Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	18 October 2022
Team ID	PNT2022TMID13018
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 Marks

Technical Architecture:

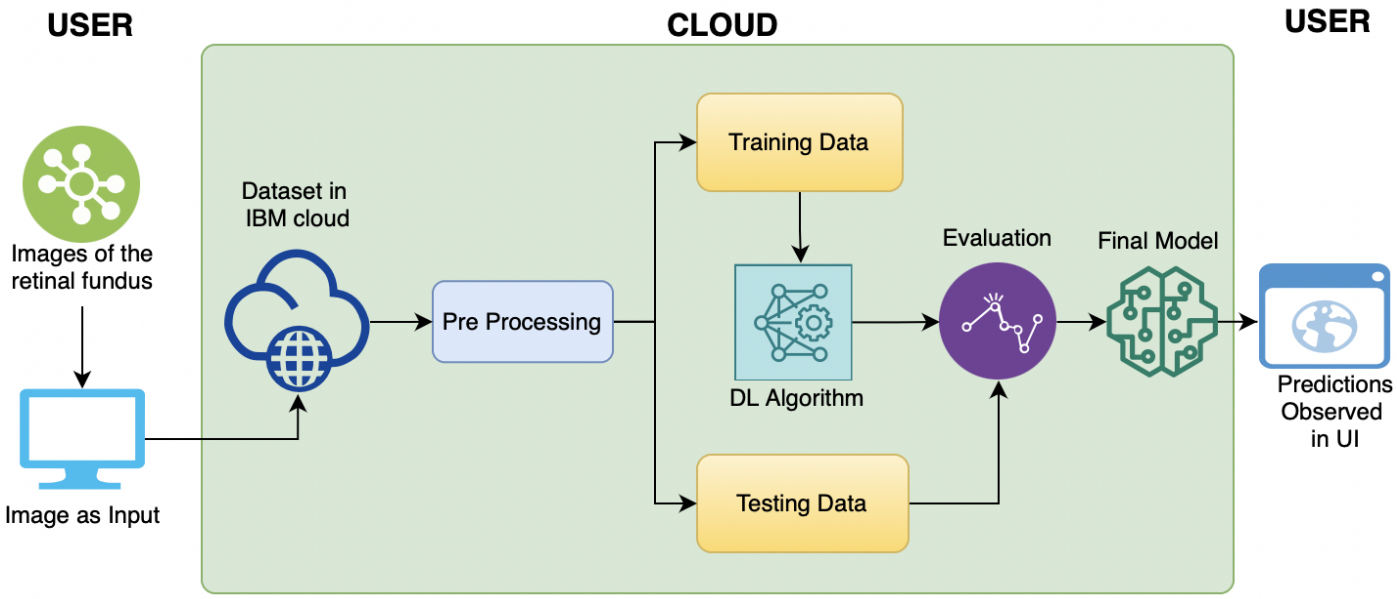

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI	HTML, CSS, JavaScript, Python
2.	Application Logic-1	Data Preprocessing	Keras, TensorFlow
3.	Application Logic-2	CNN Model Creation	Keras, TensorFlow, Python
4.	Application Logic-3	Web Application	Flask
5.	Database	Images	Upload Folders
6.	Cloud Database	Database Service on Cloud	IBM Cloudant
7.	File Storage	File storage requirements	IBM Block Storage or Local Drives
8.	External API-1	Keras	IBM preprocessing API
9.	Deep Learning Model	Inception	Object Recognition Model, etc.
10.	Infrastructure (Server / Cloud)	Application Deployment on Cloud Server	Kubernetes

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask	Werkzeug, Jinja2, Sinatra Rubyframework
2.	Security Implementations	CSRF protection, cookies security flag	Flask-WTF,SESSION_COOKIE_SECURE
3.	Scalable Architecture	Micro Services	Micro web application framework by Flask
4.	Availability	Development server and fast debugger Support for unit testing RESTful request Dispatching Jinja2 template Unicode	Werkzeug,Jinja2.Sinatra Rubyframework
5.	Performance	ORM-agnostic, web framework, WSGI 1.0 complaint,HTTP request handling functionality high flexibility	SQLAlchemy.extensions, Werkzeug, Jinja2, Sinatra Rubyframework
6.	Robustness	To increase robustness- training with weight decay, smoothing activation functions, minimizing the Hessian of the network	Python, required Libraries in import activation functions.
7.	Scalability	Clear input pipeline, optimizations	Python, keras.optimizer

Time and Budget:

The deep learning model requires a lot of training time, but it will be faster than machine learning models in predicting outcomes in the most accurate manner. Since the model trains on a large number of images, a high end infrastructure will be required for model development.

References:

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