MD KHALEQUZZAMAN SARKER LIKHON

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RESEARCH EXPERIENCE

Undergraduate Research, Ahsanullah University of Science and Technology
Title: Design of an Arrhythmia Classification Algorithm Using 2-D Convolutional Neural Networks.

- Experimented on the MIT-BIH Arrhythmia database which is the first available data on the basis of ECG data from the Massachusetts Institute of Technology–Beth Israel Hospital (MIT–BIH).
- Defined custom Convolutional Neural Networks model and applied ELU as activation function.
- The proposed model can classify seven arrhythmia beats and normal beats. This model is built on various deep learning techniques in preprocessing such as batch normalization, data augmentation, Xavier initialization and dropout.

Advisor: Dr. Mohammad Shafiul Alam, Ph.D., Professor and former head of the CSE department at Ahsanullah University of Science and Technology.

RESEARCH INTEREST

Computer Vision

Image Processing, Object Detection, Activity Recognition, Object Recognition, 3D pose estimation, Motion Estimation, video surveillance and security (real-time video analysis, object tracking, and anomaly detection in surveillance systems), and video analytics.

PROJECTS

Object Detection on PASCAL VOC 2012 Dataset

- Data augmentation is applied during training, including horizontal flips and random brightness/contrast adjustments. The Faster R-CNN model with a ResNet-50 backbone is used. The pre-trained head is replaced with a new head suitable for the Pascal VOC dataset.
- The project includes visualization of the model's predictions on a set of images from the ImageNet validation dataset.

Semantic Segmentation on Oxford-IIIT Pet Dataset

- The Fully Connected Neural Network model is built using a VGG-16 backbone with pre-trained weights. The VGG-16 is truncated to exclude its dense layers, and the final convolutional layers are replaced with additional convolutional and transposed convolutional layers.
- The model is evaluated on the test set and displays the true and predicted mask.

Object Detection on PASCAL VOC 2007 Dataset

- Applied YOLOv1(You Only Look Once) algorithm. The dataset is preprocessed and converted into a format suitable for training the YOLO model.
- The model architecture begins with a convolutional neural network (CNN) serving as a feature extractor. YOLOv1 uses the DarkNet architecture, which consists of 24 convolutional layers followed by 2 fully connected layers.
- Used Intersection over Union(IoU), Non-Max Suppression(NMS), Mean Average Precision(mAP) for better performance.

Image classification on CIFAR-10 dataset

- Defined custom Convolutional Neural Networks model using Keras functional API. The model consists of convolutional layers (Conv2D), batch normalization, max-pooling, dropout, and fully connected layers (Dense).
- The model is evaluated on the test set and the predictions are visualized using functions from Matplotlib libraries.

ACADEIMIC CREDENTIALS

Ahsanullah University of Science and Technology(AUST) January 2021

Bachelor of Science in Computer Science and Engineering CGPA: 2.74/4.00

CourseWork: Data Structures, Algorithms, Artificial Intelligence, Pattern Recognition, Digital Image Processing, Computer Graphics.

TECHNICAL SKILLS

Programming Language — Python, C, C++

Libraries and Frameworks — Numpy, Pandas, Scikit-learn, OpenCV, Streamlit, TensorFlow, PyTorch

Development Tools — PyCharm, Jupyter Notebook, Google Colab, Visual Studio Code, CodeBlocks

Version Control — Git

Database — MySQL

Others — Deep Learning, Computer Vision

CERTIFICATIONS

Machine Learning — Coursera

The course includes Supervised Learning(classification and regression algorithms e.g. Linear Regression, Logistic Regression, Support Vector Machine(SVM), Neural Networks), and Unsupervised Learning(clustering algorithms e.g. k-means, Principal Component Analysis(PCA), Anomaly Detection).

Neural Networks and Deep Learning — Coursera

This course includes Neural Networks, Computational Graph, Forward Propagation, Backward Propagation, Gradient Calculation.

LINGUISTIC PROFICIENCY

Bengali	Mother Tongue
English	Fluent Working Proficiency

EXTRA CURRICULAR ACTIVITIES AND ACHIEVEMENTS

2019	Valuable member of Organizing Committee of AUST Codeware(programming contest)
2016-2019	Member of AUST CSE(Batch-37) Football Team-(Champions-2019)
2017-2022	Home Tutor (For 10th to 12th Grade).
2012	Education Board Scholarship in Secondary School Certificate
2011	Ranked 3rd in District Astro Olympiad
2011	Valuable Member of School Hand Ball Team (District Champion)
2009	Ranked 6th in District Junior Scholarship Examination