Glaucoma Detection Using CNN Model

1. Executive Summary:

Glaucoma is a leading cause of irreversible blindness worldwide, this Project,I propose a Convolutional Neural Network (CNN) Based ConvNextTiny approach for the prediction of glaucoma using retinal fundus images from Rotterdam EyePacs Airogs. Leveraging a dataset of 9000 high-resolution retinal images from Subjects.

2. Problem Statement:

Problem:

- Early detection and timely intervention are critical for preventing vision impairment and blindness.
- However, the current methods for diagnosing glaucoma often rely on subjective assessments by ophthalmologists and specialized imaging techniques, which may not be widely accessible or cost-effective.

Objective: the primary objective is to develop a deep learning-based solution for predicting glaucoma using retinal fundus images. Leveraging a dataset of 9000 retinal images

3. Data Sources:

Primary Data: Kaggle

Author: RILEY KIEFER
Link : https://www.kaggle.com/datasets/deathtrooper/glaucoma-dataset-eyepacs-airogs-light-v2

4. Methodology:

Data Collection: Fundus images from the Rotterdam EyePACS AIROGS.

Data Preparation:

- Inspect the dataset for any corrupted or low-quality images, and remove or filter them to ensure data integrity.
- Address any inconsistencies or anomalies in the dataset, such as mislabeled images or artifacts.

Model: ConvNeXtTiny with GlobalMaxPool2D and a Regularized Dense Layer.

5. Expected Outcomes:

The goal is to train a Convolutional Neural Network (CNN) model capable of accurately classifying images as indicative of glaucoma or non-glaucoma..

6. Risks and Challenges:

Data Quality:

- The quality of the retinal fundus images in dataset can significantly impact the performance of my model.
- Poor image resolution, artifacts, or inconsistencies in image acquisition can lead to inaccurate predictions.

7. Conclusion:

The development of a Convolutional Neural Network (CNN) Based ConvNextTiny model for glaucoma prediction using a dataset of 9000 retinal fundus images presents a promising approach to improving early detection and management of this sight-threatening disease.