Project Title: Automated Detection of Fractures in X-ray Images

Objective

To develop a Convolutional Neural Network (CNN) model capable of identifying fractures in X-ray images, providing an automated, accurate, and efficient diagnostic aid for medical professionals.

Key Steps

Data Collection:

Collect labeled X-ray images of fractured and non-fractured bones.

Sources include public medical datasets (e.g., MURA, Kaggle datasets) or hospital archives.

Data Preprocessing:

Resize images to a consistent dimension (e.g., 150x150 pixels).

Normalize pixel values (0 to 1).

Perform data augmentation (rotation, flipping, etc.) to enhance model generalization.

Model Development:

Build a CNN model with layers for feature extraction (e.g., Conv2D, MaxPooling2D).

Use Dense layers for classification (output: fracture or no fracture).

Model Training:

Train the model using labeled X-ray images with a train-validation split.

Use metrics like accuracy, precision, and recall to evaluate performance.

Evaluation:

Test the model on unseen data and assess its ability to generalize.

Use a confusion matrix to analyze true/false positives and negatives.

Deployment:

Create a Flask web application for easy use.

Users can upload X-ray images and get instant fracture detection results.

Applications

Aid in rapid diagnosis for radiologists and orthopedic specialists.

Assist in rural or under-resourced areas where expert availability is limited.

Impact

This project could reduce diagnostic errors, speed up patient treatment, and support medical professionals, making healthcare more accessible and efficient.