Project Initialization and Planning Phase

Date	25 Sep 2024
Team ID	team-739715
Project Title	Real-time Bone Fracture Detection with YOLO-V8 Using X-ray Images
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) template:

The proposed solution utilizes YOLO-V8 to enable real-time and accurate bone fracture detection from X-ray images. It involves preprocessing data, annotating fractures, and training the model to handle variations in image quality and fracture types. The system is optimized for speed and accuracy through hyperparameter tuning. Integrated into a web application, it provides instant diagnostic results, reducing human error and expediting medical decision-making. This approach enhances efficiency in clinical workflows, especially in time-critical scenarios.

Project Overview	
Objective	To develop a real-time system for automated bone fracture detection using YOLO-V8 on X-ray images, ensuring high accuracy, efficiency, and reliability for medical diagnostics.
Scope	The project encompasses the collection, preprocessing, and annotation of X-ray datasets, training and optimizing the YOLO-V8 model, and deploying a web-based application for real-time fracture detection. It excludes manual diagnosis and focuses on fractures observable in X-ray imaging.
Problem Statement	
Description	Bone fractures often go undetected or are misdiagnosed due to human error or limited availability of skilled radiologists. Delayed or incorrect diagnosis can lead to severe complications, including impaired healing and increased healthcare costs.
Impact	Automating bone fracture detection accelerates diagnosis, reduces reliance on specialists, and minimizes errors. It enhances the accuracy and accessibility of medical imaging diagnostics, ultimately improving patient outcomes.

Proposed Solution	
Approach	The system leverages YOLO-V8, a deep learning model, for object detection. Key steps include preprocessing X-ray data, annotating fracture regions, training the model on diverse datasets, fine-tuning hyperparameters, and deploying the model through a Flask-based web application.
Key Features	• **Real-time Detection:** Fast and efficient diagnosis of fractures. • **High Accuracy:** Enhanced model training for subtle fracture identification. • **Web Integration:** User-friendly web application for easy accessibility. • **Scalability:** Adaptable to detect other anomalies in medical imaging.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	GPU specifications, vs code	NVIDIA V100 GPUs
Memory	RAM specifications	e.g., 8 GB
Storage	Disk space for data, models, and logs	e.g., 1 TB SSD
Software		
Frameworks	Python frameworks	e.g., Flask
Libraries	Additional libraries	e.g., Ultralytics,Yolov8l,
Development Environment	IDE, version control	e.g., Google colab
Data		
Data	Roboflow, 2GB, Directories	e.g., Roboflow dataset 1000 images