Project Design Phase-I
Solution Architecture

Date	27 October 2023
Team ID	Team-593208
Project Name	Detecting COVID-19 From Chest X-Rays Using Deep Learning Techniques
Maximum Marks	4 Marks

Solution Architecture:

1. **Datasets**:
   - Datasets serve as the raw input for the machine learning system. These could include image datasets, text datasets, or any data relevant to the problem you're trying to solve.
2. **Data Processing**:
   - Data preprocessing is a crucial step where you clean, transform, and prepare the data for training. This involves tasks like normalization, augmentation, and data splitting into training and testing sets.
3. **Train Data**:
   - The training data is a subset of the dataset used to train the machine learning model. It is essential for the model to learn patterns and features from this data.
4. **VGG-16 Architecture**:
   - VGG-16 is a specific deep learning architecture, known for its effectiveness in image recognition tasks. It consists of multiple convolutional layers followed by fully connected layers. This component specifies the neural network architecture.
5. **CNN (Convolutional Neural Network)**:
   - CNN is a class of deep neural networks well-suited for image-related tasks. It includes convolutional layers for feature extraction and pooling layers for down sampling.
6. **Test Data**:
   - The test data is another subset of the dataset that the model hasn't seen during training. It is used to evaluate the model's performance and measure its accuracy or other relevant metrics.
7. **Result**:
   - The result component is responsible for capturing and storing the performance metrics of the model on the test data, such as accuracy, precision, recall, and F1 score.
8. **Model**:
   - The model component represents the trained VGG-16 or CNN model, which has learned from the training data. It is used for making predictions on new data.
9. **User Interface**:
   - The user interface component is responsible for interacting with end-users. It can be a web application, a mobile app, or any other interface that allows users to input data and view the model's predictions or evaluation results.

- **Data Flow**:
  1. Datasets are ingested into the system.
  2. Data processing techniques are applied to clean and prepare the data.
  3. The prepared data is split into training and testing datasets.
  4. The training data is used to train the VGG-16 and CNN model.
  5. The trained model is then evaluated using the test data to obtain performance metrics.
  6. The results are stored and can be presented through the user interface for users to see.
- **Lifecycle Management**:
  - The model can be periodically retrained to improve performance using updated datasets.
  - User feedback or model metrics can trigger retraining.
  - Model versions and metadata can be managed for tracking and rollback purposes.
- **User Interaction**:
  - Users can provide input data through the user interface.
  - The system passes the input through the trained model.
  - The model's predictions are displayed to the user.

Solution Architecture Diagram