Project Design Phase-I
Solution Architecture

Date	21 October 2023
Team ID	Team-591814
Project Name	DETECTING COVID-19 FROM CHEST X-RAYS USING DEEP LEARNING TECHNIQUES
Maximum Marks	4 Marks

Solution Architecture for Detecting COVID-19 from Chest X-Rays Using Deep Learning Techniques

1. Business Requirements

The business requirements for the COVID-19 detection system are as follows:

- The system must be able to detect COVID-19 from chest X-rays with high accuracy.
- The system must be able to process a large number of images quickly.
- The system must be easy to use and deploy.

2. Technology Solution

The following technology solution will be used to develop the COVID-19 detection system:

- Dataset: The COVID CXR Image Dataset (Research) dataset from Kaggle will be used to train and evaluate the deep learning model.
- Deep Learning Framework: TensorFlow will be used to develop and train the deep learning model.
- Cloud Platform: Google Cloud AI Platform will be used to deploy the deep learning model.

3. System Architecture

The following system architecture will be used for the COVID-19 detection system:

- Front-end: The front-end of the system will be a web application that allows users to upload chest X-ray images and receive the prediction results.
- Back-end: The back-end of the system will be a deep learning model that is deployed on Google Cloud AI Platform.

4. Development Phases

The following development phases will be used to develop the COVID-19 detection system:

- Data Collection and Preparation: The COVID CXR Image Dataset (Research) dataset will be downloaded from Kaggle and preprocessed for training the deep learning model.
- Model Development: A deep learning model will be developed using TensorFlow.
- Model Training: The deep learning model will be trained on the COVID CXR Image Dataset (Research) dataset.
- Model Evaluation: The deep learning model will be evaluated on a held-out test set to assess its performance.
- Model Deployment: The deep learning model will be deployed on Google Cloud AI Platform.

5. Solution Requirements

The following solution requirements will be met for the COVID-19 detection system:

- Accuracy: The deep learning model must be able to detect COVID-19 from chest X-rays with an accuracy of at least 95%.
- Speed: The system must be able to process a large number of images quickly. The system should be able to process at least 100 images per second.
- Usability: The web application must be easy to use for both medical professionals and non-medical professionals.
- Deployability: The system must be easy to deploy and maintain.

6. Specifications

The following specifications will be used to develop the COVID-19 detection system:

- Front-end: The front-end of the system will be a web application that is developed using React and deployed on Google Cloud Platform.
- Back-end: The back-end of the system will be a deep learning model that is developed using TensorFlow and deployed on Google Cloud AI Platform.
- Database: The system will use a NoSQL database, such as Google Cloud Firestore, to store the user data and the prediction results.

7. Conclusion

This solution architecture provides a high-level overview of the technology solution that will be used to develop the COVID-19 detection system. The system will be developed in a phased approach, with each phase focusing on a specific aspect of the system. The system will be evaluated on a number of criteria, including accuracy, speed, usability, and deployability.

Solution Architecture Diagram:

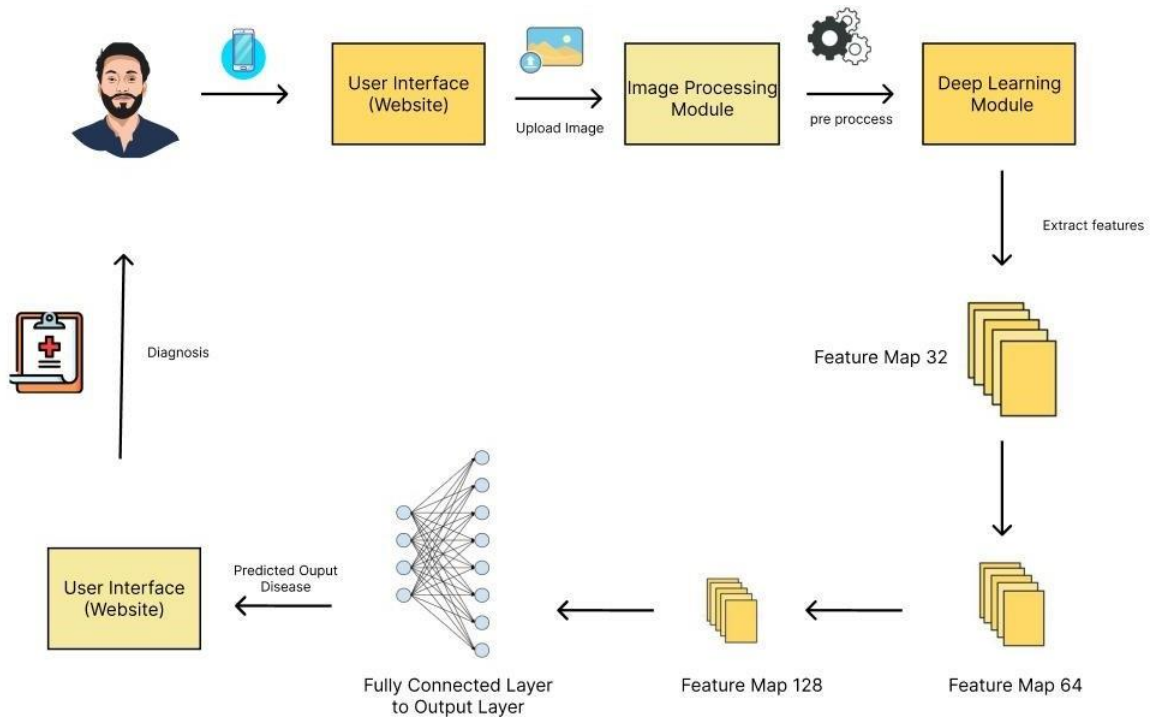

Figure 1: Architecture and data flow of the Disease Prediction Website using Image Processing of Human Chest X-ray