

# Tanisha Khurana

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## Education

### North Carolina State University

Aug 2022 – May 2024

*Master of Science in Electrical Engineering ; CGPA 3.95/4*

*Raleigh, NC*

**Courses:** Digital Imaging systems, Digital Signal Processing, Random Processes, Neural Networks and Deep Learning, Advanced Machine Learning, Detection and Estimation theory, Pattern Recognition, Cloud Computing, Natural Language Processing

### 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, Git **Developer Tools:** MATLAB, AWS, Azure, Google Cloud, Docker

**Frameworks:** OpenCV, Pytorch, Tensorflow, Scikit-Learn, Pandas, Numpy, PIL, Matplotlib, Seaborn, Pytest ROS, Flask

## Experience

### Precision Sustainable Agriculture, NCSU

March 2023 - Present

*Graduate Research Assistant*

*Raleigh, NC*

- Collaborated with USDA to integrate a camera system with an ML model for mapping crop species, biomass and densities.
- Engineered a containerized system with integrated RESTful APIs for seamless data visualization and control.
- Implemented an image classification model for precision farming, accurately differentiating crop species from weeds.

### Active Robotics and Sensing Lab, NCSU

Jan 2023 - Present

*Research Assistant*

*Raleigh, NC*

- Performed an extensive literature review on chamber segmentation techniques for identification of Foraminifera species.
- Generated 2D segmentation masks from synthetic 3D reconstructions in Blender, serving as ground truth data for region-based and topology preserving edge-based segmentation.

### 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 tasks 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.
- Implemented a scalable and dockerized system and integrated backend and frontend for efficient deployment and live usage.

### Intello Labs

Jan 2020 - May 2021

*Deep 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 ~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 - Oct 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.

### Comparative Analysis of 3D & 2D CNN for Lung Cancer Nodule Detection

- Created 2D and 3D CNN VGG-16 models to detect lung cancer with 79% and 91% sensitivity using Luna16 DICOM images.
- Conducted data preprocessing for nodule patch extraction, performed voxel coordinate conversion, and applied data augmentation techniques to enhance the dataset's diversity and model robustness.

### Laplacian Blob Detector

- Implemented Blob detection by applying Laplacian scale-space representation as well as 2-D and 3-D non-maximum suppression.
- Experimented with different thresholds, standard deviations, and constant multiplier values to achieve the appropriate number of blobs and run time for various images.