**PROJECT DESIGN PHASE-I**

**PROPOSED SOLUTION TEMPLATE**

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| Date | 3rd October |
| Team ID | PNT2022TMID22465 |
| Project Name | Project - DEEP LEARNING FUNDUS IMAGE  ANALYSIS FOR EARLY DETECTION OF  DIABETIC RETINOPATHY |
| Maximum Marks | 2 Marks |

**PROPOSED SOLUTION TEMPLATE:**

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| Problem Statement (Problem to be  solved) | Diabetic retinopathy is one of the most  threatening complications of diabetes that  leads to permanent blindness if left  untreated. One of the essential challenges is  early detection, which is very important for  treatment success. Unfortunately, the exact  identification of the diabetic retinopathy  stage is notoriously tricky and requires  expert human interpretation of fundus  images. Simplification of the detection step  is crucial and can help millions of people.  Convolutional neural networks (CNN) have  been successfully applied in many adjacent  subjects, and for diagnosis of diabetic  retinopathy itself. However, the high cost of  big labeled datasets, as well as  inconsistency between different doctors,  impede the performance of these methods.  In this paper, we propose an automatic  deep-learning-based method for stage  detection of diabetic retinopathy by single  photography of the human fundus.  Additionally, we propose the multistage  approach to transfer learning, which makes  use of similar datasets with different  labeling. The presented method can be used  as a screening method for early detection of  diabetic retinopathy with sensitivity. |
| Idea / Solution description | Our aim is to identify retinopathy using five  different diabetic retinopathy. Moreover, we  present what pre-processing and  regularization steps to the images needs to  be done for the good functionality of the  deep learning system and investigate  systematically how the size with much  smaller number of images used in training  affects its performance. |
| Novelty / Uniqueness | We will be using transfer learning. This has  become one of the most common techniques  that has achieved better performance in  many areas, especially in medical image  analysis and classification. We used  Transfer Learning techniques like Inception  V3,Resnet50,Xception V3 that are more  widely used as a transfer learning method in  medical image analysis and they are highly  effective. |
| Social Impact / Customer Satisfaction | Using this system, we can easily detect the  stages early, the doctors can able to treat the  patient effectively and also reduce the  complications. Therefore, this review  identifies the need for improved outcome  measures to provide valid, meaningful  measurement of the social and emotional  impact of diabetic retinopathy and discusses  potential directions for future research such  as item banking and computer adaptive  testing. |
| Business Model (Revenue Model) | This system would be used by both the  doctors as well as the patients. It would  reduce the time for the doctors to detect the  stages. Demand for diabetic retinopathy is  increasing with the complication related eye  which is likely to treat with various eye  injections and laser treatment for the disease  are anticipated to increase the diabetic  retinopathy market share in the forecast  period from 2022 to 2032".The systems will  be valuable in improving both screening of  individuals with diabetes and  communication and discussion among  individuals caring for these patients. |
| Scalability of the Solution | The system, being dynamically and  modularly developed, allows for much  modification and large scalable operations.  More data when made available can be  processed and produce efficient results. This  system is easily and efficiently scalable. |