



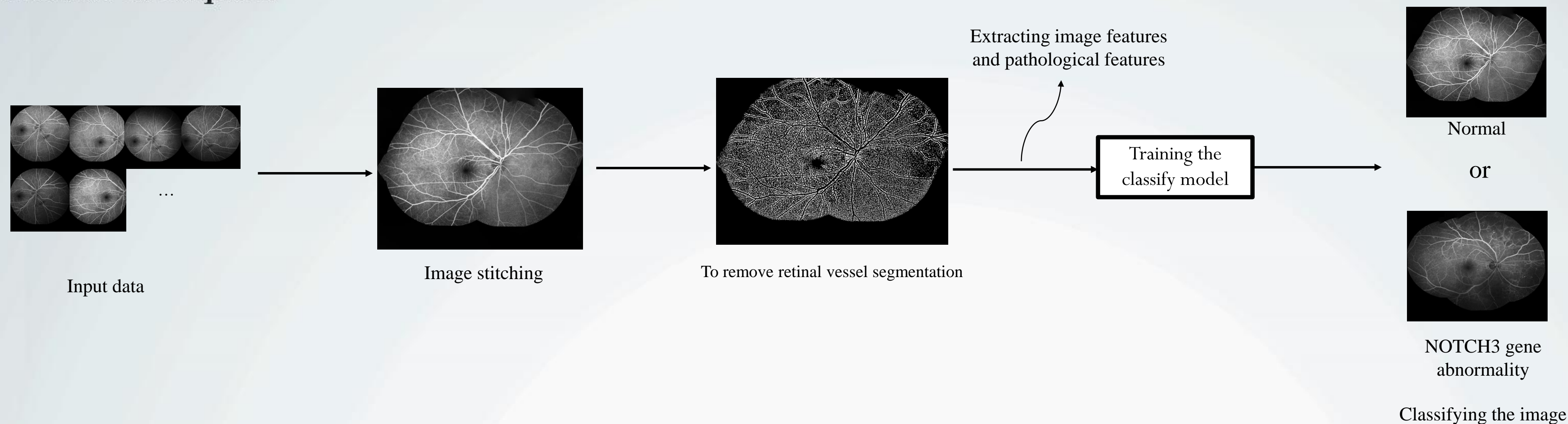
NOTCH3 gene abnormality classification using image processing and decision tree analysis of fundus images

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Abstract

In this research, the main goal is to determine whether the test subjects have NOTCH3 gene abnormalities by a decision tree model which uses features extracted from fundus images. We extracted 21 features which are average intensity computed at three locations with different sizes. And we appended 30 pathological features and assisted to train model. Finally, the obtained model accuracy and AUC are 92.86% and 0.9788 respectively.

Problem description



Results and discussion

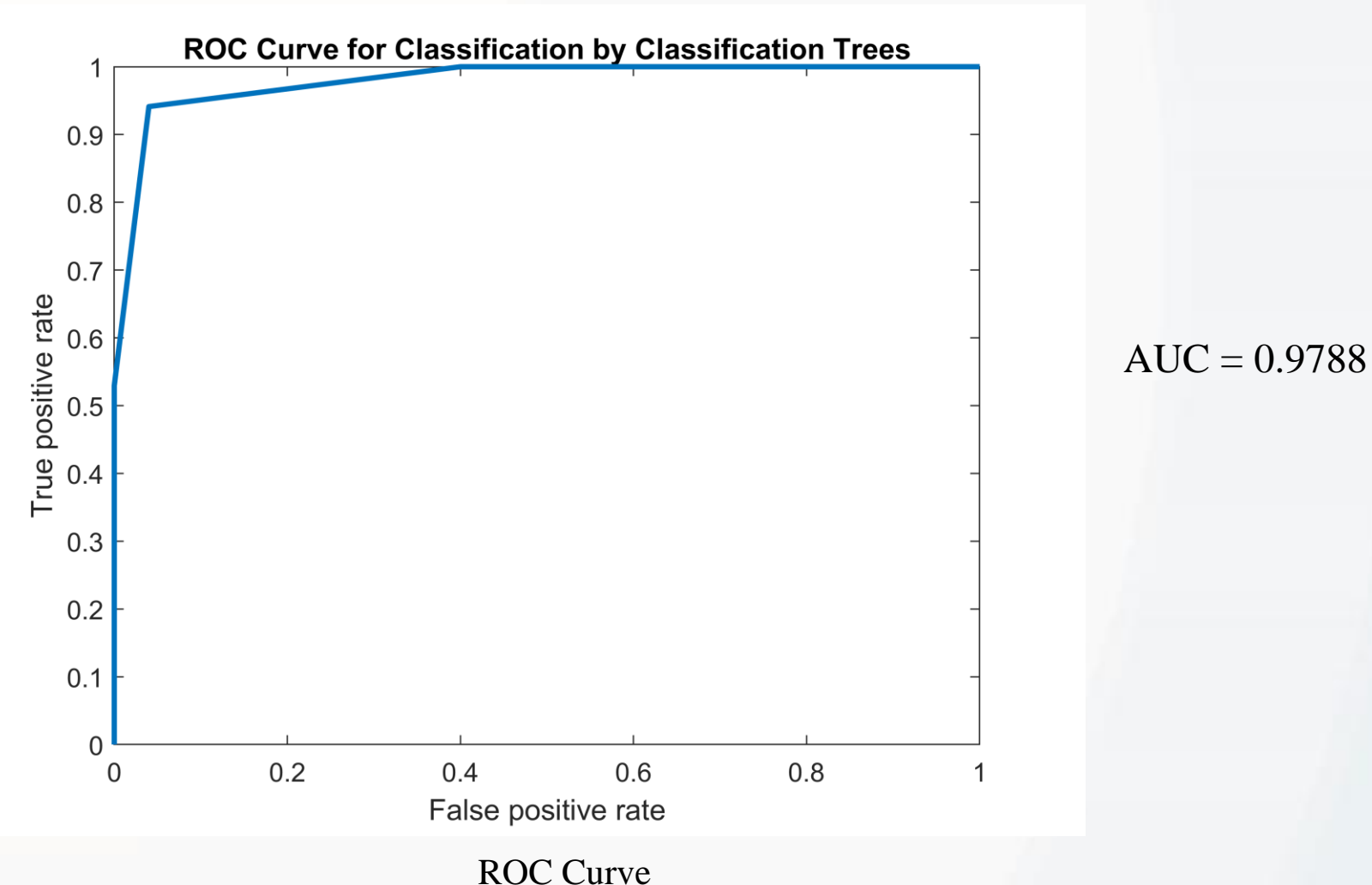
True Class	Predicted Class		
	0	1	2
0	21		
1	1	16	
2	1	1	2

Confusion matrix

$$\text{Accuracy} = \frac{39}{42} \cong 0.9286$$

$$\text{TPR} = \frac{16}{17} \cong 0.9412$$

$$\text{FPR} = \frac{1}{25} = 0.0400$$



Conclusions

Since the disease caused by NOTCH3 gene abnormalities is rare, collecting more data for training classifiers in the future make our model more stable. The use of fundus image features to determine the presence or absence of disease is not limited to NOTCH3 gene abnormality diseases. As long as the diseases that affect the eye can use the method to establish a prediction of reference indicator.

References

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