# System Scope for Web-Based Diabetic Retinopathy Detection System

## Overview

The objective of this project is to develop a web-based system that allows users to upload retinal images and receive an analysis identifying markers related to diabetic retinopathy. The system will leverage a machine learning (ML) engine trained on a Kaggle dataset to perform the analysis. Users will be able to sign in using Google Sign-In for authentication.

## Features and Functionalities

**User Authentication**

* Google Sign-In: Implement Google OAuth for user authentication to ensure secure access to the system.
* User Profile Management: Store and manage user profiles, including their login credentials and usage history.

**Image Upload**

* Upload Interface: Provide an intuitive interface for users to upload retinal images.
* Supported Formats: Ensure the system supports common image formats (JPEG, PNG).

**Machine Learning Engine**

* Model Integration: Integrate a pre-trained machine learning model (trained on the Kaggle dataset) to analyze uploaded retinal images.
* Prediction: The model will identify and highlight markers indicative of diabetic retinopathy.

**Image Analysis and Results**

* Processing: Once an image is uploaded, the system will process it using the ML model.
* Result Display: Display analysis results to the user, highlighting areas of concern on the image.
* Interpretation: Provide a summary report explaining the identified markers and their implications.

**Data Storage**

* Image Storage: Securely store uploaded images and analysis results for future reference.
* User Data: Maintain a database of user data, including their uploaded images and analysis history.

**User Interface**

* Dashboard: Develop a user-friendly dashboard for users to manage their uploads, view results, and access historical data.
* Responsive Design: Ensure the system is accessible on various devices, including desktops, tablets, and smartphones.

**Security and Compliance**

* Data Security: Implement robust security measures to protect user data and comply with relevant data protection regulations.
* Privacy: Ensure user images and personal data are handled with the highest confidentiality.

**Performance and Scalability**

* Efficient Processing: Optimize the system for fast and accurate image processing and analysis.
* Scalability: Design the system to handle multiple concurrent users and large volumes of data.

## System Architecture

**Frontend**

* Technologies: HTML, CSS, JavaScript, React.js for building a responsive and interactive user interface.
* Google Sign-In Integration: Use Google's OAuth API for authentication.

**Backend**

* Technologies: Node.js/Express.js for handling server-side logic and API requests.
* Machine Learning Integration: Python with Flask or Django to serve the ML model and handle image processing.

**Database**

* Storage: Use a relational database like MySQL for storing user data and analysis results.
* Image Storage: Use cloud storage solutions like Google Cloud Storage for storing uploaded images.

**Machine Learning**

* Model Training: Use TensorFlow or PyTorch for developing and training the diabetic retinopathy detection model.

**Hosting**

* Cloud Hosting: Deploy the system on a cloud platform like AWS, Google Cloud Platform, or Azure for scalability and reliability.

## Development Plan

**Requirement Analysis and Design**

* Detailed requirement gathering.
* System architecture and design specification.

**Implementation**

* Frontend development.
* Backend development and integration with the ML model.
* Database setup and integration.

**Deployment**

* Deploy the system to the cloud.
* Configure monitoring and logging.

## Conditions

* Feel free to use the existing tools and AI systems.
* Need to present all the steps and 3rd party tool
* Able to contact the resource people, for the hosting support