

## Project Design Phase-II Technology Stack (Architecture & Stack)

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|---------------|---|
| Date          | 31 January 2026   |
| Team ID       | LTVIP2026TMIDS81330   |
| Project Name  | Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy |
| Maximum Marks | 4 Marks   |

### Requirement Analysis

### Technology Stack

#### 1. Introduction

Technology stack defines the combination of programming languages, frameworks, tools, and platforms used to develop the project.

For the Diabetic Retinopathy Classification System, modern AI and web technologies were selected to ensure performance, scalability, and accuracy.



## **2. Frontend Technologies**

**HTML5** - Used to structure web pages.

**CSS3** - Used to design responsive and attractive medical dashboards.

**JavaScript** - Used for UI interactivity and animations.

## **3. Backend Technologies**

**Python** - Primary programming language for backend logic and AI integration.

**Flask** - Lightweight web framework used to handle routing, requests, and responses.

## **4. Deep Learning Technologies**

**TensorFlow** - Used for model training and inference.

**Keras** - High-level API for building and training CNN models.

**Xception Model** - Pre-trained CNN used for feature extraction and classification.

## **5. Database Technology**

**IBM Cloudant**

NoSQL database used for storing user credentials and session-related data.

Advantages:

- Scalable
- Cloud-based
- High availability

## **6. Tools and Platforms**

- Google Colab – Model training
- Kaggle – Dataset source
- Jupyter Notebook – Experimentation
- GitHub – Version control
- Web Browser – UI testing

## **7. Project Flow Using Technology Stack**

1. User interacts with frontend (HTML/CSS).
2. Flask backend receives input.
3. Image is processed using TensorFlow.
4. Xception model predicts class.
5. Result stored/displayed using Flask.
6. User data handled by Cloudant DB.

## **Conclusion**

The chosen technology stack ensures a balance between performance, scalability, and development efficiency. It enables seamless integration of AI with web technologies for real-world healthcare applications.