsies (WSI), under the guidance of Dr. C.V. Jawahar and Dr. P.K. Vinod.

- **Active Learning**: Developed a CNN-based expert feedback-driven interactive learning technique to pick the most relevant labeled samples required to achieve SOTA results beating existing active learning works. Achieved 95% reduction in labeled data for colorectal cancer classification. Involved ideas covering retrieval, deep metric learning, query refinement, relevance feedback mechanisms.
- **Annotation efforts**: Demonstrated the above for annotating segmentation mask where the effective scanning area was reduced to 2% of total WSI area for breast tumor segmentation with 85% IoU, improving efficiency in medical diagnosis. Showed the POC across popular datasets like Camelyon.
- **Pan Cancer deep features similarities**: Analysing the manifestation of cancer features across multiple organs from a deep learning perspective, where interpretability techniques such sa GradCAM heatmaps were leveraged to explaing cellular level feature similarities seen in cancer cells across multiple organs.
- **Synthetic image generation, nuclei segmentation, active learning, Multiple Instance attention Learning, self supervised learning, weakly supervised learning, GANs for data augmentations** were some of the key deep learning areas that were explored for the research work.

Courses: Digital Image Processing, Topics in Applied Optimization, Statistical Methods in AI, Computer Vision , Medical Image Analysis

Programming Languages: C, C++, Python

Frameworks: Pytorch, Tensorflow, Keras, Matlab

Other PROJECTS

Simultaneous Localization and Mapping [LINK] — MSRIT, Bengaluru, India
Bachelors — *Aug 2016 - April 2017*

Developed a 2D-based indoor SLAM and autonomous navigation system using an Arduino-powered 3-wheeled robot integrated with ROS. Utilized a mobile phone's gyroscope for localization and a Kinect for obstacle detection, projecting results onto a grid map. Sensor readings were processed on a remote device and visualized using ROS's RViz UI for real-time map building.

Masters Course Projects — IIIT Hyderabad, India
MS — *Aug 2018 - Sept 2018*

- **Contrast Based Filtering for Salient Region Detection [LINK]**: Image decomposed into basic, structurally representative elements that abstract away unnecessary detail, and at the same time allow for a very clear and intuitive definition of contrast-based saliency.
- **Detection-aided liver lesion segmentation using deep learning**: Cascaded Convolutional Neural Network (CNN) for segmenting the liver and its lesions from CT scans. The architecture first isolates the liver region and then accurately segments lesions within it.
- **Oriented Edge Forests for Boundary Detection [LINK]**: Developed a boundary detection model using a random forest classifier that analyzes local patches to predict oriented edges. Outputs are indexed by orientation and signed edge distance. Predictions are calibrated and fused over an image pyramid to obtain accurate boundary mapping.

Publications

- **Menon. Ashish**, Singh. Piyush, P.K. Vinod, C.V. Jawahar, **"Interactive learning for Whole Slide Image Annotation"**, Asian Conference on Pattern Recognition, 2021 [Paper] [Link]
- **Menon. Ashish**, Singh. Piyush, P.K. Vinod, C.V. Jawahar, **"Exploring pan-cancer similarities from a deep learning perspective"**, Frontiers in Oncology, section "Cancer Imaging and Image-directed Interventions" [Link]
- **R. Ashish**, B. M. Sujay, R. Caushik, S. Jayashree and H. P. Nischal, **"2D Based Indoor Slam and Autonomous Navigation Using a Terrain Robot"**, 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), Bangalore, India, 2018, pp. 968-974. [Link]

Professional Activities and Recognition

Recognitions

- Impact Award: Recognized by Andrew Chiu, VP technology of Qualcomm, Sandiego, USA [2024].
- One of my R&D POC was shortlisted among the top 12 Red-IP proposals from Qualcomm's Multimedia Organization, for the Qualcomm's flagship QBUZZ event.[2024]

Industrial Talks

Following talks were given to the ML camera team and the multi-media organization within Qualcomm.

- Talk on: The spectrum of Image Denoising and its evolution with Deep Learning [2022].
- Talk on: Camera sensor characteristics and algorithms for Demosaicing [2023].
- Talk on: Efficient Inference: Towards Content Aware Dynamic Network Forward pass [2024].

Industry Flagship events

- My work on Deep learning based sparse-PD sensor Remosaic was accepted as a poster presentation in Qualcomm's flagship ML-Summit event. [2022].
- Our work on ML based Video Reotuch framework for hardware friendly tonemapping was accepted in the annual next generation chipset workshop event [2023]
- My work on Color Retoruch model for color estimation and transformation was accepted as a poster presentation in Qualcomm's flagship ML-Summit event. [2025]

Academic events/presentations

- Attended and participated in various Computer Vision conferences including ICVGIP, NCVPRIPG.
- Presented our work on Deep learning for Medical Diagnostics, BioAsia-2020 representing IIIT Hyderabad.
- Presented posters and talks pertaining to my academic research in IIIT-Hyderabad's flagship events like R&D Showcase, Summer School for Vision and AI.

Services

- GPU cluster admin for the **NVIDA GPU cluster** (GeForce GTX 1080 Ti GPUs and GTX 2080 Ti GPUs) at the **CVIT lab in IIIT Hyderabad** whose responsibilties include but not limited to overseeing resource allocation policy, optimal gpu usage, data storage and efficient usage of the cluster
- Reviewer: Reviewed papers for Journals namely Frontiers in Oncology, IEEE transaction on fuzzy systems, Information Science