

AI IN HEALTH PROJECT, GROUP 9

Members

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TOPIC: COMPUTER-AIDED DIAGNOSTICS FOR WRIST FRACTURES USING CONVOLUTIONAL NEURAL NETWORKS

Abstract

General x-rays are an important, cost-effective and readily accessible diagnostic tool for detecting fractures. They are especially important in emergency care, such as trauma and road traffic accidents, where timely imaging can quickly rule out bone fractures. However, radiologists and specialist doctors who interpret these x-rays and diagnose fractures promptly are not always available. This challenge may be exacerbated when fractures are subtle and the image reader lacks experience. But given that wrist fractures are among the most commonly detected fractures on musculoskeletal x-rays, making early diagnosis is crucial for timely intervention and improved patient outcomes. This is where Artificial Intelligence (AI) comes in.

The project titled, “Fracture Detection on Wrist X-ray Using Convolutional Neural Networks,” is a supervised machine learning which aims to develop a Computer-Aided Diagnostic (CAD) system to detect and localize wrist fractures on general x-ray images using Convolutional Neural Network (CNN) learning model. This CAD system is expected to enhance clinical decision-making in acute wrist x-rays, facilitate early interventions, improve communication between doctors and reduce the time radiologists spend interpreting images and writing reports. Ultimately, this will enhance patient outcomes.

Specific Objectives of the Project

1. To acquire and preprocess wrist x-ray images for training the model.
2. Develop and train a CNN model for fracture detection, evaluating the model’s performance in real-world settings through testing and classifying outputs as no fracture detected or fracture detected.
3. To develop an interactive GUI platform for viewing images and output labels.
4. To localize fractures by displaying texture heatmap of images.

Resources Needed

Python, SQL, TensorFlow/Keras, OpenCV, Scikit-Learn, Matplotlib/Seaborn, Pandas, NumPy, GUI and Grad-CAM

Link to data source:

https://drive.google.com/drive/folders/1CeUv-Fs3v4apjmyrEnH8e1qHPJIZKFWA?usp=drive_link