Task 2

Paper Title:

Comparative study of SVM, KNN and Decision Tree for Diabetic Retinopathy Detection

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1 Summary

1.1 Motivation

This study compares the effectiveness of three machine learning models SVM, KNN, and Decision Tree in the identification of diabetic retinopathy using fundus images. Finding the disease's most trustworthy machine learning model is the goal of the study.

1.2 Contribution

The scientists used fundus images to compare three machine learning algorithms in order to identify diabetic retinopathy. To extract features from the fundus images, they employed CNN. Next, use the feature extractor to train the ML models, and assess their performance. Additionally, they investigated how various hyperparameters affected the performance.

1.3 Methodology

A CNN model was employed for feature extraction from the fundus images. The extracted images are used for training the ML models. The dataset used for training and testing the model consists of 3662 gaussian filtered retina scan images of size 224x224 pixels. They divided the dataset into 80:20. Different hyperparameter was used to explore the impact on the performance.

1.4 Conclusion

The authors evaluated the efficacy of three distinct machine learning models in identifying diabetic retinopathy through the use of fundus images. Throughout the training, SVM had the best results. They highlighted the ability of machine learning techniques to identify diabetic retinopathy early on. Additionally, they proposed that a larger dataset may enhance the detection's efficacy.

2 Limitation

2.1 First Limitation

The study used a dataset of 3,662 retina scan images, which may not fully represent the diversity and variability of real-world diabetic retinopathy cases. This limited dataset size could potentially affect the generalizability of the ML models and their performance in real-world scenarios.

2.2 Second Limitation

The use of an external dataset for validation was not mentioned in the paper. To evaluate the effectiveness and generalizability of the ML models using unobserved data from various sources, external validation is crucial. The lack of external validation makes it more difficult to assess the models' robustness and dependability outside the study's particular dataset.

3 Synthesis

The authors intend to use a larger dataset in order to build on their work. By doing this, the ML models that are used to identify diabetic retinopathy may become more accurate and broadly applicable.

The study's findings may be applied to improve the ML models' accuracy even further. Through examination of various hyperparameters and investigation of alternative methods, the models might be improved to get even superior outcomes in identifying diabetic retinopathy.