

Project Design Phase-II Technology Stack (Architecture & Stack)

Date	15 October 2022
Team ID	PNT2022TMID34131
Project Name	Project - Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

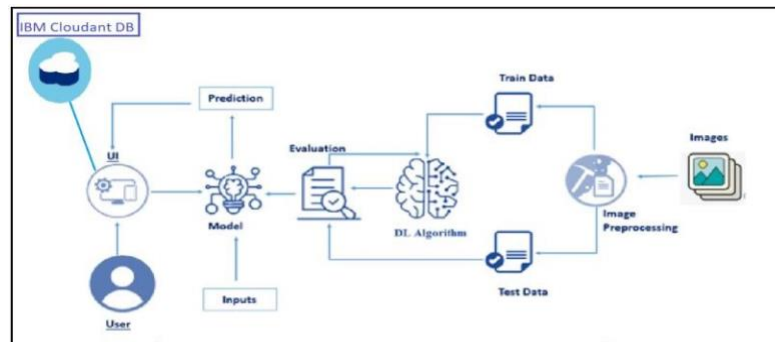


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user/client can access the functionalities in the system through user interface	HTML5, CSS, JavaScript Technologies
2.	Application Logic-1	The code for the DR detection process can be programmed using python	Python

3.	Application Logic-2	Watson is an IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a "question answering" machine. The supercomputer is named for IBM's founder, Thomas J. Watson.	IBM Watson service
4.	Application Logic-3	Watson Assistant lets you build conversational interfaces into any application, device, or channel. Add a natural language interface to your application to automate interactions with your end users. Common applications include virtual agents and chat bots that can integrate and communicate on any channel or device.	IBM Watson Assistant
5.	Database	Here we use database to organize the collection of information	IDRID, EyePACS etc.
6.	Cloud Database	We will use the storage functionality and cloud functions provided by firebase for the development of the backend	IBM cloudant DB
7.	File Storage	Images are stored for further analysis purposes	Cloud Based Server
8.	External API-1	This application is used for recognition of image, videos and face in photos etc	Kairos API,etc.
9.	External API-2	It can be used for constructing and executing a TensorFlow graph.	TensorFlow API ,etc.
10.	Deep Learning Model	Deep learning eliminates some of data Pre-processing that is typically involved with machine learning. These algorithms can ingest and process unstructured data, like text and images, and it automates feature extraction, removing some of the dependency on human experts.	Convolutional Neural Networks Model etc.
11.	Infrastructure (Server / Cloud)	Cloud services are infrastructure, platforms, or software that are hosted by third-party providers and made available to users through the internet.	AWS(Amazon Web Services), Azure (Microsoft), Google Cloud, and IBM Cloud. etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	the open-source frameworks used such as RNN, TensorFlow, Theano, Pytorch. etc	Apache MxNet:etc
2.	Security Implementations	Intrusion Detection and Prevention Systems (IDS/IPS),Spam and Social Engineering Detection,Network Traffic Analysis,NextGeneration Firewall (NGFW),Web Application Firewall (WAF)	e.g. Natural Language Processing (NLP), User and Entity Behavior Analytics (UEBA)etc.
3.	Scalable Architecture	The EfficientNetB3 Convolutional Network is a network architecture which provides a new scaling method that uniformly scales all dimensions of network depth, width and resolution	EfficientNetB3
4.	Availability	Quality, and accessibility can be amplified using this technology	EfficientNetB3
5.	Performance	The model is evaluated based on the weighted average of the macro mean, precision, recall, and f1 scores to understand model performance. The accuracy of the proposed model is 98.26	EfficientNetB3

References:

https://www.researchgate.net/publication/352346653_EfficientNetB3_Architecture_for_Diabetic_Retinopathy_Assessment_using_Fundus_Images
<https://ieeexplore.ieee.org/document/9409084>
<https://ieee-dataport.org/open-access/indian-diabetic-retinopathy-image-dataset-idrid>

