Ideation Phase

Brainstorm & Idea Prioritization

Date	12 February 2026
Team ID	LTVIP2026TMIDS88398
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 marks

Brainstorming – Idea Generation and Prioritization

Step-1: Team Gathering, Collaboration and Select the Problem Statement

The ideation phase began with a collaborative discussion to identify real-world healthcare problems that could be addressed using Artificial Intelligence and Deep Learning. After evaluating multiple medical imaging domains, the team selected Diabetic Retinopathy (DR) due to its global impact and the need for scalable screening solutions.

Manual screening of fundus retinal images is time-consuming and requires expert ophthalmologists. Early-stage abnormalities such as microaneurysms and hemorrhages are difficult to detect visually. Therefore, the team decided to build an automated AI-based screening system.

Final Problem Statement: "To design and develop a Deep Learning-based automated screening system using transfer learning techniques to detect and classify five stages of Diabetic Retinopathy from fundus retinal images and deploy it as a web application for real-time predictions."

Step-2: Brainstorm, Idea Listing and Grouping

Data Collection and Preparation Ideas

• Use Kaggle Diabetic Retinopathy dataset.

• Clean and remove corrupted images.

• Organize training and testing folders.

• Resize and normalize images.

• Apply augmentation (rotation, zoom, shift, flip).

Model Selection and Architecture Ideas

• Use Transfer Learning with Xception model.

• Freeze base layers initially.

• Add Global Average Pooling layer.

• Add Dense and Dropout layers.

• Use Softmax activation for 5-class classification.

Model Training and Evaluation Ideas

• Use ImageDataGenerator.

• Use Adam optimizer.

• Use categorical cross-entropy loss.

• Train for 30 epochs.

• Save trained model in .h5 format.

Web Application and Deployment Ideas

• Develop Flask web application.

• Create home, register, login, predict, logout pages.

• Implement SQLite user authentication.

• Integrate trained model for real-time prediction.

Step-3: Idea Prioritization

High Priority Ideas (Implemented)

• Xception transfer learning model.

• Image augmentation using ImageDataGenerator.

• Adam optimizer with categorical cross-entropy.

• Flask-based web deployment.

• Real-time prediction integration.

Medium Priority Ideas

• Fine-tuning deeper layers.

• Improving accuracy beyond 80%.

• Enhanced UI design.

Low Priority Ideas

• Cloud deployment.

• Mobile application development.

• Hospital database integration.

Conclusion of Ideation Phase

The brainstorming and prioritization process helped define a clear development strategy. The selected ideas ensured an end-to-end implementation including data preprocessing, transfer learning model development, and web deployment using Flask.