**Project Design Phase-I**
**Solution Architecture**

| | |
|---|---|
| Date | 31 October 2023 |
| Team ID | Team-592335 |
| Project Name | **"Deep Learning Model for Eye Disease Prediction"** |
| Maximum Marks | 4 Marks |

## Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered.

Utilizing metrics to assess the model's performance and adjust its hyperparameters. We implement the model into a user-friendly, RESTful API that complies with data protection laws. We used data augmentation techniques to artificially increase the number and diversity of the available data to overcome the challenges associated with data collecting. many picture manipulation techniques, including rotation, scaling, flipping, and adding noise, can be employed to provide more training examples and improve the model's capacity to generalize across many variances.

Preprocessing includes image resizing, normalization, and augmentation to enhance model training. Trained models are deployed as a RESTful API, and results are logged for future analysis. Healthcare professionals interact with the software through an intuitive web interface to upload images and receive predictions. User input triggers model inference and generates disease predictions. The model's performance is measured using metrics such as accuracy, precision, and recall, ensuring high diagnostic accuracy. Throughput, response times, and resource utilization are continuously monitored and optimized.

Features:

- Allow users to upload eye images for analysis.

- Provide quick and accurate diagnosis of eye diseases based on uploaded images.

- Develop an intuitive web interface for healthcare professionals to interact with the model.

- Provide user training and a helpdesk for healthcare professionals to use the system effectively.

Development phases:

- Data Collection and Preprocessing:

  Collect and preprocess diverse eye image datasets.

  Organize and store data securely.

- Model Development and Training

  Implement hyperparameter tuning and optimization.

- Deployment and User Interface Development:

  Deploy the trained model as a RESTful API using FastAPI or Flask.

  Develop a user-friendly web interface

- Continuous Monitoring and Updates:

  Implement monitoring for real-world performance.

  Continuously update the model based on performance and new data.

Solution Requirements

- The model must achieve a specified minimum accuracy, precision, and recall.
- Ensure data is anonymized and compliant with relevant regulations
- Provide timely diagnoses to support healthcare decision-making.
- The system must be able to handle increased data volumes and evolving diagnostic needs.
- Implement strong data encryption, access control, and security protocols to protect patient information.

**Solution Architecture Diagram:**