Tanisha Khurana

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Education

North Carolina State University **Aug 2022 – May 2024**
Master of Science in Electrical Engineering ; CGPA 3.9/4 *Raleigh, NC*
Relevant Courses: Digital Imaging systems, Computer Vision, Random Processes, Pattern Recognition, Neural Networks, Advanced Machine Learning, Natural Language Processing, Detection & Estimation theory, Cloud Computing, Probabilistic Graphical Models

Bharati Vidyapeeth University **Jul 2014 – Jun 2018**
Bachelor of Technology in Electronics and Communication Engineering ; CGPA 9.2/10 *Pune, India*

Technical Skills

Languages: Python, C, C++, SQL, Bash **Developer Tools**: MATLAB, AWS, Azure, Google Cloud, Docker, Kubernetes, Git
Libraries: OpenCV, Tensorflow, Pytorch, Scikit-Learn, Pandas, Numpy, PIL, NLTK, SpaCy, Matplotlib, ROS, Flask
Developer Tools: TensorRT, Tensorflow Serving, Nvidia Triton, CUDA, OpenVINO

Experience

Precision Sustainable Agriculture, NCSU **March 2023 - Present**
Graduate Research Assistant *Raleigh, NC*
- Working on Domain Adaptation and Multi-task learning for Semantic Segmentation using Deeplabv3+ and Biomass Composition of plant species to assess crop yield and monitor plant growth.
- Achieved an RMSE of 6.49, a 14.3% decrease from the SOTA model with no additional data and improved real time performance.
- Developed a containerized camera system with the segmentation model for mapping crop species, biomass and densities.
- Implemented an image classification model for precision farming, accurately differentiating crop species from weeds.

Active Robotics and Sensing Lab, NCSU **Jan 2023 - Sep 2023**
Graduate Student Researcher *Raleigh, NC*
- Performed an extensive literature survey and analysis on region-based and topology preserving edge-based chamber segmentation techniques for identification of Foraminifera species.
- Generated 2D segmentation masks from synthetic 3D reconstructions in Blender and trained a U-Net segmentation model.

Wobot.ai **May 2021 - Jul 2022**
Senior Computer Vision Engineer *New Delhi, India*
- Developed customized Video Analytics and Smart Surveillance solutions for diverse industries including hospitality, food service, and retail, resulting in improved security and operational efficiency.
- Formulated algorithms for varied POC's including activity recognition, multi-object detection and tracking, pose estimation, motion detection, facial recognition, and person re-identification.
- Processed RTSP feeds from over 200+ CCTV cameras, enabling advanced monitoring and actionable insights.
- Scaled ML models in high-throughput and low-latency using TF Serving and triton leading to 50% faster inference time.
- Improved accuracy of existing models by more than 20% using new data generation and augmentation techniques.

Intello Labs **Jan 2020 - May 2021**
Machine Learning Engineer *Gurgaon, India*
- Led the entire development lifecycle for a real-time AI powered commodity grader utilizing size, color and visual defect analysis.
- Accomplished an identification accuracy of 95% and classification accuracy of approximately 90%.
- Utilized Faster RCNN, Mask-RCNN and SSD for object detection of 20 different fruits with an average size error of $\sim$1 mm.
- Enhanced commodity classification with K-means, color segmentation, and PCA significantly improving processing speed.
- Innovated a novel model cascading approach, enabling the sequential execution of multiple models to optimize inference performance on NVIDIA-powered edge devices.

Qiggle.ai **Jan 2019 - Dec 2019**
Data Scientist *New Delhi, India*
- Designed a predictive analytics solution for industrial applications using Anomaly detection and remaining life estimation
- Detected under-performing and abnormally-behaving assets to save weeks of lost power generation and reduce asset downtime.

Projects

Explainable AI for Deepfake Detection Model
- Achieved an F1 score of 98% with Xceptionet architecture for deep fake detection on Face Forensics++ and Celeb-DF dataset.
- Applied Explainable AI (XAI) methods such as GradCAM, LIME and LRP to highlight the relevance of the input to the prediction and improved transparency and interpretability.

Integrating Semantic, Syntactic and Contextual Elements for Humor Classification
- Leveraged ColBERT dataset to examine the humor content of a sentence and verify the linguistic theory of humor.
- Concatenated NRC word emotion lexicons, Word2Vec and BERT embeddings to generate syntactical, semantic and contextual information and visualized interpretations using SHAP and decision trees.

Laplacian Blob Detector
- Computed scale invariant key points and corresponding region at multiple scales using response of image towards Laplacian of Gaussian filter.
- Designed a 3D neighborhood based Non-Maxima suppression algorithm to eliminate overlapping blobs in the detected key points