Nitin Nilesh

nitinnilesh49@gmail.com | +91-8981677732 | linkedIn/nitinnilesh | github/pi-rasp | pi-rasp.github.io

WORK EXPERIENCE

Camera R&D Engineer | Qualcomm Research — Bangalore, IN | Sep 2021 – Present

- Developed Qualcomm's Spectra Image Signal Processor (ISP) pipelines for various kind of input images and videos. This mainly includes designing end-to-end pipeline from the raw captures to final processed output for better perceptual image quality.
- The processing mainly involves filtering in bayer domain, noise reduction, sharpening, tone mapping, etc. on the images/videos.
- Working towards building a differentiable ISP model which is used to tune the parameters involved in the image processing algorithms using reverse mode autograd mechanism.

Applied Scientist Intern | Amazon India Machine Learning — Bangalore, IN | Aug 2020 – Jan 2021

- Worked on graph based convolution networks (GCN, GAT) to detect fraudulent customers and orders.
- Modelled attention mechanism on heterogeneous (k-partite) graph across different edge types to perform node (customer/order) classification.

AI/ML Course Mentor | Talent Sprint — Hyderabad, IN | Sep 2018 - Dec 2021

- Mentor for the AI/ML course in collaboration with IIIT-H Machine Learning Lab, conducted by Prof. C. V. Jawahar and Prof. Anoop Namboodiri.
- Design tutorials & lab sessions, and mentor industry professionals.
- Deliver lectures on machine learning and deep learning topics.

Programmer Analyst | Cognizant Technology Solutions — Pune, IN | Dec 2015 - Apr 2017

- Worked with the data science team to develop multiple proof-of-concepts to build machine learning capabilities.
- Worked as a software developer, developing mobile applications using Dot-Net framework for Cognizant Application Services.

PUBLICATIONS

Towards Real-Time Analysis of Broadcast Badminton Videos | **Nitin Nilesh**, Tushar Sharma, Anurag Ghosh, C. V. Jawahar | Arxiv Preprint | 2023

IoT-based AQI Estimation using Image Processing and Learning Methods | **Nitin Nilesh**, Ishan Patwardhan, Jayati Narang, Sachin Chaudhari | World Forum for Internet of Things | WF-IoT, 2022

IoT and ML-based AQI Estimation using Real-time Traffic Data | **Nitin Nilesh**, Jayati Narang, Ayu Parmar, Sachin Chaudhari | World Forum for Internet of Things | WF-IoT, 2022

Improving IoT-based Smart Retrofit Model for Analog Water Meters using DL based Algorithm | Ayush Kumar Lall, Ansh Khandelwal, **Nitin Nilesh**, Sachin Chaudhari | IEEE International Conference on Future Internet of Things and Cloud | FiCloud, 2022

CV and IoT-based Remote Triggered Labs: Use Case of Conservation of Mechanical Energy | Kandala S. Viswanadh, Om Kathalkar, Piyusha Vinzey, **Nitin Nilesh**, Sachin Chaudhari, Venkatesh Choppella | International Conference on Future Internet of Things and Cloud | FiCloud, 2022

Making Analog Water Meter Smart using ML and IoT-based Low-Cost Retrofitting | Ayush Kumar Lall, Ansh Khandelwal, Rhishikesh Bose, Nilesh Bawankar, **Nitin Nilesh**, Ayush Dwivedi, Sachin Chaudhari | International Conference on Future Internet of Things and Cloud | FiCloud, 2021

PATENTS FILED

System and Method for Digitizing in an Analog Water Meter Using Machine Learning | Sachin Chaudhri, Ayush Dwivedi, **Nitin Nilesh**, Rhishikesh Bose, Nilesh Bawankar, Ayush Kumar Lall, Ansh Khandelwal | Indian Patent Office | May, 2021

System and Method for Implementing an Experiment Remotely and Determining an Output of a Remote Experiment Using a Computer Vision Technique | Sachin Chaudhri, Venkatesh Choppella, **Nitin Nilesh**, Om R. Kathalkar, Vishwanadh S. Kandala, | Indian Patent Office | Sep, 2022

EDUCATION

MS by Research, Computer Science & Engg. Hyderabad, IN | July 2017 - July 2023
International Institute of Information Technology, Hyderabad
Research Area: Computer Vision; Machine Learning; Deep Learning; Sports Analysis through Videos; ML/DL on IoT

Worked on: Video analysis using broadcasting badminton videos to analyse players activities | Under Prof. **C. V. Jawahar**.
Worked on: Real-time Air Quality Index (AQI) estimation on Indian traffic scenario using images and learning algorithms and deployment on IoT device | Under Prof. **Sachin Chaudhari.**

Bachelor of Technology, Computer Science & Engg. Kolkata, IN | August 2012 - May 2015
Institute of Engineering & Management
GPA: 7.79/10
Worked on: Building automated hand-gesture tracking system based on computer vision & sensors technology.

PROJECTS

Image Signal Processing Pipeline ISP, Image Processing, Python, C++

- Developed and maintaining an end-to-end pipeline to process the camera sensor captured raw image to YUV processed image. The scenario includes both non-HDR and HDR images and videos.

Differentiable ISPs ISP, Image Processing, PyTorch, AutoGrad

- Developed a system for optimizing the parameters of automotive image signal processors by leveraging reverse mode Automatic Differentiation.
- Designed and implemented an end-to-end differentiable camera simulator in Pytorch. It enables automatic derivation of gradient for Qualcomm's proprietary image processing algorithms andoptimizes it for different machine vision tasks.

Neural Graph Execution GNN, Optimization, PyTorch

- Developed an end-to-end pipeline for SoC optimization to solve standard graph algorithms using Graph Neural Networks which comprises GNNs as approximation followed by combinatorial optimization solvers.

Real time structured analysis for broadcast badminton videos DL, CV, PyTorch

- Implemented a real time system to get structured analysis for live broadcast badminton videos.
- Performed object detection & localization on players to get the distance covered by them on court for live games at Premier Badminton League (PBL) - 2019.

Show and Tell: A Neural Image Caption Generator DL, NLP, CV, PyTorch

- Implemented a deep learning model to generate image captions from the given Image on Flickr8K dataset.
- Used encoder (CNN) - decoder (LSTM) architecture to generate the captions.

Semantic Image Segmentation DL, CV, TensorFlow

- Implemented a deep learning model to solve image segmentation problem on VOC PASCAL Dataset.
- Used Markov Random Field based model named Deep Parsing Network using CNN to segment the images.

COURSES

Machine & Deep Learning: DL Specialization on Coursera by Prof. Andrew Ng, Statistical Methods in AI (Graduate), PyTorch Tutorials
Image Processing: Digital Image Processing & Computer Vision (Graduate)
Programming: Data Structures and Algortihms
Maths: Linear Algebra, Discrete Mathematics

SKILLS

Languages: Python, C++, GNU/Linux Bash Scripting, LaTeX
Machine Learning: Scikit-Learn, Pandas, NumPy, Matplotlib
Deep Learning: PyTorch, TensorFlow, OpenCV, Deep Graph Library
Misc: Raspberry Pi, Git/Github, Perforce, MarkDown

ACHIEVEMENTS

- Winner of the Environmental Sensing Project Competition (2022) organized by the MegaSense team at the University of Helsinki for developing an image-based Air Quality Index (AQI) estimation technique. The competition was open and the reviews by the ESPC committee are available.
- Performed CV based analysis on Premier Badminton League (PBL-2019) live games broadcasted by Star Sports India. [https://blogs.iiit.ac.in/pbl]
- Ranked 3^{rd} in JELET (West Bengal Engineering Entrance Examination) 2012.
- Secured 98.39 percentile in GATE (Entrance Exam for Masters and PhD) 2017.

TALKS

- Delivered talk on using ML & and DL algorithms in the IoT domain. Also discussed some use cases for the deployment of these algorithms on low-powered devices like Raspberry Pi Zero. Talent Sprint | Apr 2022

- Delivered a talk on real-time sports analysis using broadcast badminton videos. Discussed about the whole pipeline, i.e., starting from data collection to training models to analyze players' activities. 4th Summer School on Computer Vision, IIIT Hyderabad | 2019