EYE MINER

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PURPOSE STATEMENT

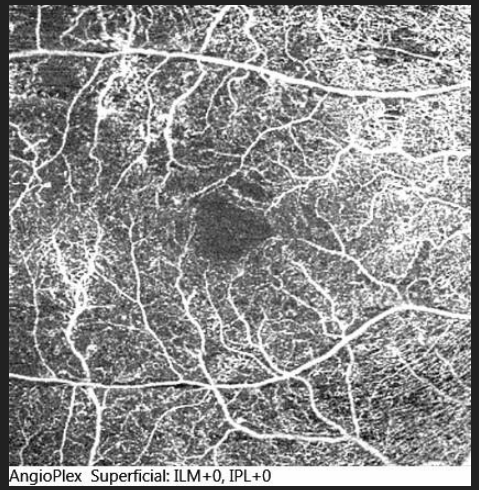
What is the best model for image classification?

SVM **KNN** **Tree**

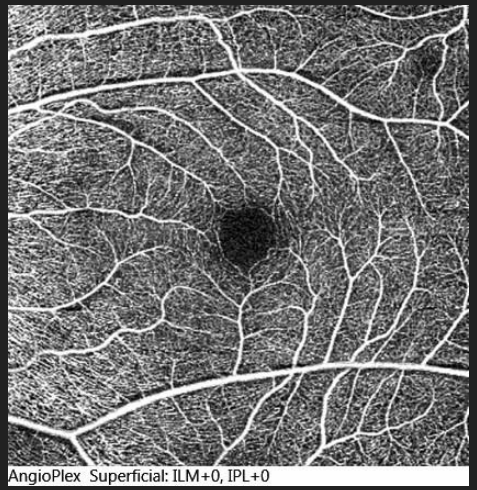
DATASET

- The Foveal Avascular Zone Image Database (FAZID)
- 304 jpeg files.
- 420 x 420 pixels corresponding to 6mm x 6mm dimension of the retina.
- Grayscale.
- 3 different classes:
  - Diabetic (107)
  - Myopic (109)
  - Normal (88)

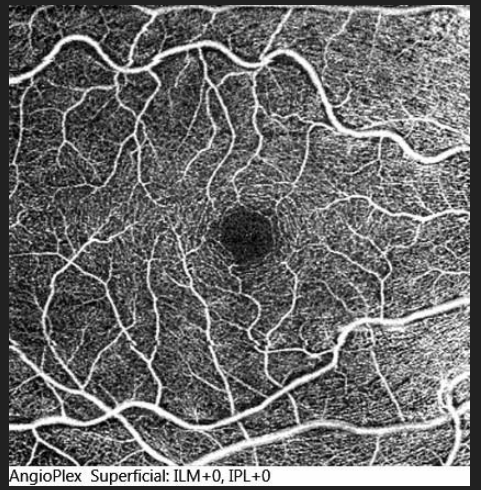
DATASET



DIABETES

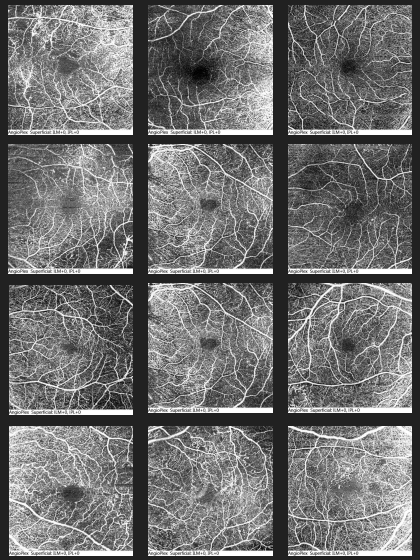


MYOPIA

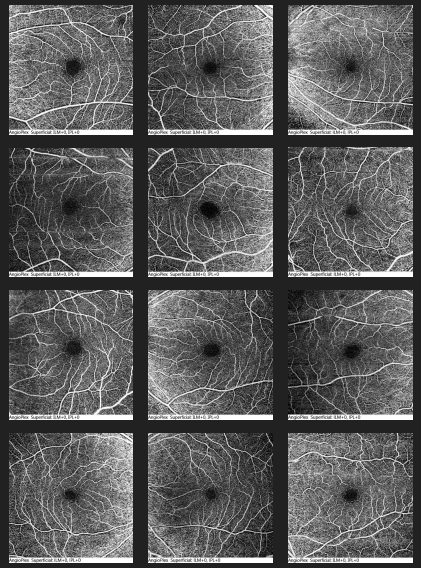


NORMAL

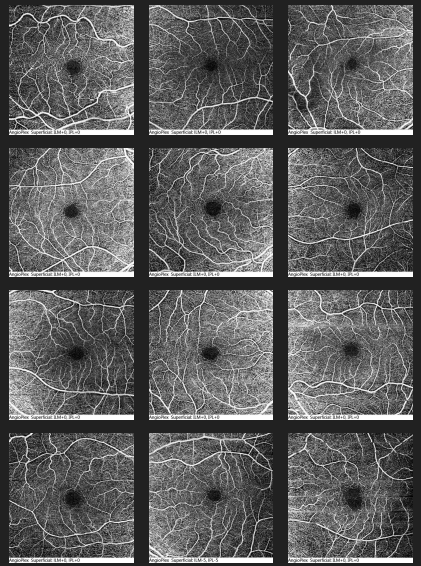
DATASET



DIABETES



MYOPIA



NORMAL

PREPROCESSING

7 different approaches

- No Transformation
- Image Zoom
- Value Threshold
- Value Threshold and Crop
- Edge Detection
- Feature Selection
- Feature Selection and Crop

PREPROCESSING

7 different approaches

	SHAPE
No Transformation	(304, 400, 400)
Image Zoom	(304, 400, 400)
Value Threshold	(304, 400, 400)
Value Threshold and Crop	(304, 400, 400)
Edge Detection	(304, 400, 400)
Feature Selection	(304, 2048)
Feature Selection and Crop	(304, 2048)

TRAIN/TEST SPLIT

80% Train Set		20% Test Set	
86	Diabetes	**21**	Diabetes
87	Myopia	**22**	Myopia
70	Normal	**18**	Normal
243	Total	**61**	Total

DATA AUGMENTATION

80%

Train Set

86 Diabetes →

87 Myopia →

70 Normal →

243 Total →

DATA AUGMENTATION

80%

Train Set

86 Diabetes →

87 Myopia →

70 Normal →

243 Total →

Flip

Noise

Rotate 90°

Rotate 180°

Shift

DATA AUGMENTATION

80%

Train Set

86 Diabetes

87 Myopia

70 Normal

243 Total

Flip

Noise

Rotate 90°

Rotate 180°

Shift

80%

New Train Set

87 Diabetes

87 Myopia

87 Normal

261 Total

MODELS

SVM	KNN	Tree
Kernel = Linear	K = 17	Max_depth = 20

RESULTS

Preprocessing	SVM Accuracy		KNN Accuracy		Tree Accuracy	
	Original	D.A.	Original	D.A.	Original	D.A.
No Transformation	63.9%	63.9%	44.3%	42.6%	34.4%	52.5%
Image Zoom	72.1%	67.2%	47.5%	47.5%	52.5%	47.5%
Value Threshold	60.7%	55.7%	44.3%	34.4%	47.5%	54.1%
Value Threshold & Crop	67.2%	65.6%	32.8%	32.8%	54.1%	36.1%
Edge Detection	54.1%	52.5%	37.7%	39.3%	32.8%	32.8%
Feature Selection	45.9%	X	42.6%	X	41%	X
Feature Selection & Crop	47.5%	X	39.3%	X	31.1%	X

RESULTS

Preprocessing	SVM Accuracy		KNN Accuracy		Tree Accuracy	
	Original	D.A.	Original	D.A.	Original	D.A.
No Transformation	63.9%	63.9%	44.3%	42.6%	34.4%	52.5%
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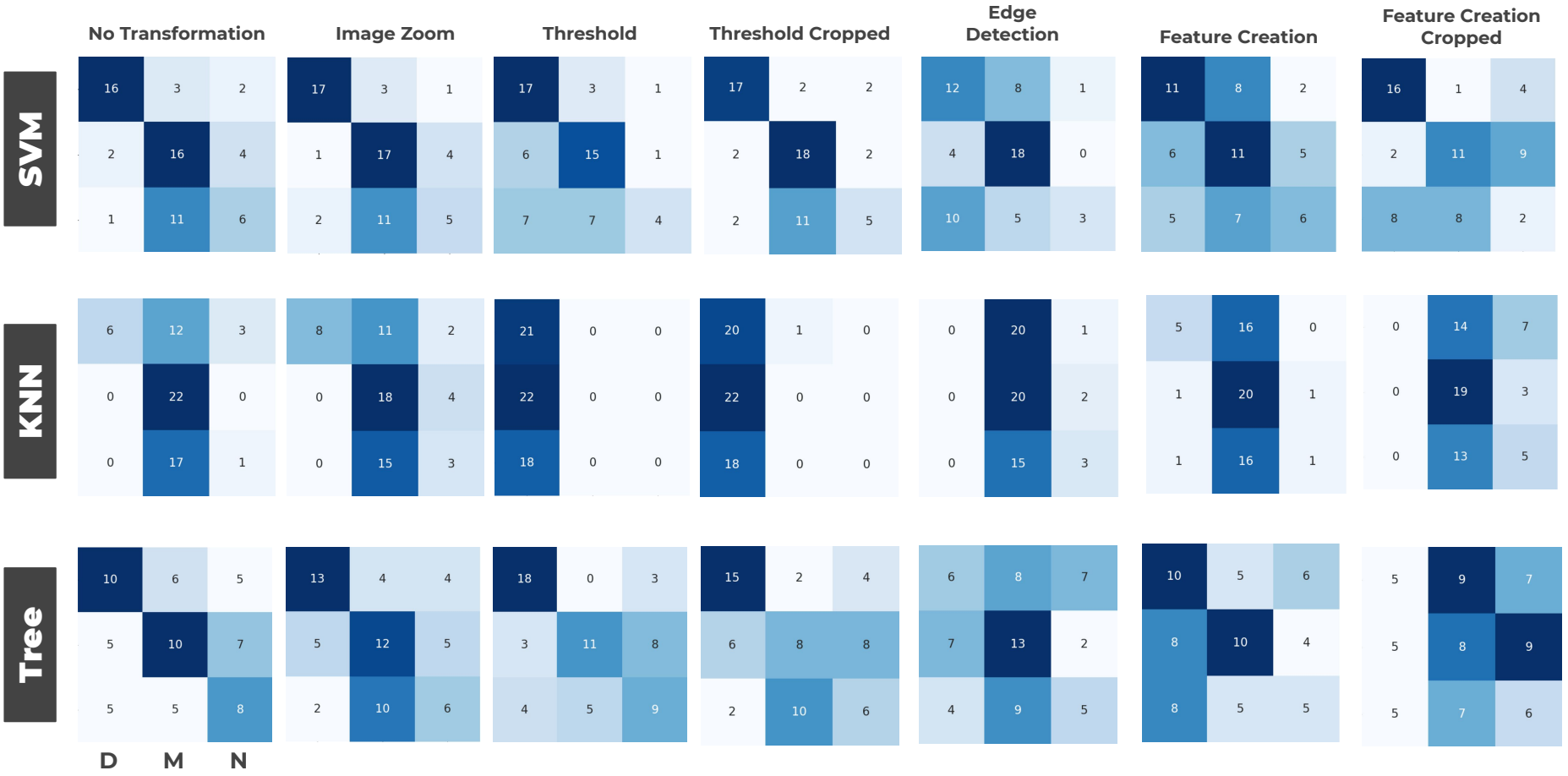
Value Threshold & Crop	67.2%	65.6%	32.8%	32.8%	54.1%	36.1%
Edge Detection	54.1%	52.5%	37.7%	39.3%	32.8%	32.8%
Feature Selection	45.9%	X	42.6%	X	41%	X
Feature Selection & Crop	47.5%	X	39.3%	X	31.1%	X


No Transformation
Image Zoom
Threshold
Threshold Cropped
Edge Detection
Feature Creation
Feature Creation Cropped
SVM
KNN
Tree
D
M
N

ENSEMBLING MODELS

67.2%

Voting Accuracy