AYA AHMED

+201112673057 Aya.Ahmed01@eng-st.cu.edu.eg LinkedIn

EDUCATION

Cairo University

- B.Sc. Systems and Biomedical Engineering. Sept 2019 -Jul 2023
- Cumulative GPA: Excellent with honor.

Digital Egypt Pioneers Scholarship | MCIT May 2024 -Present

- Awarded by Ministry of Communications and Information Technology to study Machine Learning Engineering powered by Microsoft.

PROJECTS

Automatic analysis of cardiovascular MRI myocardial T1-mapped images using CNN | ***(Python, Computer vision, Deep learning, TensorFlow)***

- Implemented a Dense-UNet model combining features of Dense-Net and U-Net for binary semantic segmentation of the myocardium.
- Refined the CNN model using hyper-parameter tuning to achieve a dice coefficient score of 89%.
- Implemented geometrical assessment for validating the output masks using Euler number and eccentricity.
- Partnered with my team while delegating our tasks effectively to develop five CNN models (U-Net, Seg-Net, Res-UNet, Dense-Net and Dense-UNet) and to evaluate and compare their results.
- Conducted a literature review of the last state-of-art works related to our research.

Debiasing Facial Detection Systems | ***(TensorFlow, Variational Auto-Encoders, Computer Vision, Convolutional Neural Network)***

- Implemented a convolutional neural network for a facial classification model.
- Trained the model on CelebA and ImageNet datasets and evaluated its accuracy across four demographics that differs in gender and skin tone.
- Used variational autoencoders (VAEs) to adaptively resample the training dataset to mitigate potential biases of the model against certain skin tone and gender.
- Evaluated the performance of the debiased model against the baseline CNN model.
- Improved the model's accuracy of the most underestimated category (dark male) due to bias from 43% to 65% by utilizing the VAE model.

Diabetes Mellitus prediction | ***(Machine Learning, TensorFlow)***

- Conducted a systematic review identifying eleven different machine learning techniques for diabetes prediction and comparing their performance through previous studies.
- Performed data preprocessing by feature selection, normalizing continuous features and excluding null records.
- Implemented a Random Forest ensemble algorithm and evaluated its performance to achieve F1-score of 79%.

ECG Anomalies Detection | ***(Python, TensorFlow, Auto-Encoders, Keras)***

- Developed and trained an Auto-Encoder model to classify anomalies on the ECG5000 dataset using the reconstruction error.
- Enhanced the model performance by conducting data preprocessing and normalization to achieve a high prediction accuracy of %94.

Generating realistic handwritten digits | ***(Deep Learning, GANs, TensorFlow, Keras)***

- Built a discriminator and a generator network of Fully Connected Layers for generating handwritten digits that resemble those in the MNIST dataset.
- Improved model loss function by implementing the more stable loss function of Least squares GANs.
- Enhanced the model's spatial reasoning by implementing Deep Convolutional GANs network that utilizes convolutional networks in discriminator and generator.

Transfer learning image classifier | ***(Python, Deep Learning, Transfer Learning, TensorFlow)***

- Implemented a neural network model to classify images of cats and dogs utilizing a pre-trained Mobile-Net image classifier as a feature extractor.
- Conducted and trained a CNN classifier model as a benchmark for evaluating the transfer learning approach.
- Analyzed the models' performance using loss and accuracy curves of train and validation sets and confusion matrices.

Volunteering & Awards

Competitive Programmer | ACM Competition Aug 2021

- Participated in Cairo University Faculty of Engineering ECPC Collegiate Programming Contest
- Awarded 6th place by solving coding challenges in data structures and algorithms in C++ while collaborating with my teammates.

Coding Instructor | Bahga Academy Jun 2023 - Sep 2023

- Instructed sessions to young students in the core principles of programming by utilizing MIT Scratch educational software.
- Empowered students with technical, problem-solving skills and creative thinking through designed projects.
- Answered and supported students' inquiries while encouraging communication and positive classroom culture.

SKILLS

- C++, Ruby, Java, CSS3, HTML5, SQL, Python, C
- Ruby On Rails, PostgreSQL, Git, TensorFlow, NumPy, OpenCV, Pandas
- Data Structures, Algorithms, Object-oriented design, Machine learning, Deep learning, web development
- Leadership, Teaching