Project Design Phase-II

Technology Stack (Architecture & Stack)

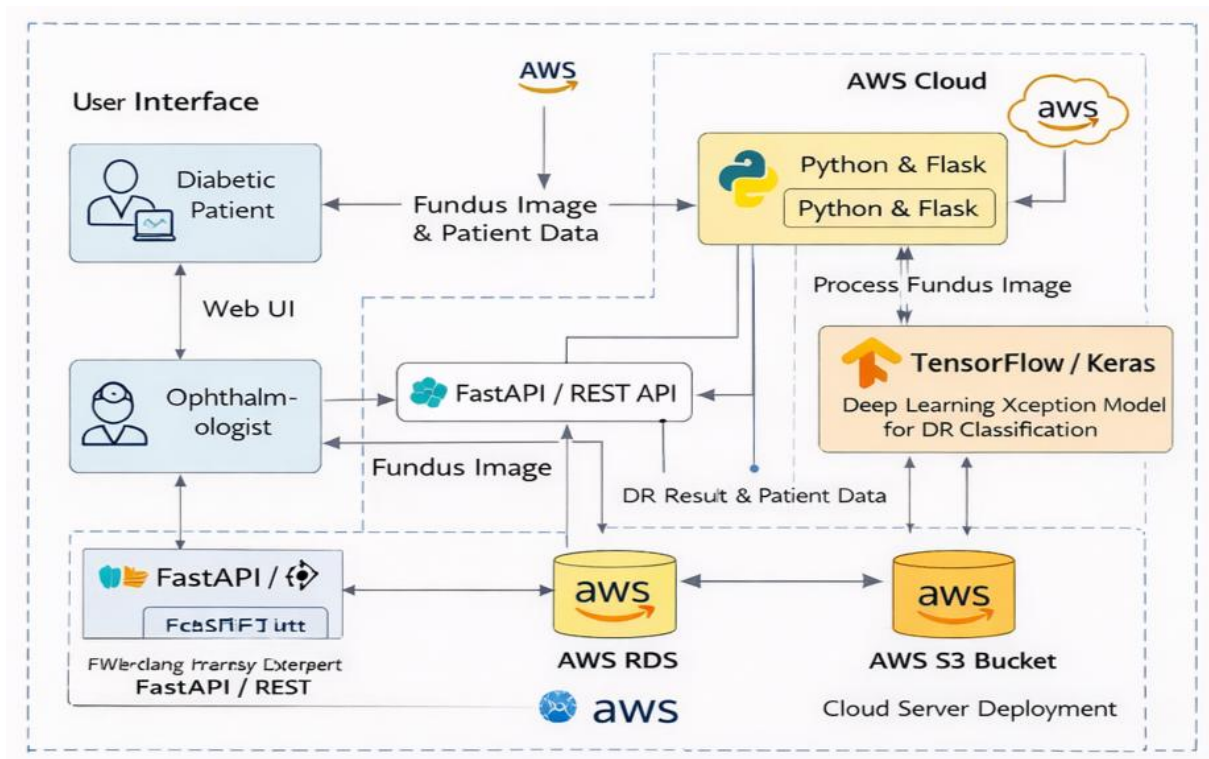| Date	13 February 2026
Team ID	LTVIP2026TMIDS88398
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 marks

Technical Architecture:

Table-1: Components & Technologies

S.No	Component	Description	Technology
1	User Interface	How user interacts with application (Web UI)	HTML, CSS, JavaScript

2	Application Logic-1	Backend logic for authentication & routing	Python & Flask
3	Application Logic-2	Image preprocessing & validation logic	OpenCV, NumPy
4	Application Logic-3	Deep Learning inference for DR classification	TensorFlow / Keras (Xception)
5	Database	Store user credentials & prediction records	SQLite
6	Cloud Database	Optional cloud database for scalability	MySQL / AWS RDS
7	File Storage	Storage of uploaded retinal images	Local File System / Cloud Storage
8	External API-1	Prediction request handling	Flask REST API
9	External API-2	Image handling & file utilities	Werkzeug Utilities
10	Machine Learning Model	Pre-trained DR classification model	TensorFlow / Keras
11	Infrastructure (Server / Cloud)	Application deployment environment	Local Server / AWS

Table-2: Application Characteristics

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Frameworks used for development	Flask, TensorFlow, Keras
2	Security Implementations	Password hashing & session management	Werkzeug Security
3	Scalable Architecture	3-Tier Architecture (UI, Logic, Data Layer)	Flask Architecture
4	Availability	Accessible when server is running	Localhost / Cloud Hosting
5	Performance	Prediction generated within few seconds	Optimized TensorFlow Model

| 6 | Reliability | Stable system behavior during usage | Python Exception Handling |