VIRAJ GHORPADE

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OBJECTIVE

Experienced computer vision and imaging specialist with over 13+years in developing and deploying advanced algorithms across multiple domains **(Robotics, ADAS, AI on Edge devices, Federated learning, Active learning, LLMs)**. Adapting new trends in computer vision for a variety of use-cases. Collaborating with global customers and stakeholders to deliver tailored solutions with AI and computer vision technologies. Skilled in adapting the latest trends to address specific use cases and driving innovation at the intersection of Computer vision, deep learning, and hardware optimization.

PROFILE

1	Lead Experience	**Partnered with global customers and stakeholders to design and implement customized AI and computer vision solutions, to meet business needs and industry challenges.**. Mentored multiple teams both R&D for prototyping and development of AI pipeline on edge devices. Experience in building and leading a team from scratch, cultivating a collaborative and high-performance work environment, Requirement collection and prioritizing, Planning milestones design AI pipeline, Plan and execute cutting-edge research, Various domains expertise-Robotics, ADAS, Edge devices, worked on devices like Nvidia -Jetson, RTX3060/1080, A6000, GTX720, Kneron - NPUs
2	Technical Experience	Total 13+ years IT experience. 9+ years in Deep Learning, Machine Learning (Python, Keras, Pytorch, Azure DevOps, Databricks). 1 year experience in Federated Learning with Flower framework 8+ years' experience in Image Processing, Algorithm development (C++, OpenCV). 1 years experience in Data Science 1 year internship @ Siemens Technology and Services Pvt. Ltd Hands-on experience on Deep Learning concepts. Root Cause Analysis.
3	Education	M.Tech - Digital Systems (Distinction) from Govt. College of Engineering, Pune, India GATE - 94 percentile
4	Publications Presentations	IITD, AIC, IEEE, IITB, DICOM, Organization level - building working model using Arduino, Section level presentations

KEY SKILLS

1	Solution Development	System Architecture, End-to-End Solution Design, Prototyping, Optimization, Scalability
1	Deep Learning, Machine Learning	Segmenation: nnUnet Active Learning, Data version control, Experiment tracker Deep Learning (Keras, Tensorflow), Image Processing (OpenCV, skimage), Machine learning (scikit-learn) Worked on algorithms like Yolo, RCNN, Hybrid model (LSTM+AE+ Classifier) Self-explainable AI: Gradcam, Saliency maps, Grad cam++
2	Computer Vision Concepts	Worked with standard CNN architectures, Visualization of activations and kernels, build efficient networks, Regularization
3	Time Series analysis	Auto-encoders, LSTM, Bidirectional LSTM
4	Data	Spark
4	Programming	Python (8 years), C++ (3 years), Pytorch (3 years), C, R, and Matlab
5	Communication	**Technical Presentations, Public Speaking, Global Conferences, Cross-Cultural Communication**

EDUCATION

Qualification	Institution	Score	Year of Passing
M.Tech (DS)	Govt. College of Engineering, Pune	8.65 CGPA	2012
GATE		94 percentile	2010
BE (EC)	SDMCET, Dharwad	65 %	2008
PUC	JSS, Dharwad	75 %	2004
SSLC	KE Board's, Dharwad	88 %	2002

WORK EXPERIENCE

Mantra(R&D) (October 2023-Present) Designation - Lead Computer Vision(HOD)

1	Optimization of AI pipeline design for Facedetection and recognition for NPUs and GPUs	**Mentoring and guiding the team along with individual contribution on conducting in-depth research and streamlined multiple AI pipelines**. Model optimization (layer and weights pruning), constructing device compatible models, model quantization, Succesfully delivered modified retinaface architecture to reduce model size from 20MB to 1.8MB **(11.1X reduction in memory consumption)**, this resulted in increase FPS from 8FPS to 30FPS **(3.75X FPS improvement)**. Proactively collaborated with CFTs and productionized the model on Kneron embedded/edge device. Changed the existing EffDet architecture to incorporate FPN, PAnet, modified BiFPN. Modified the forward function to increase computational accuracy.	1 year
2	Active learning	Leading a team of 7 engineers. Developed and deployed an end-to-end framework for Active learning and continual learning. Used Apache Airflow, MLFlow, Data Version Control, pytorch framework to build and deploy models. Detection algorithm: Implemented stringent evaluation on server side to prompt every client to check if it is poisoned.	6 months
3	Federated	Leading a team of 3 engineers in this project. Function proven development on-ging for **Federated detection workflow using Flower framework**. Used Tensorflow, pytorch framework to build and deploy models. Detection algorithm: Implemented stringent evaluation on server side to prompt every client to check if it is poisoned.	4 months

Mercedes Benz Research and Development India Jan2019-Oct2023 Designation - Senior Technical Lead (Team lead)

1	Occupant Vital Sensing using camera	Research and implement AI and Image processing techniques for heart rate, breathing direction, pulse, etc Design and implement data pipeline to pick the data from data dump 1. Implement mysql db to get data status in dump 2. Design and implement data processing pipeline for data validation, extraction, pre processing 3. Involves machine learning techniques to identify anomalous data 4. Notify stake holders with mail about data processing status	1 year
2	Intelligent Endurance Run Analytics	This project aims to identify anomalies in multi-nomial signals in near real time Huge data dump from the endurance run from vehicle testing is picked up from the data pipeline running on cloud This data is then analyses using multiple Deep learning representation techniques, Gaussian models, etc	2 years
3	Deep Learning based system for Root Cause Analysis of Time Series signals	Project aimed at identifying the root cause of an anomaly/rare-event 1. Hybrid Deep Learning architecture (LSTM+AE+ Classifier) is developed that works on optimizing multiple constraints simultaneously. Algorithm is deployed on Azure Cloud (Databricks, AzureDevOps, Data Lake) 2. Saliency maps and Grad-Cam is used for explainable AI. 3. Configurable Deep Learning system is developed where parameters like complexity, layer count, etc could be configured by the user.	1 year
4	Turbine Befund Analysis	1. This project involves hot-spot identification on the turbine cast, that can result as a potential threat for the vehicle. 2. Deep learning based computer vision algorithm is developed. It deals with CAD images for analysis.	1 year

Yaskawa India Pvt. Ltd Feb2018-Jan2019 Designation - Staff Manager

1	Servo Motor as Sensor	Hybrid LSTM based AutoEncoder to represent Multi-channel, Multi-nominal time series data. Current and Voltage are used to detect the anomaly	1 year
2	Adaptive bin picking	This project involved recognizing objects and analyzing them in a 2D image. The output of the project was 3D position of the object (X,Y,Z,Rx,Ry,Rz) A robotic arm was then deployed to pick the object at that position. Python, scikit-learn, skimage, OpenCV 1. Decision Tree Regressor 2. Shape detection (Hough Transform) 3. Shape deformity modeling	5 months
3	Weld Defect Detection System	This project involves analysis of the Current and Voltage signals to identify defects that occurred during the welding process. Feature extraction stage involved computing Laplacian and Gradient of the signals. Python, scikit-learn, Keras 1. LSTM 2. Markov Process 3. SVM 4. Logistic Regression	5 months

Robert Bosch Business Solutions Pvt. Ltd July2015-Nov2017 Designation - Research Engineer

1	Bosch Annotation Studio for ADAS (Advanced Driver Assistance System)	1. Smart Contour-Correction Tool for Deep-Learning-Network output correction (with Research and Technology Lab) 2. Incremental SVM for in-camera training (with Corporate Research, Germany) 3. Approach for algorithm-guided, quick, easy and light-weight annotation tool using Image processing algorithms	2 years

Siemens Technology and Services Pvt. Ltd (2011 - 2015) Designation - Senior System Engineer

1	Wind farm simulation tool (with Siemens Energy)	Simulate the real wind farm energy generation, maintanence and operations Probability distributions and random number generators This project provided a best estimate of profitability of a windfarm that is planned to be installed	1 year
2	Acute myeloid leukemia detection in bone marrow aspiration whole-slide images using Image processing algorithms	This project involved parse and analyse DICOM image Back ground subtraction, morphological operations, countour estimation and countour fitting	1.5 years
3	Siemens MRI log file data mining (with Siemens Health Care)	Analysing log files from MRI device Maximum repeting pattern identification	6 months

PAPERS PRESENTED AT INTERNATIONAL CONFERENCES

- Enhancing Object Detection Model with Post-inference Feedback mechanism using Temporal Information (8th International Conference on Parallel, Distributed and Grid Computing(PDGC-2024)) - (IEEE link to be updated soon)
- Anomaly Detection in Electric Powertrain System Software Behaviour ((14th International Conference on Computing Communication and Networking Technologies) (ICCCNT-2023)) - (Link)
- Multistaged gradient based scaling technique (IEEE Pervasive Computing (ICPC), 2015 International Conference) - (Link)
- Contour feature-point tagging as a mechanism for automated splitting of highly-occluded and dissimilar-sized cells in blood smear images (IEEE Second International Conference on Image Information Processing, 2013) - (Link)
- eSiePath – An Application for Analysis of Whole-Slide Images (DICOM Conference Bangalore 2013 @ IISc) -(Link)
- Acute Myelogenous Leukemia Detection in Bone Marrow Aspiration Images (National Conference - MedImage 2012, IITB, Mumbai
- Counting and Marking Reticulocytes in Blood Smear Images using Image Processing Operations (National Conference - MedImage 2012, IITB, Mumbai)

LEADERSHIP

Leading a team of 8 people.
Leadership skills: Lead by example. Become a part of the solution that we provide. Ownership. Team accountability

EXTRA-CURRICULAR ACTIVITIES AND HOBBIES

Help students to build AI/ML/DL projects. Workshops on building projects. Conducting seminars.