

**IBM-EPBL/IBM-Project-54108-1661597230 PROPOSED  
SOLUTION : Deep Learning Fundus Image Analysis for  
Early Detection of Diabetic Retinopathy.**

**Team Members :**

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**AIM :** To write the proposed solution for Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy.

**Proposed Solution :**

<b>S.No.</b>	<b>Parameter</b>	<b>Description</b>
1.	Problem Statement	<p>Diabetic Retinopathy (DR) is a common complication of diabetes mellitus, DR mutilates the retinal blood vessels of a patient having diabetes.</p> <p>This causes damages to retinal blood vessels which lead to imperfect vision and <b>if it is not detected early stages , it can lead to blindness.</b></p>

		<p>The early stage of DR <b>does not have any Symptoms</b>, so it is important to identify microaneurysms and hemorrhages to detect the early stage of DR.</p> <p>Unfortunately, DR is not a reversible process DR early detection and treatment can significantly reduce the risk of vision loss.</p>
2.	Idea/Solution description	<p><b>Existing methods are lacking in the earlier detection.</b> Because preprocessing techniques used in those methods are not effective to analyze such smaller features.</p> <p>We opt to use multi-layer neural networks as deep Neural network. In the fact that data is Image, the best type of neural network that we use to process is Convolutional Neural Networks.</p> <p>First the <b>data preprocessing</b> is done to the images (our dataset) it is highly recommended, For better accuracy to be achieved.</p> <p>As we have to do for most of the data, <b>normalization</b> plays an important role in our process.</p> <p>After preprocessing and <b>normalizing</b>, the prepared dataset could be used as input to our deep convolutional neural network.</p>

		Then deep NN will run and fit our data and then the result will be produced by that. This report will cover steps how this deep convolutional network to be implemented
3.	Novelty / Uniqueness	<p>One of the most important decision had to be made is which programming language can be used for satisfying our goal for extracting knowledge from our data. The suitable programming language is <b>Python</b>. Because it has ,a lot of tools and framework to create a strong ANN.</p> <p><b>IBM Waston</b> is also use to predict the future outcomes, automate complex processes and optimize user's time.</p> <p>The result accuracy can so be increased from the existing codes which are proposed.</p>
4.	Social Impact / Customer Satisfaction	This may help the Diabetic patient to detect DR in early stages by health camps and in regular interval of checkup with their retinal images.
5.	Business Model (Revenue Model)	<p>Can be collaborated with the <b>Diabetics Diagnosis center</b> for regular check up.</p> <p>Government camps and NGO healthcare camps can be conducted for awareness</p>

6.	Scalability of the Solution	The project will help as to detect DR more prominently than the existing system. It can also produce a result with specific stage of Diabetic Retinopathy.
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