

# Mole Detection

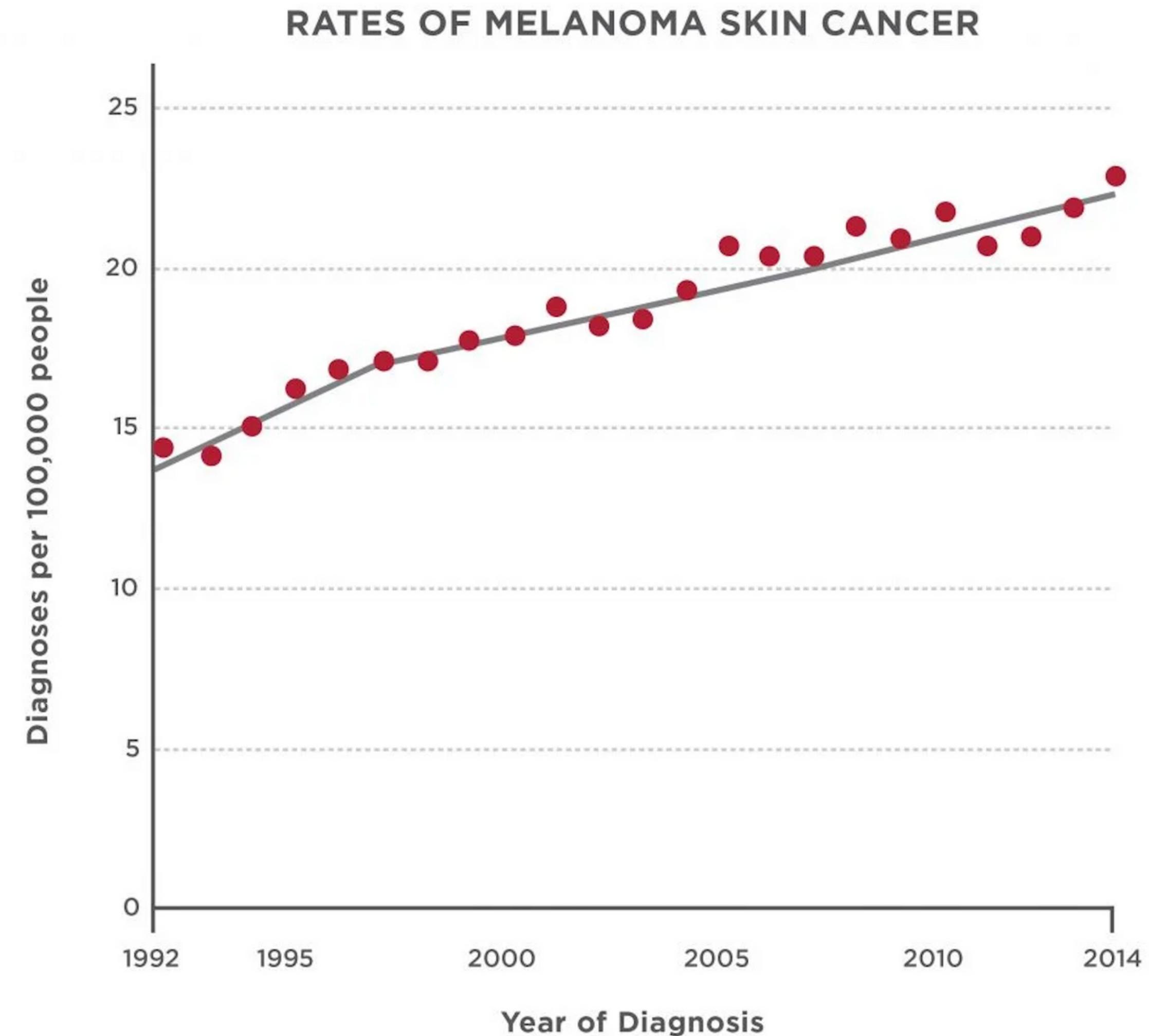
Zeynep Filiz EREN

Mehmet Kadri GOFRALILAR

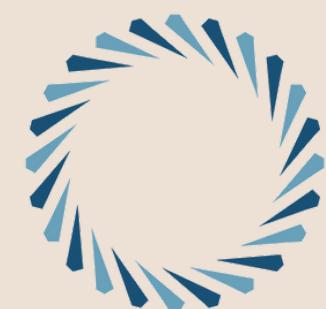
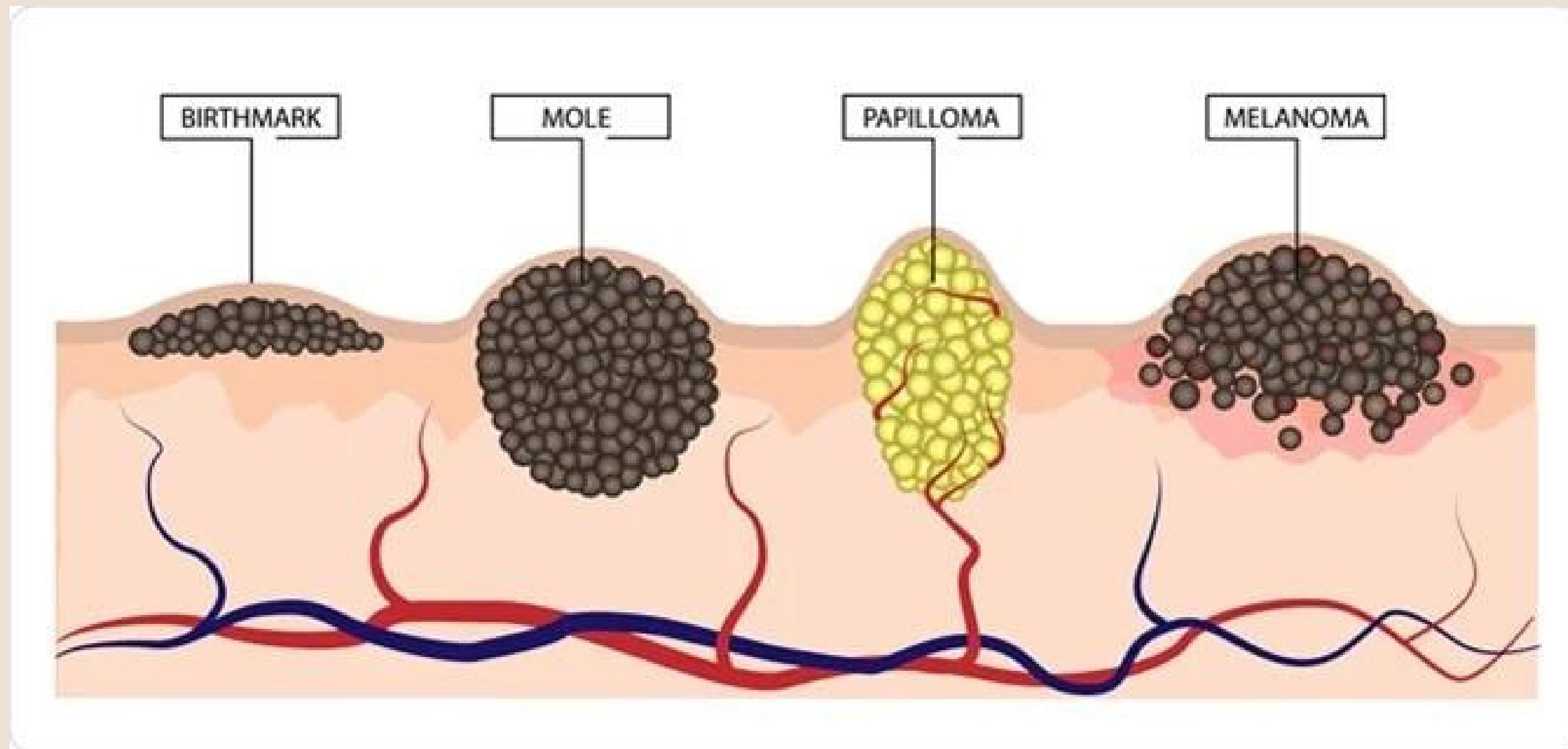
Hasan Ali ÖZKAN



# INTRODUCTION



# DATA



# DATA



Nevus



ISIC Archive

# DATA



Nevus



Seborrheic Keratosis



ISIC Archive

# DATA



Nevus



Melanoma



Seborrheic Keratosis



ISIC Archive

# DATA



Nevus



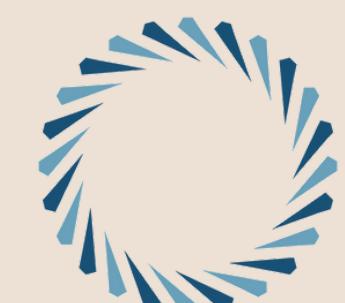
Melanoma



Seborrheic Keratosis



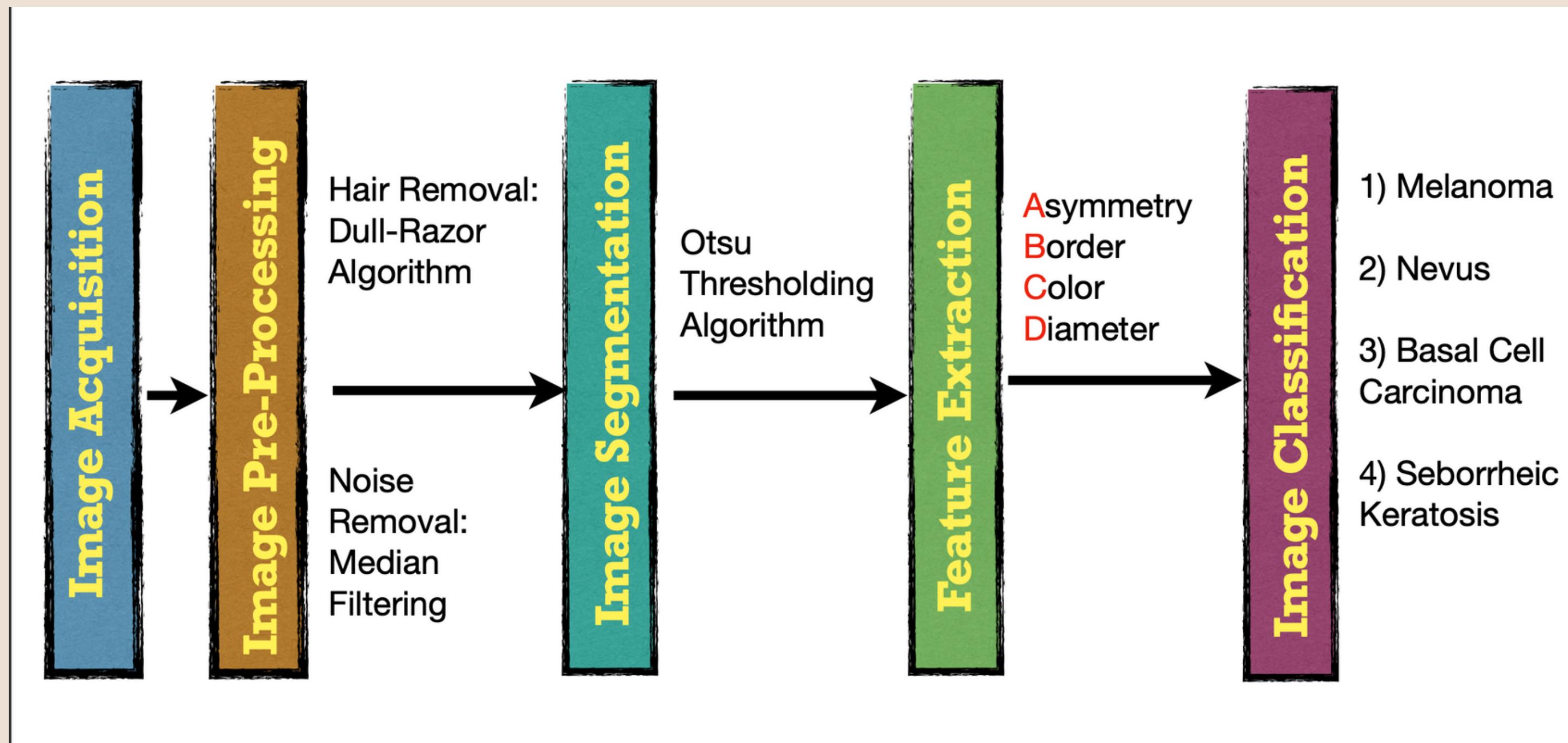
Basal Cell Karsinoma



ISIC Archive

# METHOD

## All -Pipeline

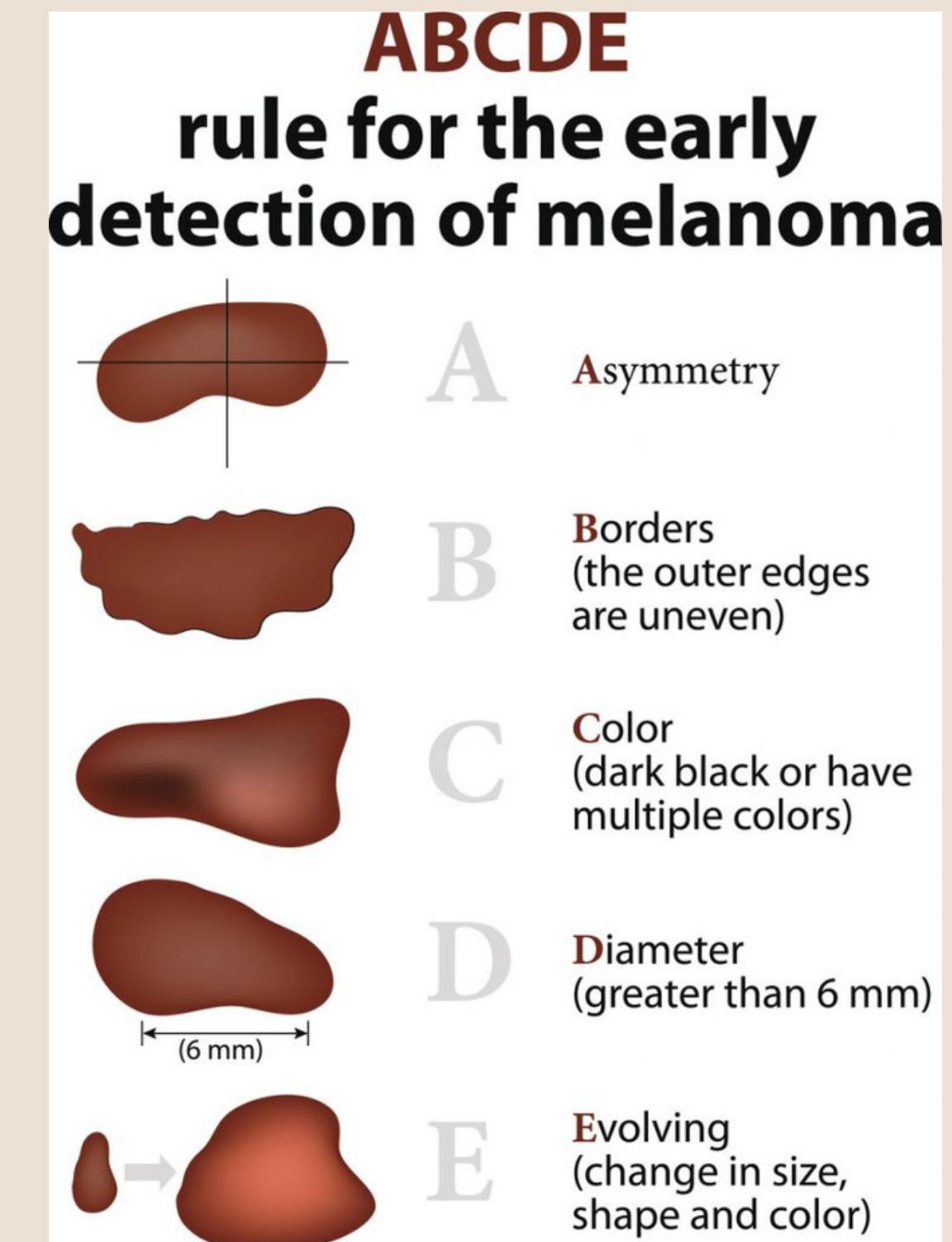


# METHOD

## Feature Extraction

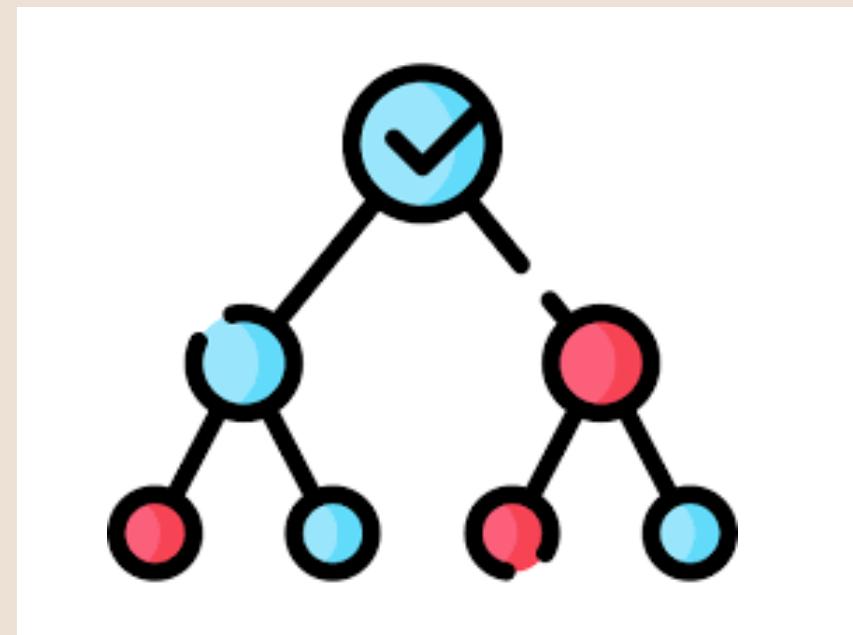
## Feature Extraction

- Asymmetry
- Border Irregularity
- Color
- Diameter

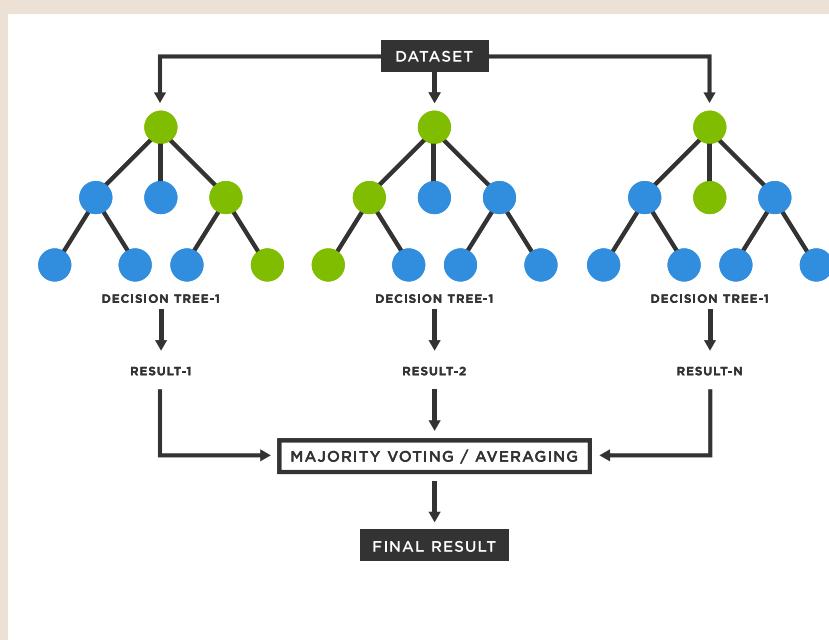


# METHOD

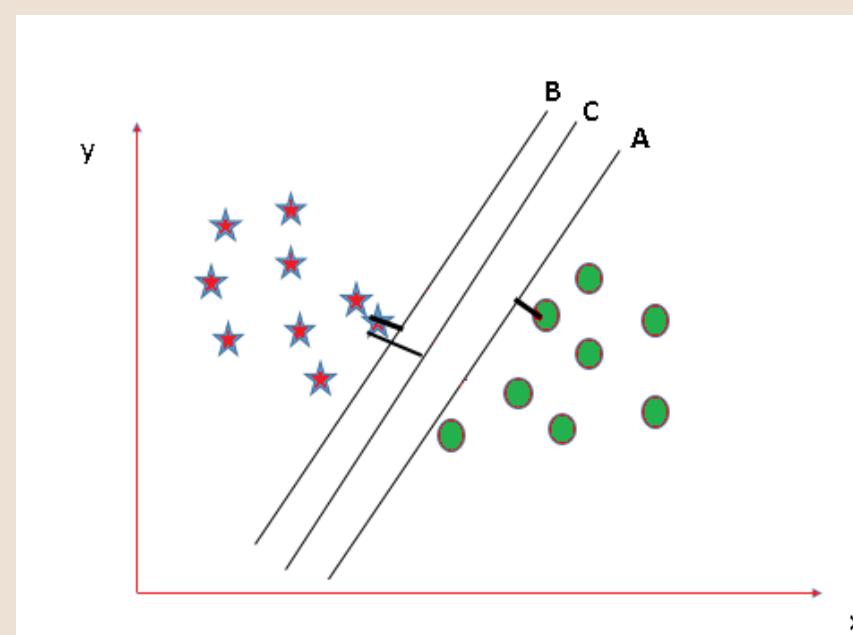
## ML-Classification



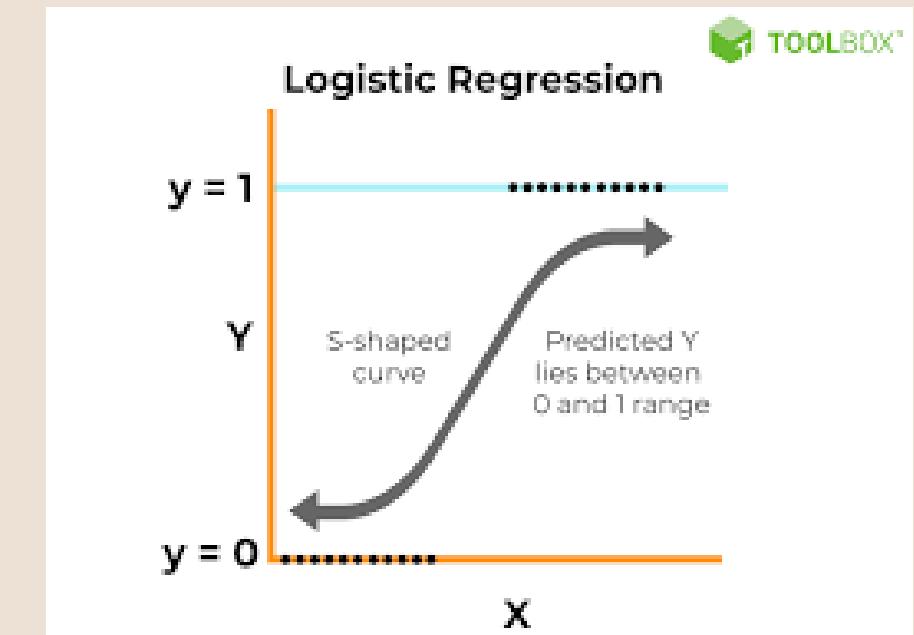
Decision Tree



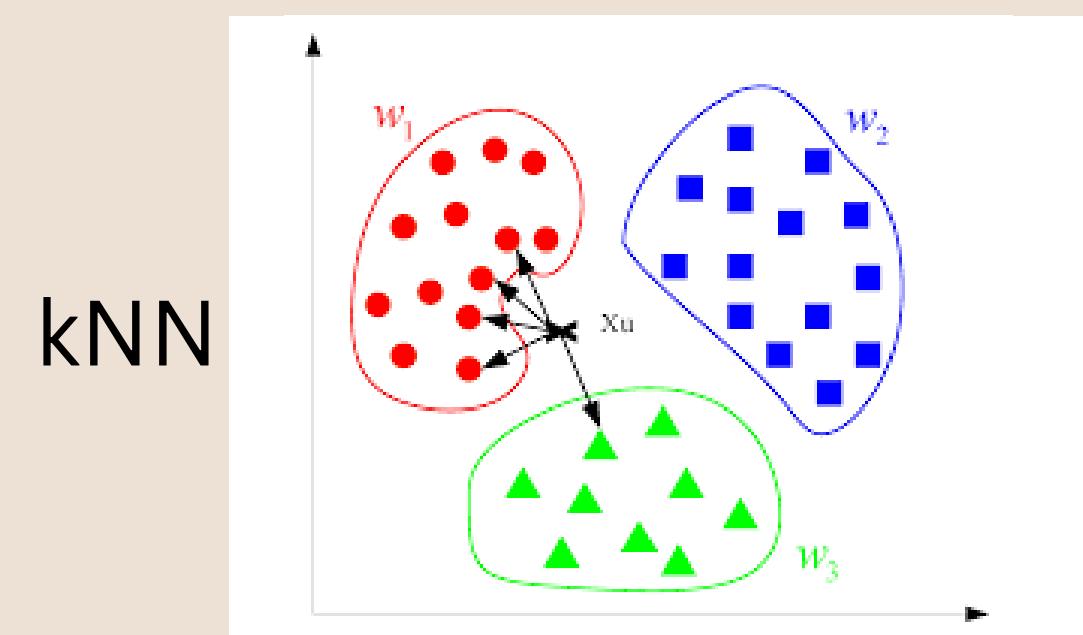
Random Forest



SVM



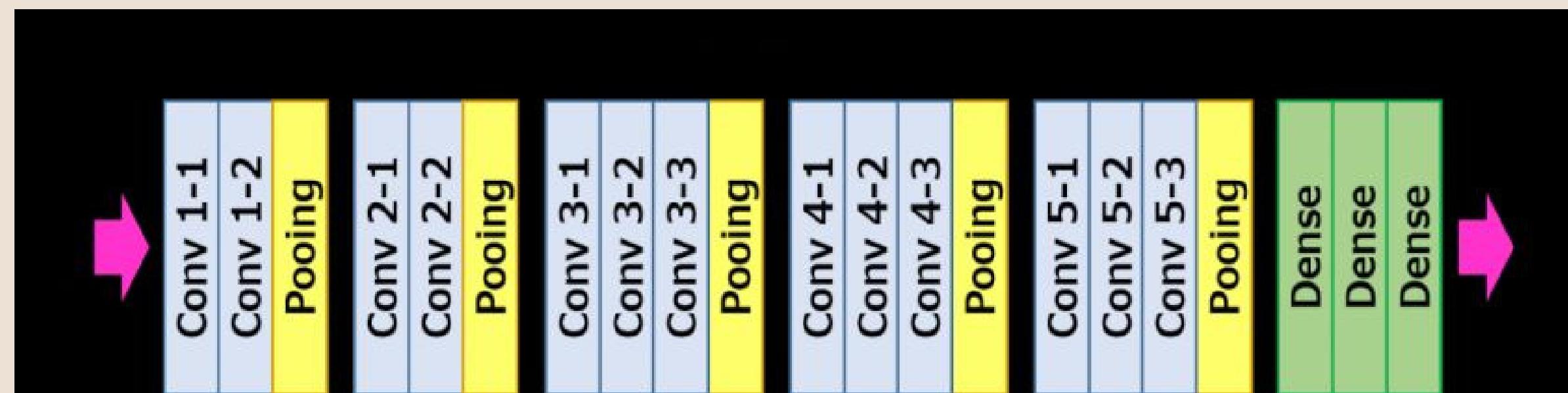
Logistic Regression



kNN

# METHOD

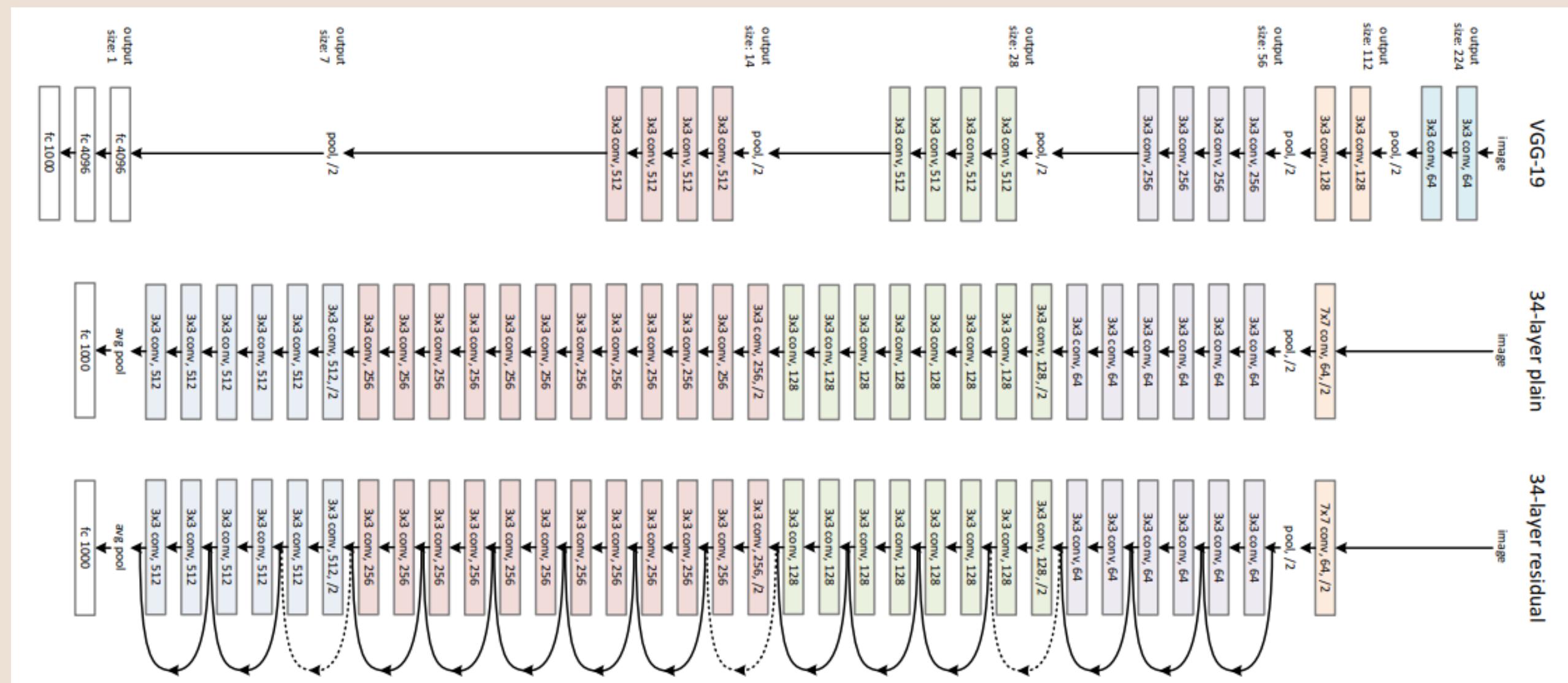
## DL-Classification



VGG16

# METHOD

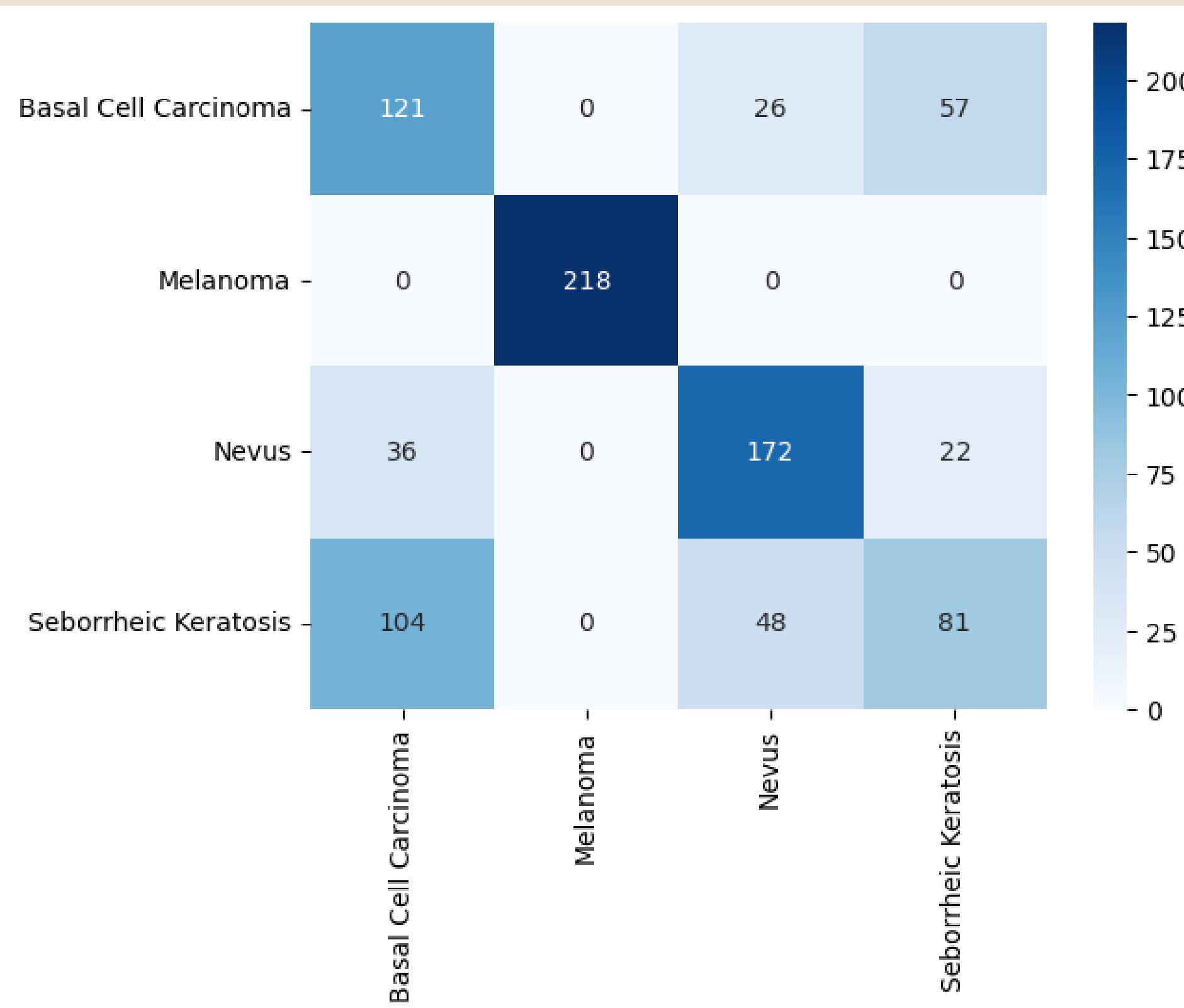
## DL-Classification



# RESNET

# EVALUATION

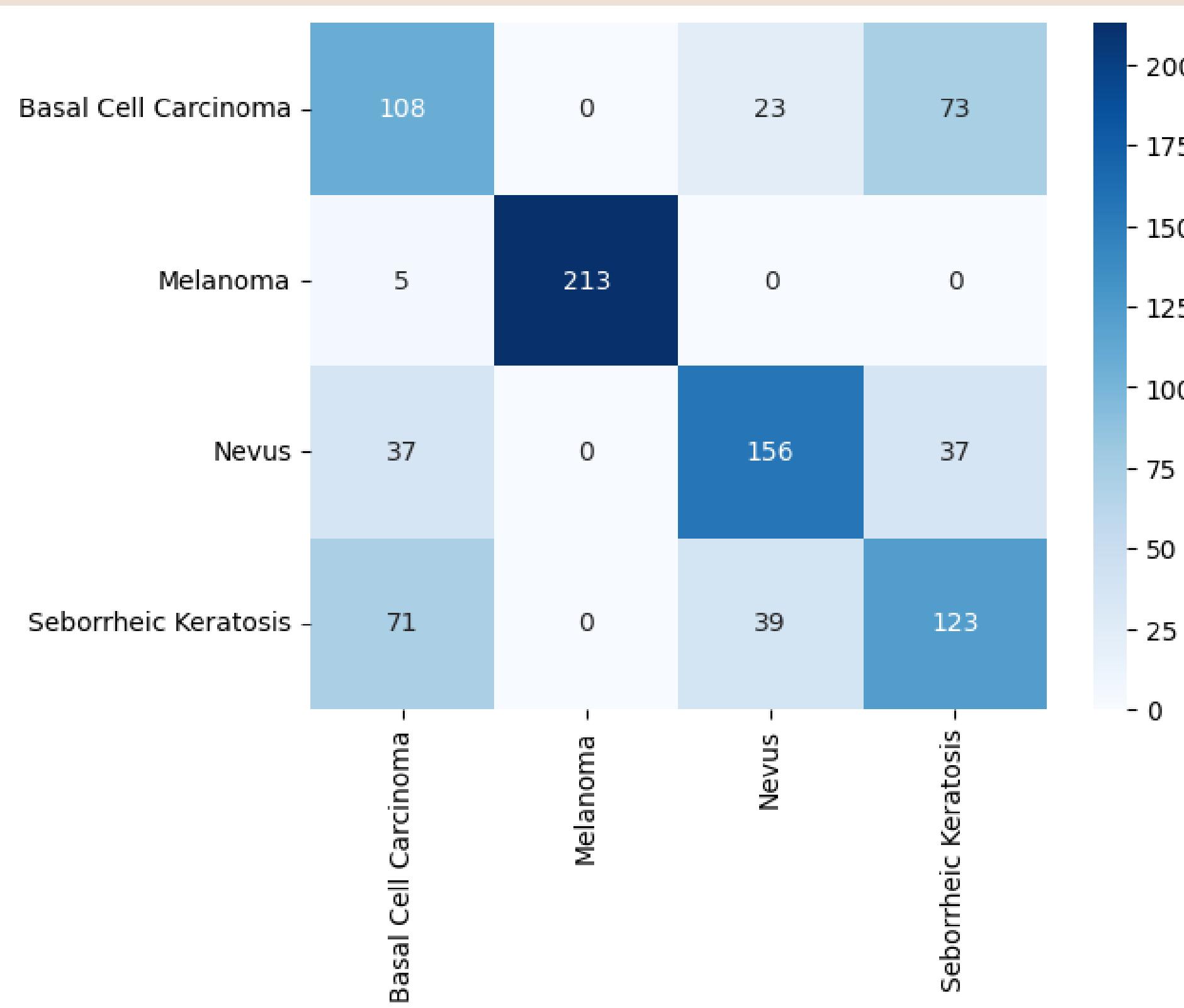
## ML-Classification



Logistic Regression				
	Precision	Recall	F1-Score	Support
<b>Basal Cell Carcinoma</b>	0.46	0.59	0.52	204
<b>Melanoma</b>	1.00	1.00	1.00	218
<b>Nevus</b>	0.70	0.75	0.72	230
<b>Seborrheic Keratosis</b>	0.51	0.35	0.41	233
<b>Accuracy</b>	0.67			
<b>Time (seconds)</b>	0.2			

# EVALUATION

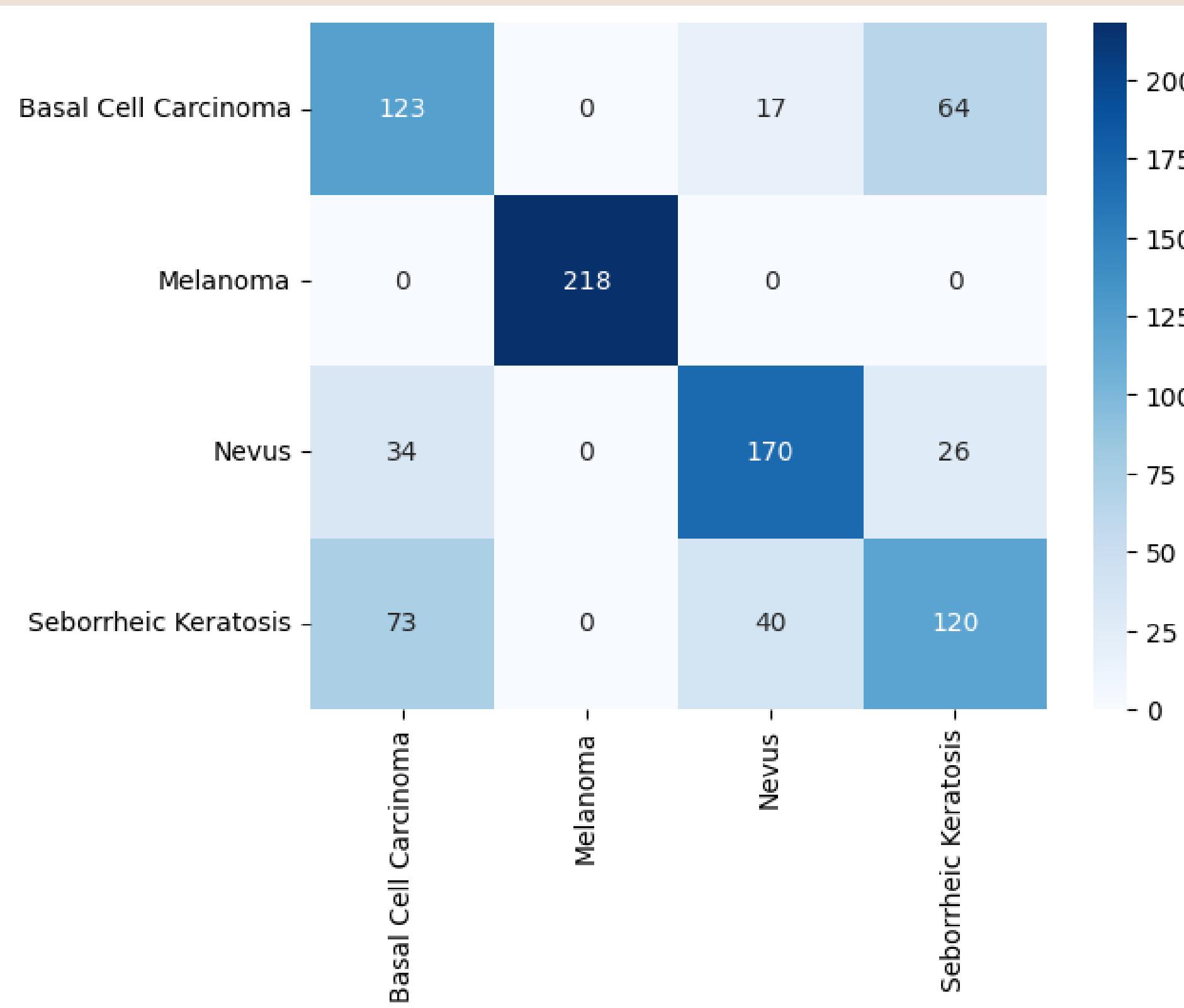
## ML-Classification



Decision Tree				
	Precision	Recall	F1-Score	Support
<b>Basal Cell Carcinoma</b>	0.47	0.49	0.48	204
<b>Melanoma</b>	1.00	0.98	0.99	218
<b>Nevus</b>	0.70	0.64	0.67	230
<b>Seborrheic Keratosis</b>	0.49	0.51	0.52	233
<b>Accuracy</b>	0.66			
<b>Time (seconds)</b>	0.3			

# EVALUATION

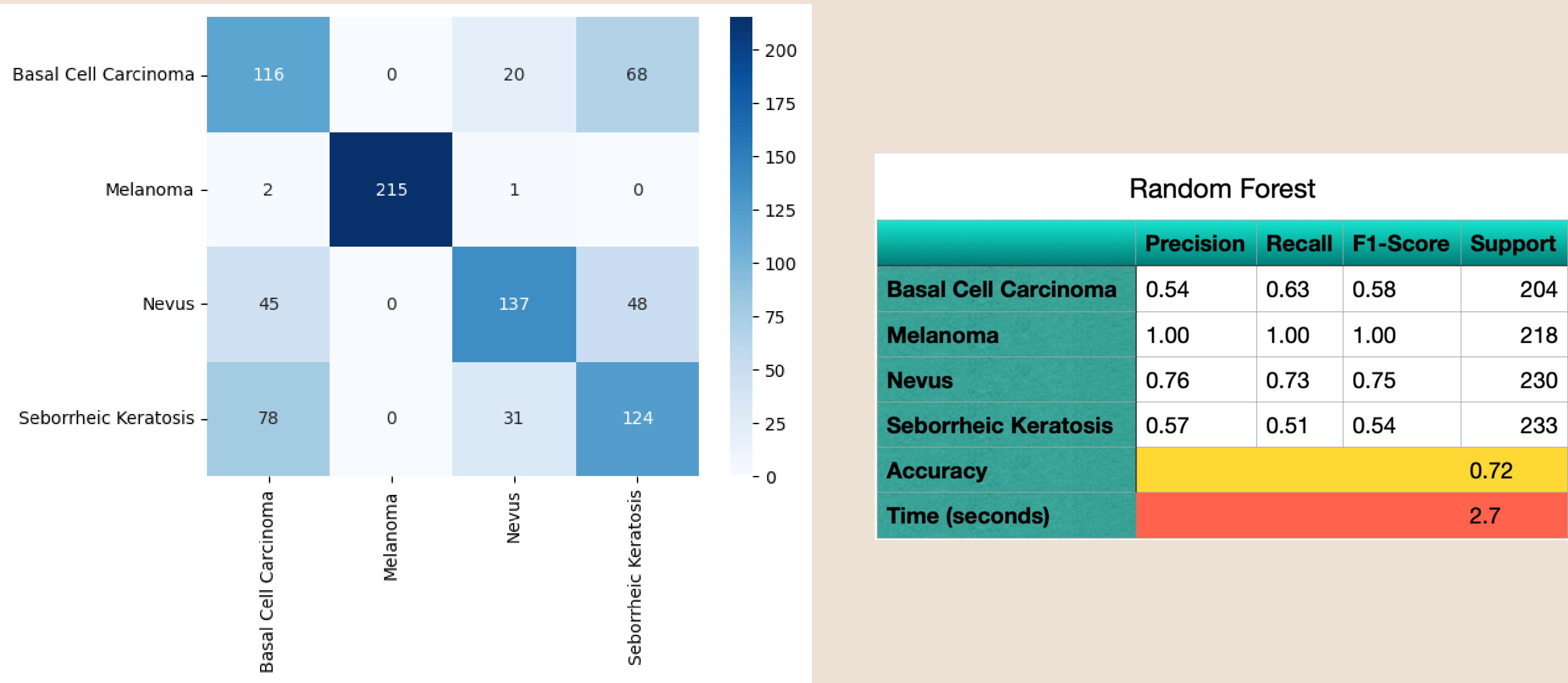
## ML-Classification



	Precision	Recall	F1-Score	Support
<b>Basal Cell Carcinoma</b>	0.48	0.57	0.52	204
<b>Melanoma</b>	1.00	0.99	0.99	218
<b>Nevus</b>	0.72	0.60	0.65	230
<b>Seborrheic Keratosis</b>	0.52	0.53	0.52	233
<b>Accuracy</b>				0.67
<b>Time (seconds)</b>				0.2

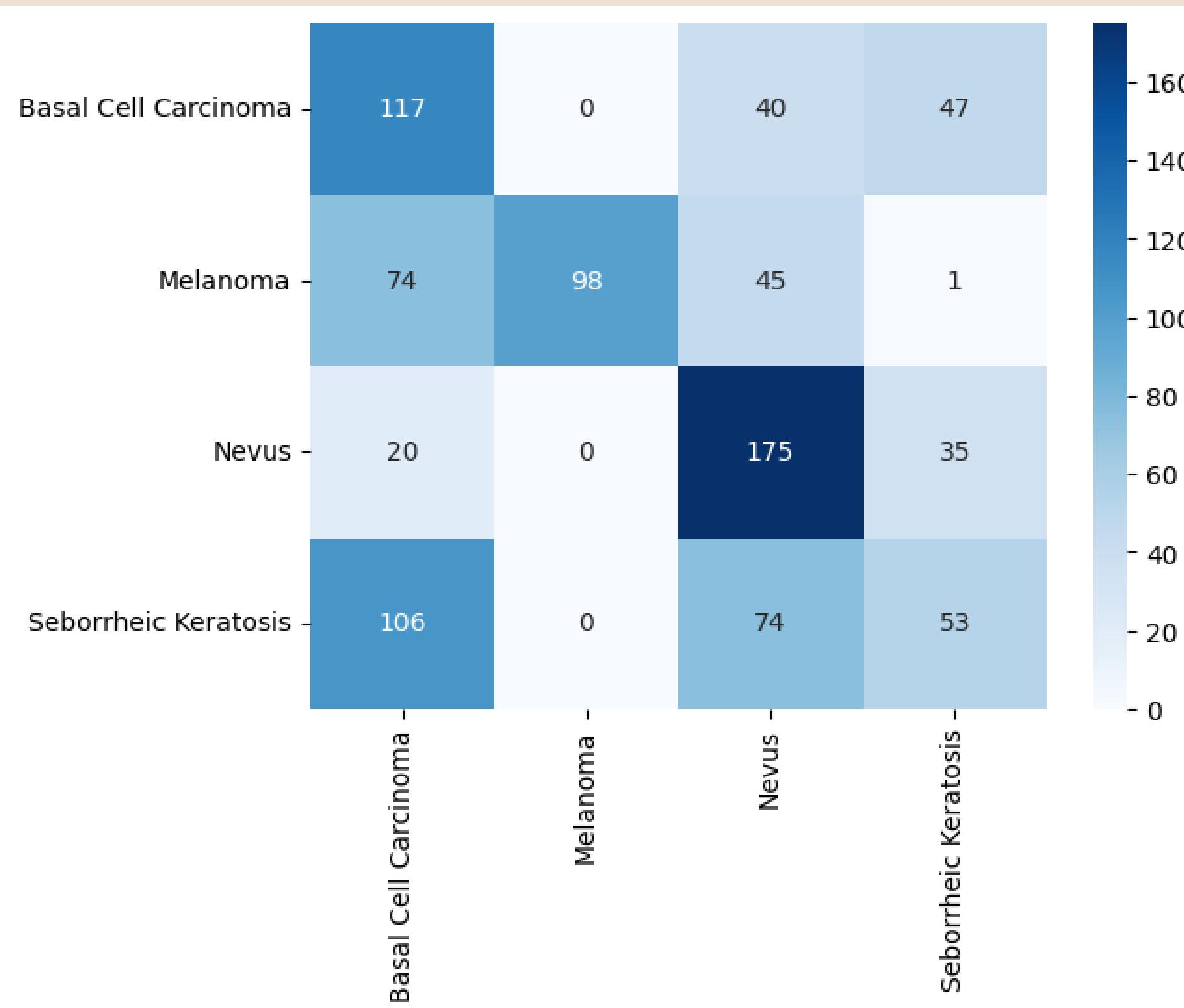
# EVALUATION

## ML-Classification



# EVALUATION

## ML-Classification

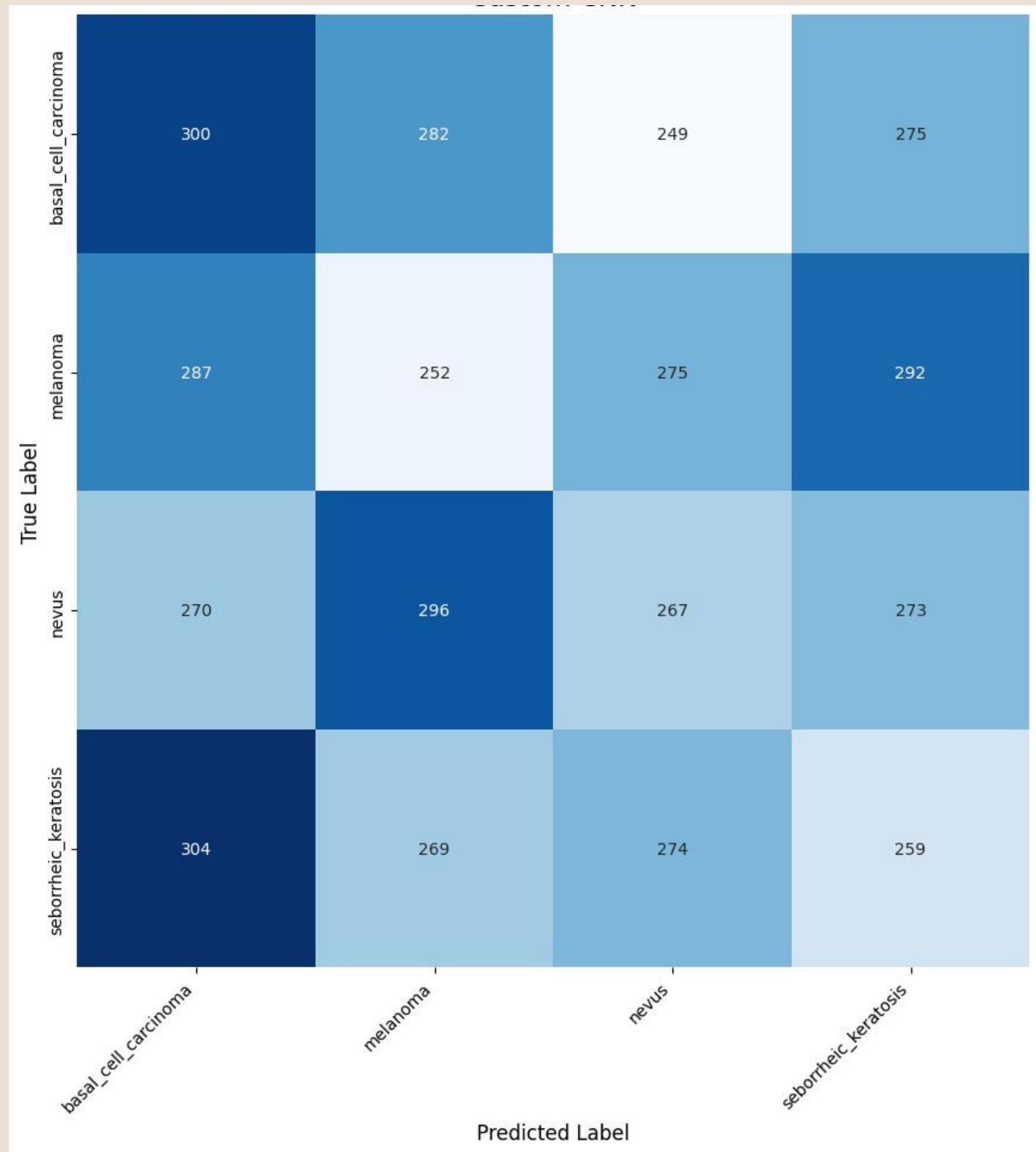


### Support Vector Machines

	Precision	Recall	F1-Score	Support
<b>Basal Cell Carcinoma</b>	0.37	0.57	0.45	204
<b>Melanoma</b>	1.00	0.45	0.62	218
<b>Nevus</b>	0.52	0.76	0.62	230
<b>Seborrheic Keratosis</b>	0.39	0.23	0.29	233
<b>Accuracy</b>				0.50
<b>Time (seconds)</b>				3.6

# EVALUATION

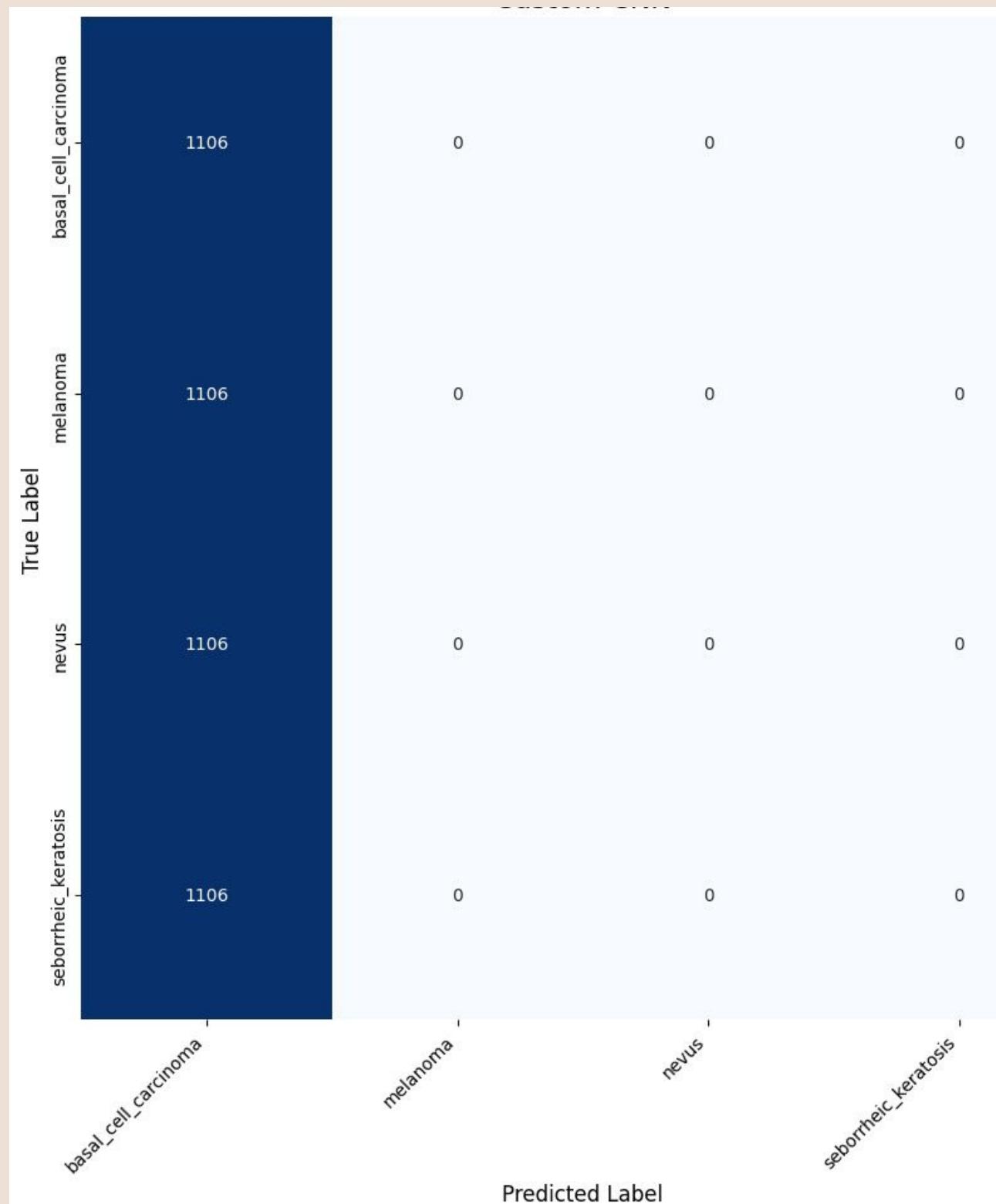
## DL-Classification



	Precision	Recall	F1-Score
<b>Basal Cell Carcinoma</b>	0.27	0.25	0.41
<b>Melanoma</b>	0.25	0.24	0.39
<b>Nevus</b>	0.24	0.23	0.37
<b>Seborrheic Keratosis</b>	0.27	0.26	0.41
<b>Accuracy</b>	0.2436		
<b>Loss</b>	0.12		
<b>Time(Minutes)</b>	145.26		

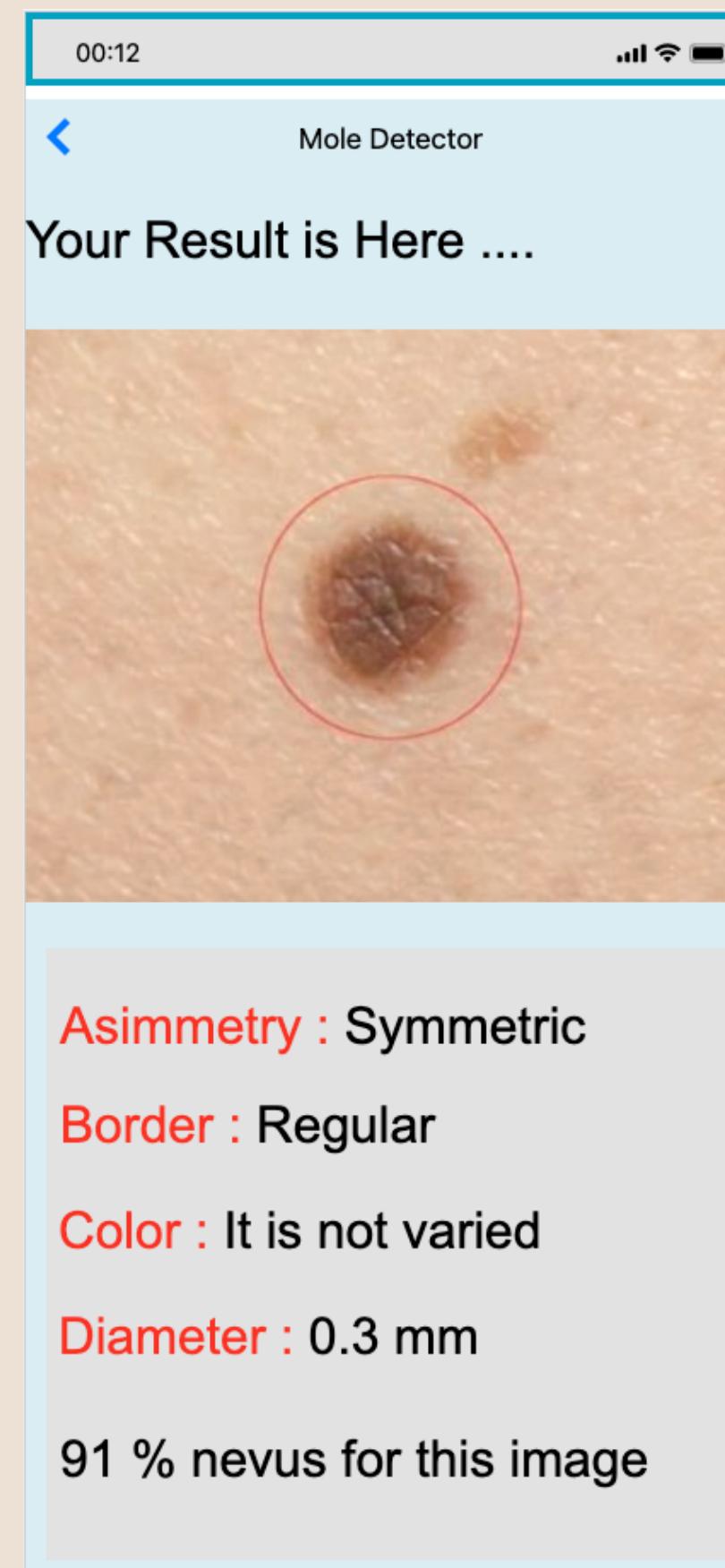
# EVALUATION

## DL-Classification



	Precision	Recall	F1-Score
<b>Basal Cell Carcinoma</b>	1.0	0.25	0.4
<b>Melanoma</b>	1.0	0.25	0.4
<b>Nevus</b>	1.0	0.25	0.4
<b>Seborrheic Keratosis</b>	1.0	0.25	0.4
<b>Accuracy</b>		0.25	
<b>Loss</b>		1.00	
<b>Time(Minutes)</b>		154.36	

# FUTURE WORK



# REFERENCES

- <https://ijece.iaescore.com/index.php/IJECE/article/view/24282/14972>
- <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7532834>
- <https://www.mdpi.com/2075-4418/11/8/1390/htm>
- <https://arxiv.org/pdf/1807.08993.pdf>
- <https://arxiv.org/ftp/arxiv/papers/1901/1901.10802.pdf>
- <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9007729>
- <https://www.mdpi.com/2079-9292/10/24/3158/htm>
- <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9393198>
- <https://www.mdpi.com/1424-8220/20/6/1753/htm>
- [https://web.stanford.edu/~kalouche/docs/Vision\\_Based\\_Classification\\_of\\_Skin\\_Cancer\\_using\\_Deep\\_Learning\\_\(Kalouche\).pdf](https://web.stanford.edu/~kalouche/docs/Vision_Based_Classification_of_Skin_Cancer_using_Deep_Learning_(Kalouche).pdf)

ANY QUESTIONS...