Diagnosing Diabetic Retinopathy

Can We Automate The Process?

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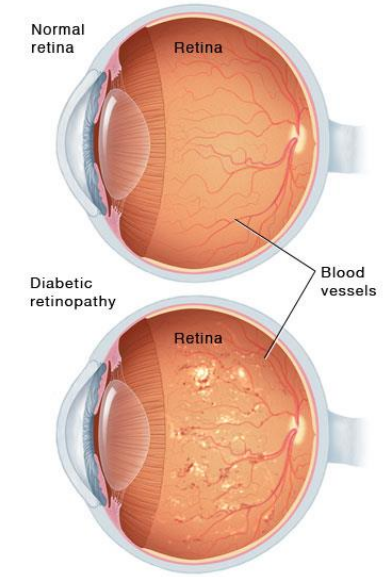
What is Diabetic Retinopathy?

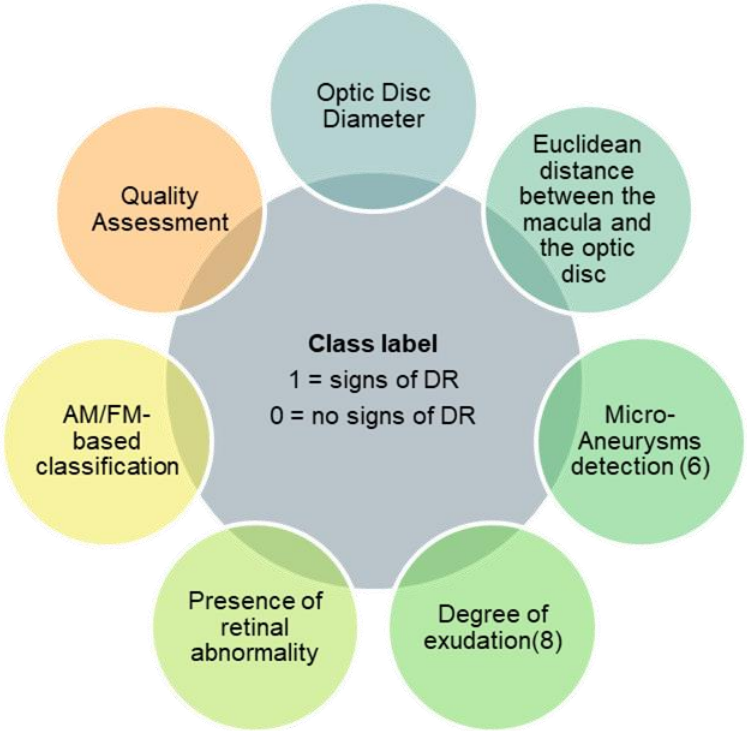
Diabetic Retinopathy(DR)

- Is a diabetes complication that affects eyes.
- Damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina).



References: https://www.mayoclinic.org/diseases-conditions/diabetic-retinopathy/symptoms-causes/syc-20371611

Diabetic Retinopathy Debrecen Data Set



Dataset Features

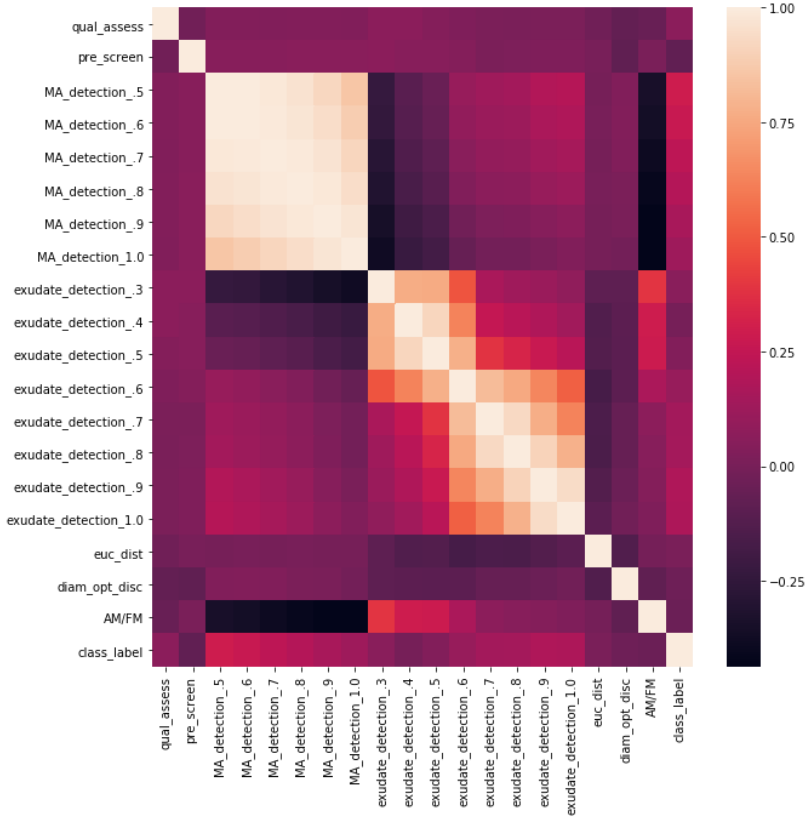
- [UCI Machine Learning Datasets Repository]
- 20 Attributes
- 1151 observations
- Features extracted from the Messidor image set to predict whether an image contains signs of diabetic retinopathy or not.

Methodology

- Review and clean data
- Identify features to use for classification algorithms
- Apply different classification algorithms to the dataset
- Select the algorithm that is most optimal at predicting diagnosis.

Features

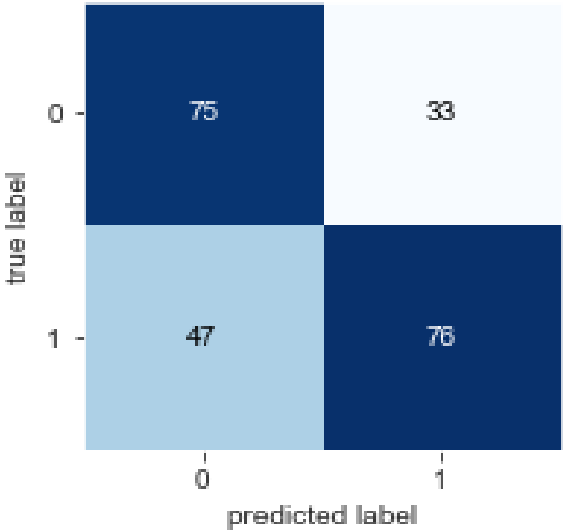
Feature	Importance
MA_detection_.5	0.097307
MA_detection_.6	0.076096
MA_detection_.7	0.069559
MA_detection_.8	0.069032
exudate_detection_.3	0.066318
MA_detection_1.0	0.065796
exudate_detection_.4	0.065709
exudate_detection_.5	0.058947
euc_dist	0.058898
MA_detection_.9	0.056849
exudate_detection_.6	0.053309
diam_opt_disc	0.051463
exudate_detection_.7	0.043141
exudate_detection_1.0	0.041968
exudate_detection_.9	0.039397
exudate_detection_.8	0.038759
AM/FM	0.032051
pre_screen	0.013427
qual_assess	0.001972

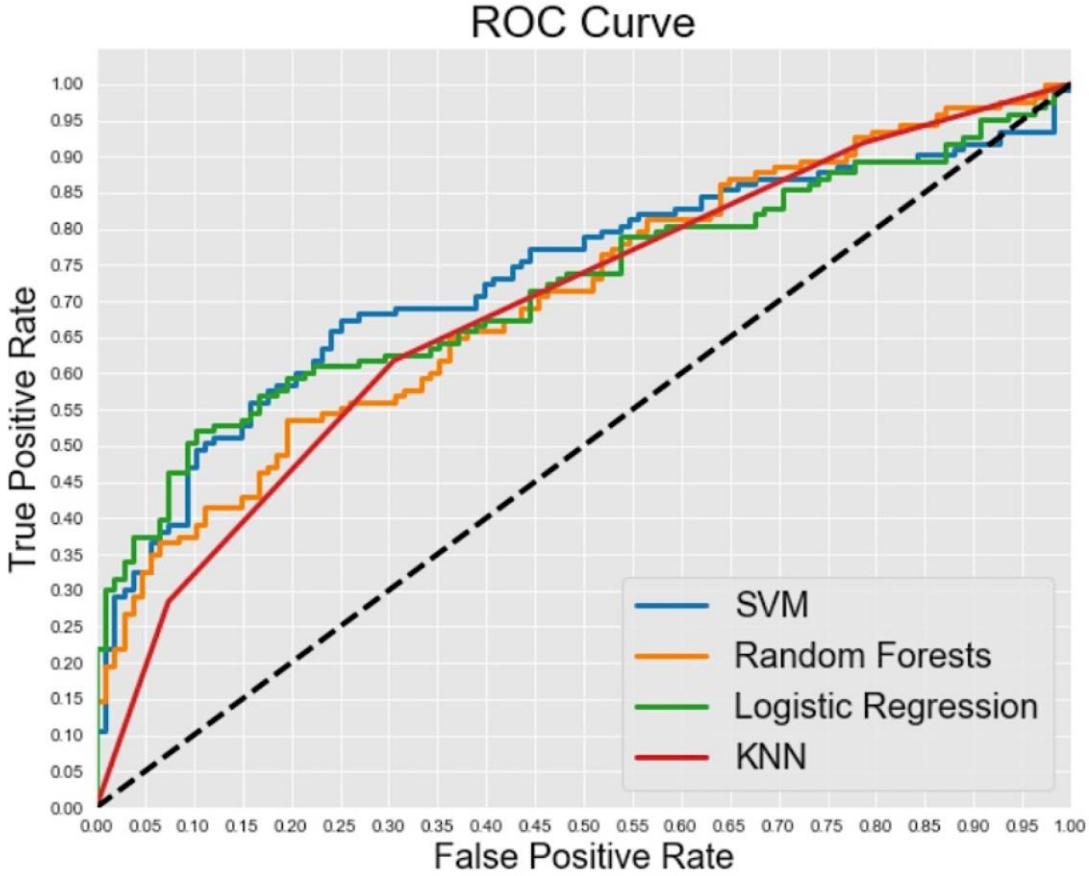


Findings & Next Steps

Findings: KNN model is most optimal.

- Best in Recall
- 2nd Best in Accuracy
- Not quite ready to aid in DR diagnosis yet





Next Steps

- Generate more data.
- Include more features that are known to relate to DR.
- Test more parameters.
- Try different cost metrics for False Positives and False Negatives.

Thank You!

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