

Ideation Phase


Brainstorm & Idea Prioritization

Date	13 September 2022
Team ID	PNT2022TMID13018
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 Marks




The original PDF of the below Brainstorming is submitted as a single file for better clarity.

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

Deep Learning Fundus Image analysis for Early Detection of Diabetic Retinopathy



Brainstorm & idea prioritization


-  **10 minutes** to prepare
-  **1 hour** to collaborate
-  **4 People**

19I222 Harlprasath
20I436 Samyuktha
20I434 Priyanka
19I248 Raveena

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Problem statement

To develop a Deep Learning model for Fundus Image Analysis for Early Detection of Diabetic Retinopathy which prevents any later complications.

 **5 minutes**


PROBLEM


How might we solve **Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy**?





Key rules of brainstorming


To run an smooth and productive session


 Stay in topic.

 Encourage wild ideas.

 Defer judgment.

 Listen to others.

 Go for volume.

 If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

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Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

Hariprasath T

Extract features from well-known pre-trained deep learning model

With the aid of exudates that have been extracted, the system that will be developed.

Priyanka

A diabetes condition that impacts the eyes is diabetic retinopathy.

Automated approaches for diagnosing diabetic retinopathy to speed up examinations and assist doctors.

Raveena

Pre-trained models, in order to detect exudates from diabetic retinopathy, and then perform performance evaluation on the models.

segment-based learning method that simultaneously learns classifiers and features from the data

Sort the diabetic retinopathy into mild, moderate, severe, or proliferative categories...

Samyuktha

Initially, diabetic retinopathy may not manifest any symptoms or may only result in minor vision issues.

The analyst is responsible for manually detecting exudates, which takes time.

Diabetic retinopathy is a common disease that diabetic patients are diagnosed with.

Damage to the blood vessels in the light-sensitive tissue at the back of the eye is what causes it (retina)

Deep learning is a key component in ophthalmology to diagnose critical disorders like diabetic retinopathy (DR).

Color fundus retinal pictures should be processed to look for diabetic retinopathy.

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Features & Extraction

Identify characteristics in a well-known, previously trained deep learning model.

Remove the optic disc out of the picture using the properties of the same and feed the picture to the same ML model that was developed.

In addition to a complicated grading system, the manual diagnosis of diabetic retinopathy (DR) through colour fundus pictures necessitates trained doctors to recognize the presence and relevance of numerous tiny characteristics.

The empirical proof can be given by removing the optical disc and feeding the picture to the two models and predicting the output.

Model

To detect exudate using a pretrained convolutional neural network (CNN)-based framework.

The existing system uses RESNET-50 which is pre-trained and is highly complex.

A two-stage training method with supervised contrastive loss function, to identify the DR.

Multiple simple algorithms work together to complement and augment each other

Classification

The current model used was a spinoff of CNN with varying number of layers.

A hybrid machine learning model that takes the pictures as the input and classifies the exudates based on grades that is 0-5.

A Convolutional Neural Network, also known as CNN or ConvNet, is a class of neural networks that specializes in processing data that has a grid-like topology, such as an image.

The optical disc in the picture is proving to be an impediment in the prediction process.

Approach

Hard and soft exudates, as well as other diverse situations like haemorrhage and microaneurysms individually, are not distinguished by any system.

As no single cap fits all heads, no single ML procedure is appropriate for all issue

HML is a progress of the ML, work process that perfectly unites different computations, processes, or procedures from equivalent or different aspects of data or areas of usage fully intended to enhance each other.

To ameliorate the accuracy data augmentation will also be done.

Step-3: Idea Prioritization

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Prioritize

Your team should all be on the same page about what's Important moving forward. Place your Ideas on this grid to determine which Ideas are Important and which are feasible.

20 minutes

