AKASH MANNA

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SUMMARY

As a Computer Vision Engineer over **4+** years of experience, I have an extensive experience in developing and optimizing advanced classical and deep learning computer vision problems.
I have hands on knowledge of object detection, image segmentation, object tracking and perception problems for autonomus driving using **TensorFlow/keras, PyTorch, Pandas, Python, Opencv, CNN, ViT,** all relevent technologies where I have successfully translated complex research findings into practical solutions.
With a robust foundation in both mathematical and statistical principles and practical applications, I have contributed to 7 real world industry projects from RD to deployment in the targeted devices.
Driven by a commitment to innovation and excellence, I am eager to pursue a Ph.D. to further refine my expertise and contribute to pioneering research in the field of computer vision.

KEY SKILLS

Category	Skills
Languages	Python, C++, Fortran
Deep Learning	TensorFlow Lite, Keras, PyTorch, ONNX, Neural Networks from Scratch
Tools	PyCharm, Git, CLI, LFS; JIRA, Confluence
Algorithms	Regression, Classification, Forecasting, Anomaly Detection, Computer Vision, Vision Transformer
ML Models	Hugging Face Models, TorchHub
Optimization Methods	Fine Tuning, clibration, Graph, Operations, Quantization, Pruning, Quantization-aware training, Architecture Search, TensorRT
Data Analytics	Numpy, SciPy, Scikit-learn, EDA, PCA, pandas-profiling, D-Tale, UMAP, t-SNE, Tableau, Plotly, Seaborn, Matplotlib, numerous other libraries
Cloud Technology	EC2, S3, AWS Sagemaker
CI-CD	MlFlow, DagsHub, Github Action
Hardware	Jetson Xavier, AGX, ARM, X86, RasberryPI
Others	Generative AI, Deep Stream, Multi Camera Fusion

EXPERIENCE AND PROJECTS

Working Experience

Deep Learning Engineer

Pravaig Dynamics

Feb'23-Present Bangalore

- (1)**Multi-Head Model Inference :** Given a NvJetson Xavier edge device, a Indian road segmentation model is deployed using C++ TensorRT API.After using C++ and TensorRT, we achieved near real time performance of 20FPS inference.
- (2)**Bird Eye View Generation:** From multiple monocular camera feed, a 360°, top down view is generated using CNN architecture. This model helps in driver perception for better understanding the surrounding of the ego-car.
- (3)**Camera Data Collection:** A G-streamer-CPP pipeline is designed and created for camera data collection and storing on local storage. Another pipeline using kafka pub-sub architecture is created for realtime 30FPS clous storage of video stream data colection. The pipeline is utilized to create a Indian Driving Dataset.
- (4)**Radar data Vizualization on ROS2:** Using Autoware framework, a C++ codebase is being implemented that will visualize the Radar sensor output on Rviz GUI.

- (5)**Camera Radar Fusion:** As, camera is inadequate in scenario of occlusion or low light condition, a camera-radar fusion is utilized for makeing our perception model more robust and reliable. A CentreFusion model architecture is being used that can perform at a speed of $\sim$ 30 FPS
- (6)**Driver Rating System:** Using a Accelerometer and gyroscoic data, LSTM based model can detect if the car has gone through any harsh braking or harsh cornering. Based on that information, a driver can be rated and thet rating information can be used for scocio-economic scenario. The model can detect harsh braking and acceleration with 98% realtime accuracy.

Machine Learning/Computer Vision Engineer

Emage Vision Pvt. Ltd.

Jan'22 -Jan'23 Bangalore

- (1) **Object Detection-Segmentation and background removal:** Detecting a carton box in scattered and compact background in front of humanoid robot. Utilised Yolact-edge(YOLO model modified for low-end system like Xavier) model in this project because of its light weight and less inference time($\sim$ 50 ms). The background is being removed by applying the segmentation mask from the model trained on custom carton dataset, on the input image. Link: Tray object segmentation and background removal
- (2) **Tray filling anomaly detection:** To detect abnormal filling(viz. fall of boxes, wrong oriented box, gap between boxes, etc) of boxes inside a carton box by a robotic hand, a custom architecture "AdPredictor" is being used. Have achieved about 98 % accuarcy with speed of 30 FPS in live camera. Link: AdPredictor model
- (3) **Correction of orientation:** To correct the orientation of an object before grasping by humanoid robotic hand, Push-Net architecture is being used for predicting in which direction the object will be best pushed to achieve its goal orientation. Have integrated Push-Net model with Robot Operating System for live input from head camera and pushing the object as per the prediction of the model by a robotic hand. Have achieved $\sim$ 90 % accuracy in real-life scenario. Link: Correction of orientation
- (4) **Unsupervised Anomaly Detection:** Have worked on State Of Art Architectures like PatchCore, FastFlow, PaDim for unsupervised anomaly detection on a contact lens image.
- (5) **6D pose estimation:** In this project, the trained model is implemented on a robot for detecting and making conscious about how to grab different objects of various shapes.
  The model has been trained on 6D information(x,y,z, rotation about x-axis, rotation about y-axis, rotation about z-axis) of an object to get the whole view of the object.

Machine Learning Engineer

FxGet Active - Intern

Oct'21 -Dec'21 Bangalore

- **Human Pose Estimation:**Using pretraineds model like Posenet, ThunderNet, the model is able to detect real-time 2D human pose. The project is conducted for a fitness based company in Bangalore. The model is successfully embedded into their app .

Data Scientist- Intern

Aug'21 -Oct'21 Remote

In 2 months internship programme, worked with a global client for helping his business data analysis using Power BI, Google Data Studio, Neo4J libraries.

ACADEMIC PERFORMANCE

Duration	Degree	Institution	Score
Aug 2018 - Sept 2020	Masters of Science in Physics	Physics Department, Pune University, India	8.14/10
July 2015 - Aug 2018	Bachelor in Physics	Vidyasagar University, India	72.25%

CONTRIBUTIONS

(1)Contributed to Medium :
(a)CNN Blog : CNN :An Idiotic Guide

(b)Gradient Descent Optimization Blog :Gradient Descent Optimization