Abdolreza Marefat

Machine Learning Engineer

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Machine Learning Engineer with more than 5 years of practical experience in the industry. Building and maintaining real-time intelligent systems ranging from face authorization and vision-based recommendation systems to multi-modal video indexing systems resulted in more than 30 real-world applications. Have worked in agile environments with teammates from 4 to 50 colleagues. Equipped with back and front-end technologies and hands-on experience for making production-level services for AI-based modules. A mentor, buddy, and friend for newcomers in the workplace.

Skills

- Machine Learning
- Deep Learning
- Computer Vision
- Generative Models
- Data Science
- Python
- C++
- JavaScript
- PyTorch
- Tensorflow
- OpenCV (Python, C++)
- Vector Databases (FAISS, Azure)
- Numpy/Matplotlib/Pandas
- React, Flask, Django, FastAPI, HTML, CSS, NodeJS, Bootstrap, Gradio, Streamlit
- SQL/PostgreSQL/Elasticsearch
- Git, CI/CD
- Azure
- Linux / MacOS / Windows
- Slack, Quire

Experiences

Tentamus Group, Berlin Germany

Senior Computer Vision Engineer (Contract-based)..... AUG 2023 - PRESENT

- Built the AI core of a product named "Photostation" for automatically registering a large number of products.
- Trained a SOTA ViT-based model for extracting the textual contents from the product images, achieving less than 14% WER on 2k different products.
- Ensured a real-time object detector is trained without any manual labeling
- Designed a segmentation-based pig tracker system for counting the number of pigs discharged to a slaughterhouse, achieving the error rate of less than 7 in 1000 pigs.
- Fine-tuned Llama large language model on a in-house large dataset of legal texts

Vyro, Islamabad, Pakistan

Computer Vision Research Engineer (Remote) ....MAY 2023 - Jan 2024

- Integrated different transformer-based text encoders in lora training of stable diffusion models
- Developed a background removal and replacement system based on stable diffusion models
- Trained several models based on textual inversion method for defect detection in images
- Devised a fast visualization and exploration system for large imagery databases based on similarity indexing
- Designed a virtual staging approach based on diffusion models and trained several modules for room structure segmentation and object orientations

Dotin, Tehran, Iran

Senior Machine Learning Engineer (Hybrid)..... AUG 2022 - JUL 2023

- Created a real-time face segmentation module with 20-30 ms of runtime on a normal Corei7 CPU and improved IoU to 98% and dice score to 97% on a dataset of 4k samples
- Established a skin segmentation module based on knowledge distillation, resulting in a significant improvement of up to 25% in both IoU and Dice Score
- Formed a real-time face anti-spoofing based on contrastive learning and FastViT with 97% accuracy and 15 ms of runtime on a common Corei7 CPU
- Implemented a real time face alignment module with the speed of 17ms, handling more than 40k samples of api requests per day
- Made a multi-class NSFW detection model, achieving 6% of accuracy more, and 50% less trainable parameters than the existing SOTA models
- Built a face authorization system, handling more than 40k successful cases daily and improved the precision and recall of the system by a margin of nearly 12% and 14% respectively
- Designed a BERT-based spell checker for the Persian language, achieving WER of lower of 3.5% on a dataset of 20 million Persian sentences, outperforming the SOTA methods in the literature
- Made a CCTV-based self-supervised person reidentification model with Top-1 accuracy of more than 87%
- Mentored and coached other teammates for Deep Learning and Pyotrch

MedadAI, Tehran, Iran

Machine Learning Engineer (On-Site)..... FEB 2021 - JUL 2022

- Collected a dataset comprising more than 10k samples and made a semi-automated pipeline for labeling required for localization and recognition and enhanced the overall CER by integrating self-attention modules.
- Formed a content-based image retrieval system based on a self-supervised approach, achieving the 99% of human voted relevancy factor, while decreasing the pipeline's inference time to lower than 60ms.
- Implemented a novel seq2seq-based soccer match summarizer system capable of finding the most critical scenes, with more than 91% of exact frame match rate.
- Created a face retrieval system in movies achieving more than 97% precision and 95% recall for 1000 Iranian celebrities
- Assembled sound preprocessing modules, including human voice detector, sound diarization, and sound noise removal
- Training and maintaining Wav2vec and DeepSpeech for the Persian language, attaining 1.43 WER on “common voice” benchmark dataset
- Coached and pair-programmed for 3 newcomers in front and backend technologies over a course of 3 month

Azaran Industrial Structures Co, Tehran, Iran

Software Engineer (On-Site).....JUN 2019 - SEP 2020

- Programmed more than 4 in-house applications for facilitation of engineering procedures

Education

- MSc in Artificial Intelligence at Azad South Tehran Branch, Tehran Iran
- BSc in Civil Engineering at University of Tabriz, Tabriz, Iran

Languages

- English (Fluent)
- German (A2)
- Persian (Native)

Publications

- Javad Hassannataj Joloudari, **Abdolreza Marefat**, Mohammad Ali Nematollahi, Solomon Sunday Oyelere, Sadiq Hussain, "**Effective Class-imbalance Learning based on SMOTE and Convolutional Neural Networks**", Applied Sciences, 2023
- **Abdolreza Marefat**, Mahdieh Marefat, Javad Hassannataj Joloudari, Mohammad Ali Nematollahi, Reza Lashgari, "**CCTCOVID: COVID-19 Detection from Chest X-ray Images Using Compact Convolutional Transformers**", Frontiers in Public Health, 2023
- Soroush Hashemifar, **Abdolreza Marefat**, Javad Hassannataj Joloudari, Hamid Hassanpour, "**Enhancing Face Recognition with Latent Space Data Augmentation and Facial Posture Reconstruction**", Expert Systems with Applications, 2023