MUHAMMAD ABDULLAH HANZALAH

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EXPERIENCE

Machine Learning Engineer Feb 2022 - Present
Darvis *Islamabad, Pakistan*

- Developed an end to end pipeline on Intel's OpenVINO and DLStreamer for CPU-based inferences of object detection, face detection and recognition.
- Created an auto training service based on Nvidia TAO toolkit running on Nvidia Triton Server, and includes model training, stopping, and logging functionalities. The app is built using FastAPI, MongoDB, and Redis streams.
- Built a pipeline using Nvidia Deepstream for real-time multi-camera inference to detect vehicles, classify their fill levels, and extract license plate information, improving warehouse logistics.
- Created a facial detection and recognition system to help organizations register and match their personnel.
- Model deployment and creation of custom clients for inference of edge detection models like DEXTR using NVIDIA Triton Server

Machine Learning Engineer Jun 2019 - Feb 2022
Red Buffer *Islamabad, Pakistan*

- Developed an image processing solution to segment, detect, and generate maps of individual boxes on silicon wafers from high-resolution images. This solution was built using a combination of Scikit-image and OpenCV, to efficiently process and analyze large amounts of visual data.
- Tackled a range of time series forecasting challenges, from predicting revenue generation across 25+ locations for an organization to forecasting voltage discharge of electrical cells over hours using LSTMs.
- Designed and implemented an automated firmware upgrade process using a combination of python and selenium for over 100 radio tower links at one of Pakistan's largest telecommunications companies to efficiently and securely upgrade firmware across a large and complex network.
- Built a search engine to rank products using information from articles on the internet. Integrated Flair's NER for English language to extract location and address information, improving the engine's accuracy and efficiency.

Machine Learning Engineer Intern July 2018 - Aug 2018
Red Buffer *Islamabad, Pakistan*

- Studied various object detection deep neural networks such as RetinaNet, U-Net and YOLO.
- Partially worked on the ORLink project for real time object detection of surgical instruments from a video using RetinaNet.
- Implemented Data Augmentation using segmentation, creating different angles and sizes in images to generate larger data set.
- Trained U-Net model on surgical instruments dataset to test and generate segmented image results.

PROJECTS

Productivity Tracker Dec 2022 - Present
The project involves detecting and identifying personnel in an environment. This consists of registering people using face detection and recognition models and storing this information in the database. Object detection models with person reidentification are used to track of a person through multiple camera streams.. The pipeline is built in Nvidia Deepstream as well as Intel DLStreamer.

Annotation Tool Mar 2022 - Dec 2022
Developed an auto training service for in house annotation tool based on the Nvidia TAO toolkit. This consists of

functions such as ingesting data for model training, image augmentations, training multiple models for classification and instance segmentation, evaluating and exporting the models. The service is packaged into a deployable app using FastAPI and dockerized as part of the annotation tool.

Phononics Oct 2021 - Dec 2021

The aim of this project was to analyze and identify small box shaped dyes in a silicon wafer from a high resolution full frame image consisting of multiple wafers placed in a dish. Several techniques such as regionprops, watershed, convex hull, edge detectors etc were used to generate the final wafer map. The project was implemented in scikit-image and OpenCV in python.

Stealth Search July 2021 - Oct 2021

The goal of this project is to deliver users the top choices of product/service for any given search query. A number of factors such as occurrence counts, review scores, search results ranking are used to identify top products. Different Named Entity Recognition (NER) models by Rasa, spaCy and flair were tested and used for extraction of entities such as location addresses and personnel names. The project was implemented in python and deployed using docker.

Voltx Feb 2021 - July 2021

The objective of this project was to classify the outlier/abnormal behavior of an electric cell from the provided data of batches of cells. A thorough data analysis was done including correlation plots, box plots etc in order to identify the discharge trend. A variety of LSTM models with different configurations were tested in order to generate voltage values and then later compared with the discharge pattern of an abnormal cell over a course of time.

SKILLS

Programming	Python
Libraries/Frameworks	OpenCV, Scikit-Image, Scikit-Learn, Pytorch, FastAPI, Numpy, Pandas, Nvidia Deepstream, Nvidia TensorRT, DLStreamer, Nvidia Triton Server
Technologies	Linux, Docker, AWS, git

EDUCATION

National University of Sciences and Technology (NUST), Islamabad, Pakistan Sep 2015 - May 2019

Bachelor of Electrical Engineering

Relevant Coursework: Computer Vision, Digital Image Processing, Machine Learning, Data Structures and Algorithms

Senior Design Project: IntelliAid - Smart Aid for the hearing impaired

EXTRA-CURRICULAR ACTIVITIES

- Participated in a community development project initiated by the United States Educational Foundation in Pakistan (USEFP). In this project, I visited several secondary schools in Islamabad, Pakistan, where I raised awareness among more than 50 girls in each class from various backgrounds about the opportunities and benefits of pursuing a career in computer science.
- Volunteered at the SOS Children's Village, which provides a home for orphaned children. For a period of three weeks, I was assigned to work with a specific child and carried out various activities to promote their growth and development. These activities ranged from educational sessions to engaging in fun activities such as playing cricket and holding drawing competitions.