**PROJECT PROGRESS BOOK**

**Academic Year-2022-23 (Monsoon Session)**

1. **Details of Students**

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| **PRN** | **Name of Student** | **Email ID** | **Contact Number** |
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1. **Group No: (Allocating by School): 1**
2. **Project Guide / Mentor Details:**

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| --- | --- | --- | --- | --- |
| **Guide** | **Name** | **Designation** | **Email ID** | **Mobile No** |
| DYPIU Guide | Dr. Maheshwari Biradar | Assistant  Professor | maheshwari.biradar@dypiu.ac.in | +919881343211 |
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1. **Project Title: AI-Driven Pneumonia Diagnosis and Prescription Recommendation**
2. **Area of Work: Medical , AI , Computer Vision , Language Model**
3. **Sponsored (if any): NA**
4. **Name of the organisation (Full Address) where the project work is carried Out:**

**D Y Patil International University ,** 3rd Floor, J Block ,

Sector 29, Nigdi Pradhikaran, , Akurdi, Pune, Maharashtra. Pin - 411044.

Students Signature Supervisor Signature

**SYNOPSIS**

**AI-Driven Pneumonia Diagnosis and Prescription Recommendation**

**Introduction**

Pneumonia, a common and potentially life-threatening respiratory infection, demands rapid and accurate diagnosis for effective treatment. In this era of technological advancement, we present an innovative approach to pneumonia classification, severity assessment, and prescription recommendations using the power of artificial intelligence (AI). Our project focuses on two primary objectives: firstly, the accurate identification of pneumonia and the localization of infected areas through bounding box detection, and secondly, the precise classification of pneumonia severity as mild, moderate, or severe. By harnessing the capabilities of machine learning and deep learning algorithms, we aim to enhance the speed and accuracy of diagnosis, ultimately leading to more effective treatment strategies tailored to the specific severity of the infection.

**Objectives**

Pneumonia Detection: Develop an AI-based classification system that can accurately detect the presence of pneumonia in chest X-ray images.

Infected Area Localization: Implement bounding box detection to precisely identify the regions of the lungs affected by pneumonia within the X-ray images.

Pneumonia Severity Classification: Create a classification model that categorizes pneumonia cases into three severity levels: mild, moderate, and severe.

Prescription Recommendation: Utilize the severity classification to provide tailored prescription recommendations, ensuring appropriate treatment plans for each patient.

Clinical Validation: Collaborate with medical professionals and institutions for the clinical validation of the system, ensuring its reliability and safety in real-world healthcare settings.

Research Contribution: Contribute to the advancement of AI in healthcare and diagnostic processes by sharing insights and methodologies with the scientific and medical communities.

**Methodology/ Planning of work**

Data Selection: The project will utilize chest X-ray datasets, specifically the RSNA Pneumonia Detection Challenge (DICOM format) (https://www.kaggle.com/c/rsna-pneumonia-detection-challenge/)and Chest X-ray Images (JPEG format). (https://www.kaggle.com/datasets/paultimothymooney/chest-xray-pneumonia) Comparative analysis will determine which dataset yields the best results for pneumonia detection and severity classification.

Data Preprocessing: Data preprocessing will involve standardization, augmentation, and conversion to a suitable format for model training.

Model Selection:Pneumonia Detection: Utilize RCNN (Region-based Convolutional Neural Network) for bounding box detection of pneumonia-infected areas.

Pneumonia Severity Classification: Implement deep learning techniques to classify pneumonia cases as mild, moderate, or severe.

Language Model: Train a language model to suggest prescriptions based on severity classification.

Training and Evaluation: Kaggle notebooks will be employed for model training and evaluation, optimizing model parameters for maximum accuracy.

Deployment: Flask or Streamlit will be used for deployment, providing a user-friendly interface for medical professionals.

Clinical Validation: Collaborate with medical professionals and institutions for clinical validation.

**Hardware Requirements**

A computer with internet connectivity.

**Software Requirements**

Kaggle account: To access the Kaggle platform for data, GPU, and memory resources.

Kaggle API: Required for interfacing with Kaggle services and accessing GPU resources.

Python: To develop and deploy the AI models, as Python is a popular programming language for machine learning and deep learning.

**Feasibility of work**

Technical Feasibility: The project is technically feasible, leveraging AI and Kaggle resources.

Data Availability: Ensure access to diverse, quality chest X-ray datasets.

AI Expertise: Consider the complexity of medical AI model development.

User Acceptance: Collaborate with healthcare professionals for real-world usability.

**References**

[**https://blog.paperspace.com/mask-r-cnn-in-tensorflow-2-0/**](https://blog.paperspace.com/mask-r-cnn-in-tensorflow-2-0/)

[**https://neptune.ai/blog/image-segmentation**](https://neptune.ai/blog/image-segmentation)

**<https://www.kaggle.com/c/rsna-pneumonia-detection-challenge/>**

[**https://www.ajronline.org/doi/10.2214/AJR.19.21512**](https://www.ajronline.org/doi/10.2214/AJR.19.21512)