Ashwani Kumar Sinha

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Education

Anna University — Chennai, IN
Masters of Engineering in Computer Science — *Nov. 2020 – July. 2022*

SRM Institute of Science and Technology — Chennai, IN
B.Tech. in Computer Science — *Aug. 2016 – Aug 2020*

Experience

AI Analyst — July 2022 – Present
Alstom — *Bengaluru, India*

- Designed and deployed an automated BrakePad inspection system using UNet (VGG-16) for thickness measurement, improving precision by 30%.
- Built a tire defect detection system using YOLO with Raspberry Pi multi-camera setup; achieved 98.6% validation accuracy and streamlined rail maintenance inspection.
- Deployed real-time audio analytics on Jetson AGX Xavier to classify operational sounds in metro cars, improving diagnostic reliability under noisy environments.
- Collaborated with global teams (India & Chile) for hardware setup, edge deployment, and system integration.
- Awards: Bronze Medal (India Region), Regional Best Project Award (Chile).

Research Fellow(During Masters) — Dec 2020 – Sept 2021
NGN Lab, Anna University — *Chennai, India*

- Conducted UAV research integrating ROS, Gazebo, and Ardupilot for autonomous flight and obstacle detection.
- Implemented YOLO and LiDAR-based vision for aerial surveying and monitoring construction sites.

Projects

BrakePad Profiling System | *Python, OpenCV, CNN (VGG-16), UNet, Image Segmentation, Contour Detection*

- Developed an AI-based brake wear inspection pipeline using UNet (VGG-16) for image segmentation and contour profiling.
- Improved thickness measurement accuracy by 30% through sub-pixel precision and trigonometric calibration.
- Enabled automated profiling and defect visualization for brake maintenance optimization.
- **Achievements**: Won Bronze Medal Award.
- **Paper publishing ongoing..**

Tire Defect Detection | *Python, OpenCV, TensorFlow, YOLO, Raspberry Pi, LabelImg, GUI Development*

- Built a real-time tire defect detection system integrated with a multi-camera Raspberry Pi setup for industrial inspection.
- Designed and implemented image acquisition pipeline including segmentation, perspective transformation, and 360 image stitching.
- Achieved 98.6% validation accuracy and reduced manual inspection time by 40%.
- Designed a lightweight dashboard for local defect monitoring and cloud-based data archiving.
- **Achievements**: Got Regional Best Project Award in Alstom - Chile(South America Region).
- **Patent filing ongoing..**

Audio Analytics |

- Implemented a deep learning-based audio classification system to detect various categories of sounds in metro environments.
- Deployed models on NVIDIA Jetson AGX Xavier for low-latency, on-device inference.
- Enhanced fault detection reliability under noisy ambient conditions.

Technical Skills

Technical Skills: Python, AI, Data Science, Machine Learning, TensorFlow, PyTorch, OpenCV, ONNX, TensorRT
ML & CV Skills: Object Detection, Image Segmentation, 3D Vision, Edge AI, Audio Analytics, Robotics
Tools & Platformss: NVIDIA Jetson Xavier, Raspberry Pi, CUDA, Git, ROS, Gazebo
Libraries: Pandas, NumPy, Matplotlib