**X-ray Pathology Automated Detection Project Documentation**

**1. Introduction**

**1.1 Project Overview**

The X-ray Pathology Automated Detection project aims to develop a sophisticated machine learning-based system designed to automatically detect various pathologies in X-ray images. This innovative system is intended to significantly enhance the efficiency and accuracy of disease diagnosis for radiologists, ultimately improving patient care.

**2. Annotated Dataset: Chest X-Ray Cases**

The project leverages a meticulously annotated dataset comprising X-ray images with labeled pathologies. The dataset includes the following categories:

* **Consolidation:** 100 Subjects
* **Hilar:** 100 Subjects
* **Nodules:** 100 Subjects
* **Pleural Effusion:** 100 Subjects

The dataset is stored at the following path:

/data/chest\_x-ray\_cases\_for\_annotation

**3. Data Preprocessing**

**3.1 Conversion of Image Data Format (DICOM to PNG)**

For converting DICOM files to PNG, the X-ray segmentation model is used to segment out the lungs and heart. The lungs and heart are then masked out, and the image is saved as a PNG. This masking ensures the model focuses only on relevant parts of the image during training.

Steps for Conversion:

1. Load the DICOM files from the dataset.
2. Apply the segmentation model to isolate the lungs and heart.
3. Mask out the segmented regions to exclude other parts of the image.
4. Save the processed image as a PNG file.

**4. Model Training**

For training the model with the given labels, the data in /data/chest\_x-ray\_cases\_for\_annotation is used. The models are saved in the models\_<label> folder. The following models are trained:

* DenseNet121
* EfficientNetV2
* ResNet152

The model with the best validation accuracy is selected.

**5. Model Deployment**

**5.1 Backend Deployment**

The backend deployment code using Flask is located at:

/home/ubuntu/xray\_krsna/server

Steps to Deploy Backend:

1. Navigate to the server directory:

cd /home/ubuntu/xray\_krsna/server

1. Build the Docker image:

sudo docker build -t xray\_krsnaa .

1. Run the Docker container with Docker Compose:

cd /home/ubuntu/xray\_krsna

sudo docker-compose -p xray\_krsnaa up -d

**5.2 Frontend Deployment**

The frontend deployment code using React is located at:

/home/ubuntu/xray\_krsna/client

Steps to Deploy Frontend:

1. Navigate to the client directory:

cd /home/ubuntu/xray\_krsna/client

1. Start the development server:

npm start

**5.3 Running Frontend in the Background**

To run the frontend in the background using PM2:

1. Build the production version of the app:

npm run build

1. Install PM2 globally:

npm install -g pm2

1. Serve the build folder using PM2:

pm2 serve build 3000 –spa