Shakra Batool

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Research Interests

Image Classification, Image Segmentation, Machine Learning, Deep Learning, Data Mining, Feature Extraction

Education

B.S. Bioinformatics

COMSATS University, Islamabad, Pakistan. Feb. 2017 - Jan. 2021
Thesis: Breast Cancer Detection and Segmentation using Convolutional Neural Networks.
Relevant Courses: Artificial Intelligence and Neural Networks, Bioinformatics Analysis, Deep Learning, Deep Learning in Medicine

Higher Secondary School Examination, Pre-Medical, June 2013 - May 2016

Work Experience

- **Undergraduate Student Researcher** Medical Imaging and Diagnostic Laboratory, National Center for Artificial Intelligence (NCAI), Islamabad, Pakistan Sep. 2020 - Present
  - Research and development of tumor detection algorithms
  - Development of a mobile application for doctors and radiologist to detect and segment breast cancer

Research Projects

- **Cancer Detection using Convolutional Neural Networks**
  Approach: I evaluated several CNN models including **VGG16**, **ResNet50**, and **MobileNet** to detect tumors from mammograms and histopathological images. For training and testing **CBIS-DDSM** dataset is used which is an updated and standardized version of the Digital Database for Screening Mammography (DDSM).
  Outcome: Trained MobileNet models that are able to accurately classify the tumor into *benign* and *malignant* classes.
- **Cancer Segmentation using UNet**
  Approach: For the segmentation of histopathological images, I used the UNet model. Training is performed on a publicly available dataset namely Data Science Bowl 2018. The training dataset contains images along with the mask of nuclei present in images. To reduce the overfitting, I employ data augmentation techniques which resulted in improved accuracy of the model.
  Outcome: A trained UNet model is able to segment the nuclei present in images.

Course Projects

- Auto diabetes detection using logistic regression on the microbiome of human body
- Identification and Extraction of specific human proteins using dictionaries and suffix trees
- Restaurant Management System with online reservation system using Object Oriented Programming
- Wampus World game in which an intelligent agent has to move with different arrows and to get the GOLD for winning the game.
- **MUSINTO:** A game for kids to teach rhymes, alphabets, and numbers.

Languages and Tools

- **Languages:** Python, R, FORTRAN, C++, Java, Matlab, SQL. I am also familiar with HTML, Visual Studio, and C#.

- **Tools:** Eclipse, Idle, Google Colab, Netbeans, Visual Studio, MS SQL Server, XAMP.

Other Skills

- Drug Designing by receptor-ligand binding using Bioinformatics Softwares including **Hex Software**, **Ligplot Plus**, **PDB Editor**, **Chimera**, and **Wincoot**.
- Study of DNA of different species using **NCBI**, **EBI**, and **SwissProt** .
- DNA to Proteins Conversions using Bioinformatics Tool **ExPasy**.
- Identifying Novel proteins and compare their sequences with other protein's sequences using **BLAST**, **FASTA**, **Rasmol**, **ClustalW**, and **Emboss**.
- **Microsoft Word**, **Microsoft Exel**, **Microsoft Powerponint**, and **Microsoft Access**.

Volunteer Work

- Fund raising and distribution to local deserving people affected by COVID-19
- Awareness talk on Muscular Dystrophy and Thalasymia
- Hospital visit to understand the cause and effects of Muscular Dystrophy and Thalasymia in young children.