Paper Title:A Machine learning approach to detect diabetes disease based on Convolution Neural Network

Paper Link:

https://www.kaggle.com/datasets/abhia1999/chronic-kidney-disease/data

Summary:

1.1 Motivation/Purpose:

There are millions of people worldwide suffering from a chronic illness called diabetes. To avoid difficulties, early identification is necessary for the body and soul . Blood tests are used in traditional ways, which can be intrusively uncomfortable. In order to provide a non-invasive , quicker technique for diabetic illness identification, this study investigates the use of a Convolutional Neural Network (CNN) in conjunction with Machine Learning (ML).

1.2 Contribution:

Using deep learning to provide precise and effective diagnosis, a CNN-based model for diabetes detection is being developed.

The training model using data from medical imaging shows how CNNs can be used in the healthcare industry.By testing the model's effectiveness in detecting diabetes evaluating its performance using common criteria.

1.3 Methodology :

Acquire a dataset of diabetes-related medical pictures, such as retinal scans or other pertinent medical imaging information.To ensure that the data is appropriate for training the CNN, preprocess the pictures to improve features and minimize noise.
Using methods like transfer learning or creating a bespoke architecture, design and train a CNN architecture for diabetes diagnosis.Analyze the trained model's performance using measures like area under the curve (AUC), sensitivity, specificity, and accuracy.Examine the outcomes to comprehend the model's advantages and disadvantages, and, if necessary, compare it to other approaches already in use.

1.4 Conclusion:

The goal of this study is to determine whether CNNs can be used to detect diabetes illness by analyzing retinal images. The initiative can aid in the investigation of non-invasive and perhaps quicker techniques for early diabetes detection by creating and assessing a CNN model.

Limitations:

2.1 First limitation/Critique:

Access to a large and diverse dataset of retinal images with accurate labels is crucial for building a robust model.

2..2 Second limitation/Critique:

The model's performance might be affected by factors like image quality or variations in disease presentation. Further testing on diverse datasets is necessary.CNN models can be complex and interpreting their decision-making process might be challenging. This could limit their integration into clinical practice.

Synthesis:

In conclusion, this work suggests a machine learning strategy for diabetes identification. Also, from medical pictures that make use of convolutional neural networks (CNNs). The goal of this strategy is to offer a effective means of early identification, which is essential for successful diabetes treatment and the avoidance of complications. The creation of a CNN based model trained on diabetes related medical imaging data is the primary contribution of this work. The model can reliably identify diabetes by utilizing deep learning, providing a quicker and less intrusive substitute for conventional diagnostic techniques.Data collection, preprocessing, model creation, and assessment are all part of the technique. The trained model has encouraging outcomes, including good sensitivity and accuracy in identifying diabetes from medical images.
It is crucial to acknowledge the study's limitations, such as the requirement for additional validation and improvement of the model to guarantee its efficacy in a range of situations and people. This study's result emphasizes CNNs' potential for use in healthcare applications, especially in the area of diabetes illness diagnosis. This study lays the groundwork for future developments in the application of deep learning for bettering diabetes diagnosis and management despite obstacles and constraints to be addressed.