Mohtashim Butt

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Education

Lahore University of Management Sciences – BS Computer Sciences Lahore, Pakistan
Relevant Courses: Computer Vision, Machine Learning, Language Processing with Generative AI, Deep Learning, Introduction to AI, Software Engineering, Database, Algorithms *Aug. 2020 – May 2024*

Professional Experience

Deep Learning Research Assistant **Centre for Urban Informatics, Technology, and Policy**
Developed a model for greenspace segmentation in satellite imagery *Aug. 2023 – Ongoing*

- Curated a remote sensing dataset using GEID, annotated greenspaces using LabelMe, preprocessed the dataset, and hosted it on Roboflow.
- Fine-tuned Yolov8 instance segmentation model and trained it for greenspace segmentation on the prepared dataset.
- Overlayed NDVI for post-processing and evaluated model on DICE, IoU, and pixel-wise error. | Paper | Code

Technical Content Engineer **Educative Inc.**
Area: Research and Development *June. 2023 – Sept. 2023*

- Curated around **58** technical articles on VPython, OpenCV, d3JS, and ReactJS, with SEO principles.
- Set up docker containers for OpenCV/Matplotlib python code, VPython, d3.js, Octave, and React to deploy the applications within Educative's online widget. | My profile.

Machine Learning Engineer **Centre for Water Informatics and Technology**
Engineered web-based system for forest fire detection via camera *May. 2023 – June. 2023*

- Integrated four ESP-32 camera modules to develop a low-cost single unit for capturing a multi-directional (360°) view.
- Wrote scripts (in PHP, Python, Arduino, and HTML) to automate the process of sending captured images from assembled ESP-32 cameras to a self-hosted site and retrieving them to the local PC. | Hosted Site
- Fine-tuned a tiny-Yolov5 model for forest fire detection in the retrieved images to trigger an alarm. | Final Report

Projects (2022-2024)

Multi-Modal Conversational Story Generator **OpenAI API, GPT-3.5, DALL-E, BERT, Stable Diffusion, LLM**

- Fine-tuned BERT/GPT-3.5 on STORIUM dataset as a storyline guidance model following MCQA approach.
- Leveraged GPT-3.5 API for paragraph generation and integrated DALL-E stable diffusion model for image generation as the story progresses | Poster
- Deployed the project's frontend on Vercel and backend on Pythonanywhere | Deployed Project Link

Automatic Annotation Tool via Semi-Supervised Learning **Python, CNNs, PyTorch, OpenCV, LabelMe**

- Generated a dataset of ancient South Asian rock art images via semi-supervised learning.
- Scrutinized CLIP and Dall-E to leverage the prompt-based explanation of the segmented carvings on the rocks.

Lane Segmentation Model for Road Safety **Yolo, OpenCV, LaneNet, Keras, TensorFlow**

- Designed an algorithm for an autonomous car to automatically segment lanes (using LaneNet architecture) and detect vehicles (using the Yolov7 model).
- Developed a dynamic homography mechanism to display a real-time orthographic top-view of the Lane. | Code

ML Modeling for Classification/Regression/Generation **Librosa, Gradiao, PyTorch, Seaborn**

- Made a cycleGAN for zebra to horse image generation (and vice versa), keeping the other features intact | Code
- Implemented PCA and Autoencoders on MNIST, STL-10, and CIFAR-10 datasets for image reconstruction and denoising | Code
- Generated mfcc features from AudioMNIST dataset and trained a neural network for multi-class classification. | Code
- Engineered an RNN for new-born baby name generation (character-level sequence modeling) | Code

ML Model Deployment **Flask, Heroku, CI/CD Pipeline, NLTK**

- Implemented a linear regression model using the gradient descent algorithm (using graduate admission dataset with careful feature selection) to predict the likelihood of admission to graduate school. | Code
- Developed an emotionally intelligent therapist chatbot using RegEx and Naïve Bayes classifier. | Code
- Deployed the aforementioned projects on the web using Python Flask and hosted them on Heroku.

Knowledge Dissemination Analysis in IVRs **SQL, Apache, PHP, HTML, Relational Db, APIs**

- Investigated Sawaal's database via SQL queries to determine the users' knowledge retention, engagement, and the kind of content they post.
- Determined the penetration magnitude of IVR among Pakistan's low-literate and low-income populations and hosted the analysis locally using PHP scripts. | Report

Teaching Experience

Teaching Assistant Computer Vision Fundamentals (CS-5310)
Instructor: Dr. Murtaza Taj *Fall-2023*

- Made programming assignments on CNNs, image feature processing, camera models, and SFM for **70+** students.
- Led the project on real-world to satellite view mapping and introduced Hugging Face and Roboflow to the curriculum.

Languages & Frameworks

- C, C++, Python, MATLAB, TypeScript, JavaScript, HTML, CSS, Haskell, Arduino, NLTK, scikit-learn, Matplotlib, Cuda, Git, Docker, Kaggle, Hugging Face, Roboflow, SQL and no-SQL database, REST APIs, Proteus.

Award & Achievement

- Fully-funded undergraduate scholarship at LUMS.
- First position at the provincial level in Intermediate (Pre-Engineering).
- 100% merit scholarship during high school.