AI health care Hackathon

- Theme 2 : Deep Learning Multiple Diseases Prediction Model based on Retina Image

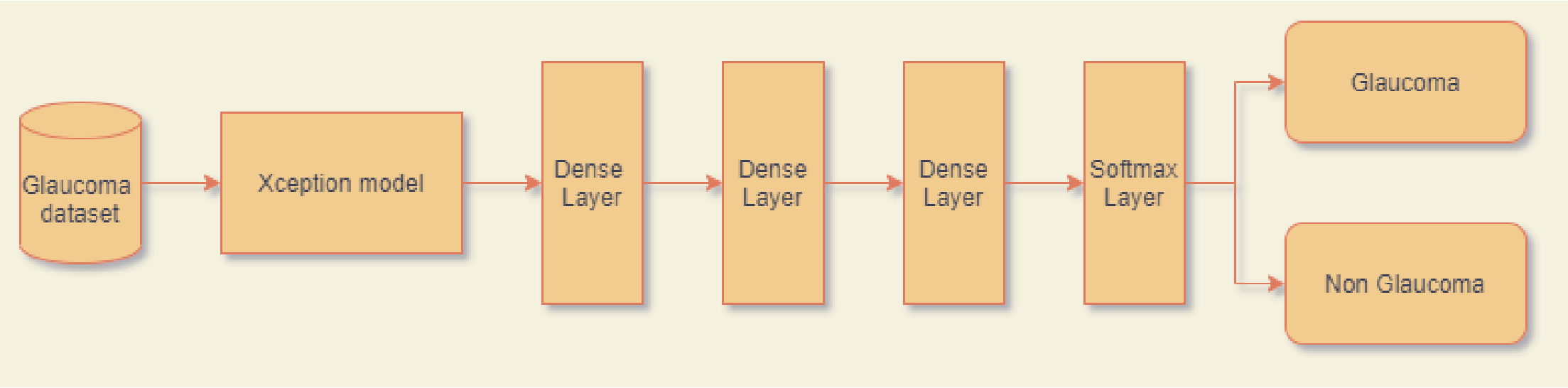
- The diseases we are focusing on are Glaucoma, Cataract, Myopia and Diabetic retinopathy.

Glaucoma model

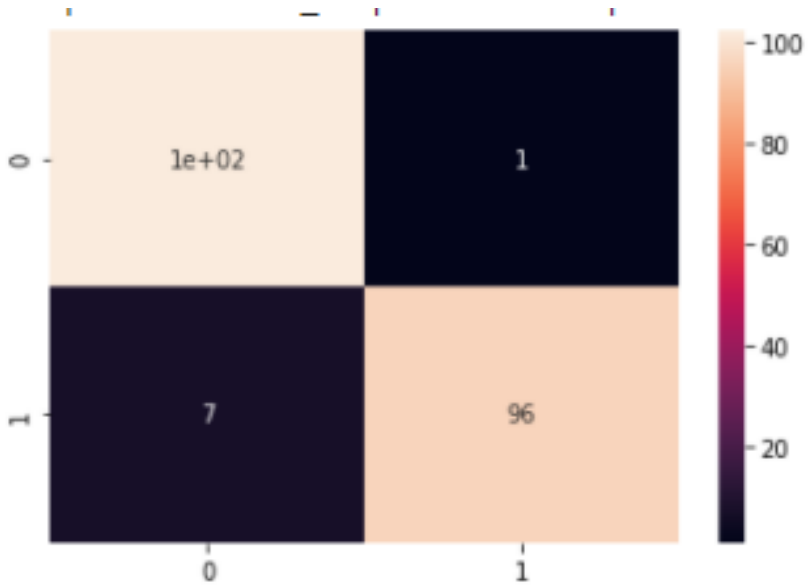
Kaggle dataset link: https://www.kaggle.com/himanshuagarwal1998/glaucomadataset

Kaggle dataset api : kaggle datasets download -d himanshuagarwal1998/glaucomadataset

The dataset have images belonging to two classes glaucoma and non- glaucoma

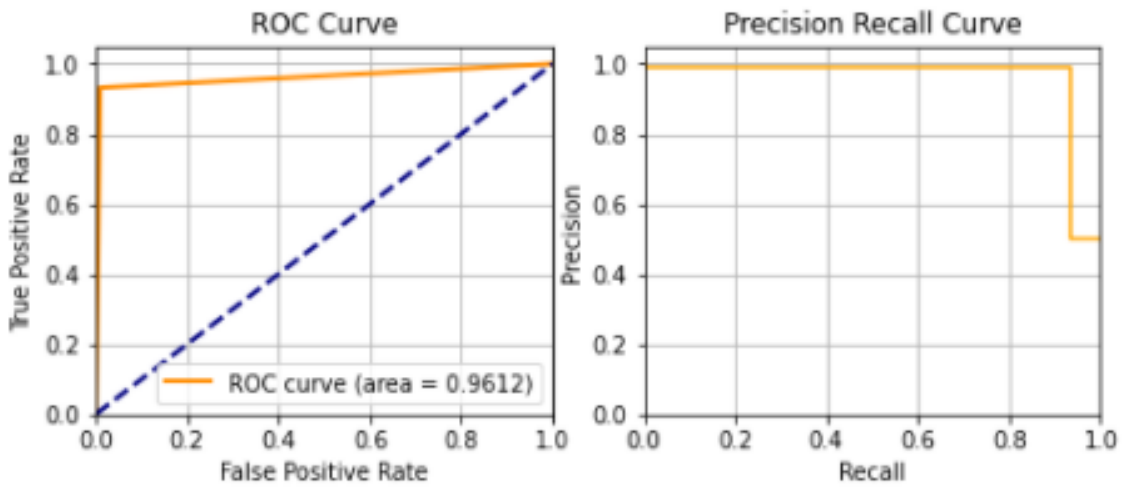


Results



Classification Report

	precision	recall	f1-score	support
Glucoma	0.94	0.99	0.96	103
No_Glucoma	0.99	0.93	0.96	103
accuracy			0.96	206
macro avg	0.96	0.96	0.96	206
weighted avg	0.96	0.96	0.96	206



Cataract model

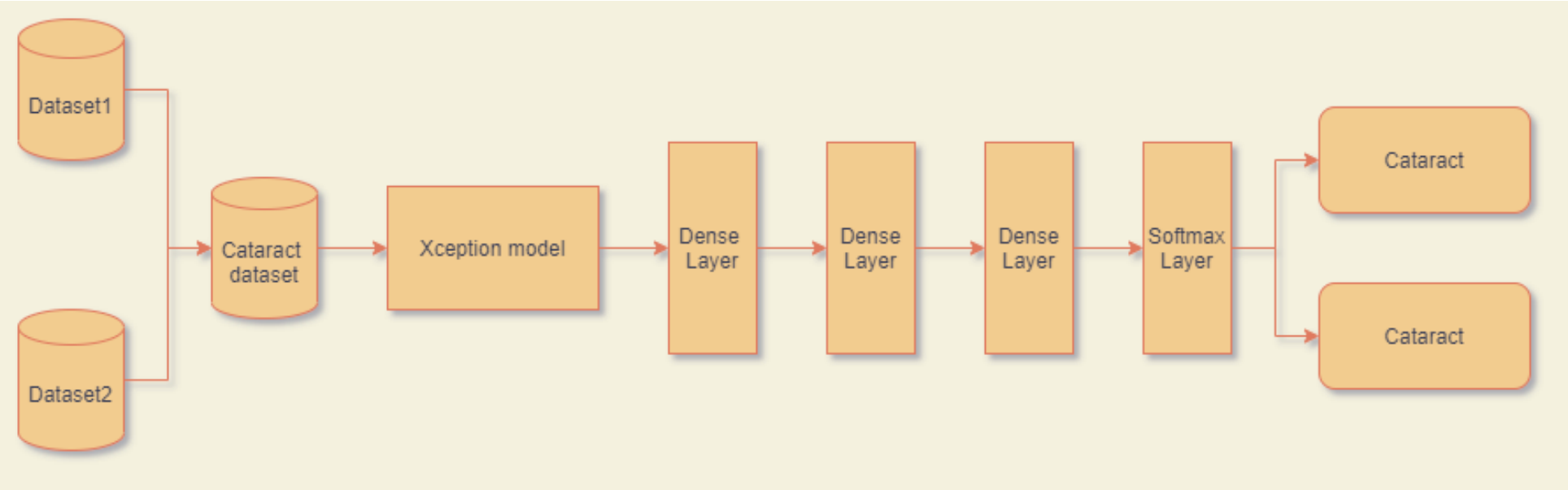
Kaggle dataset 1 link: https://www.kaggle.com/andrewmvd/ocular-disease-recognition-odir5k

Kaggle dataset 1 api : kaggle datasets download -d andrewmvd/ocular-disease-recognition-odir5k

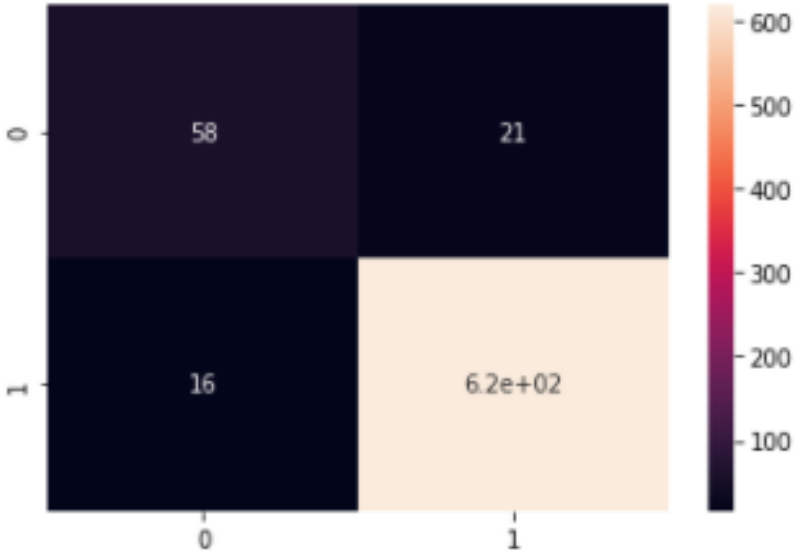
Kaggle dataset 2 link : https://www.kaggle.com/jr2ngb/cataractdataset

Kaggle dataset 2 api: kaggle datasets download -d jr2ngb/cataractdataset

The dataset have images belonging to two classes cataract and non- cataract

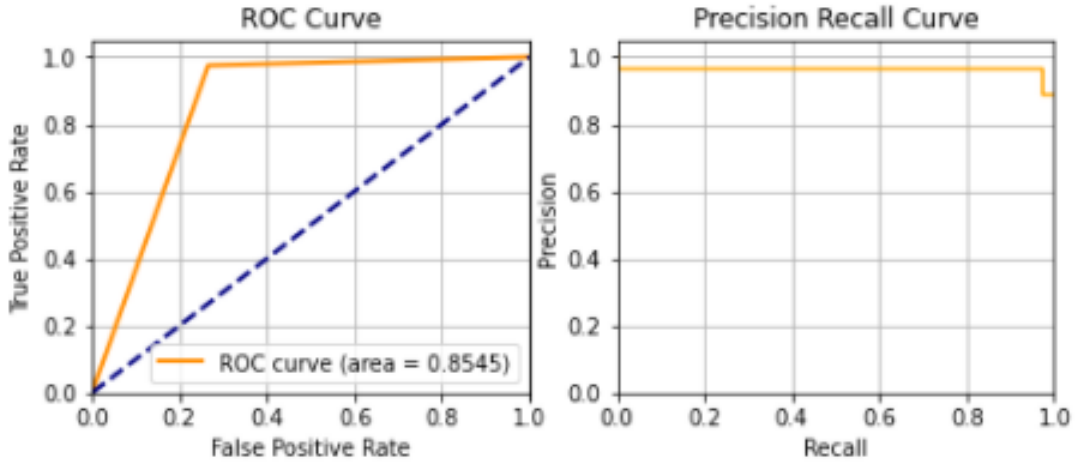


Results



Classification Report

	precision	recall	f1-score	support
Cataract	0.78	0.73	0.76	79
No_cataract	0.97	0.97	0.97	635
accuracy			0.95	714
macro avg	0.88	0.85	0.86	714
weighted avg	0.95	0.95	0.95	714



Pathological myopia model

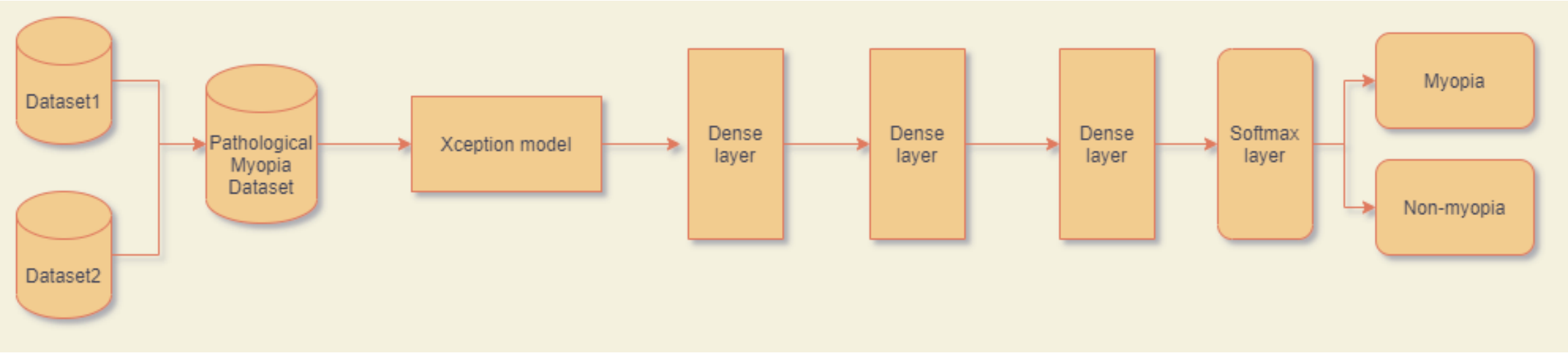
Kaggle dataset 1 link: https://www.kaggle.com/andrewmvd/ocular-disease-recognition-odir5k

Kaggle dataset 1 api : kaggle datasets download -d andrewmvd/ocular-disease-recognition-odir5k

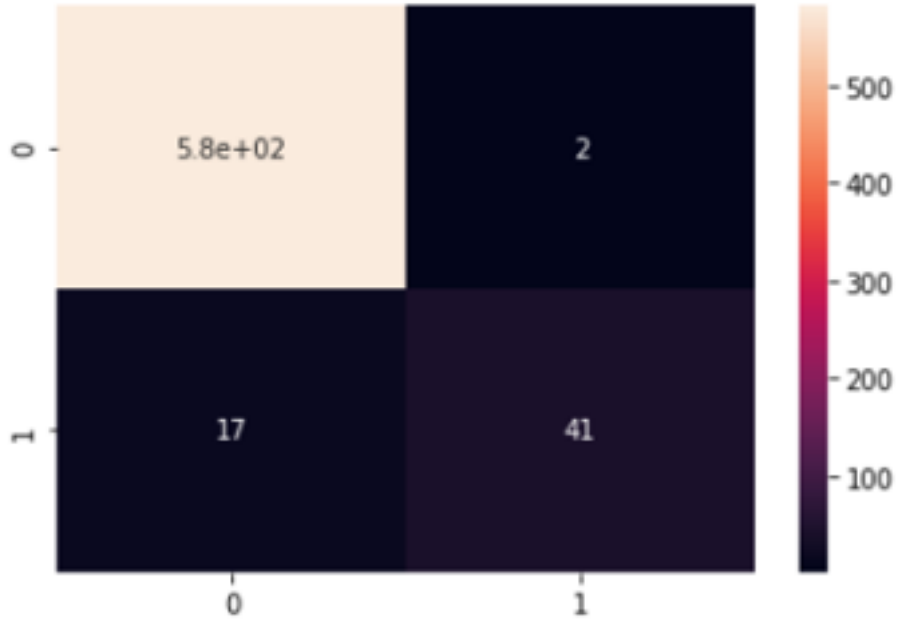
Kaggle dataset 2 link : https://www.kaggle.com/linchundan/fundusimage1000

Kaggle dataset 2 api: kaggle datasets download -d linchundan/fundusimage1000

The dataset have images belonging to two classes myopia and non- myopia

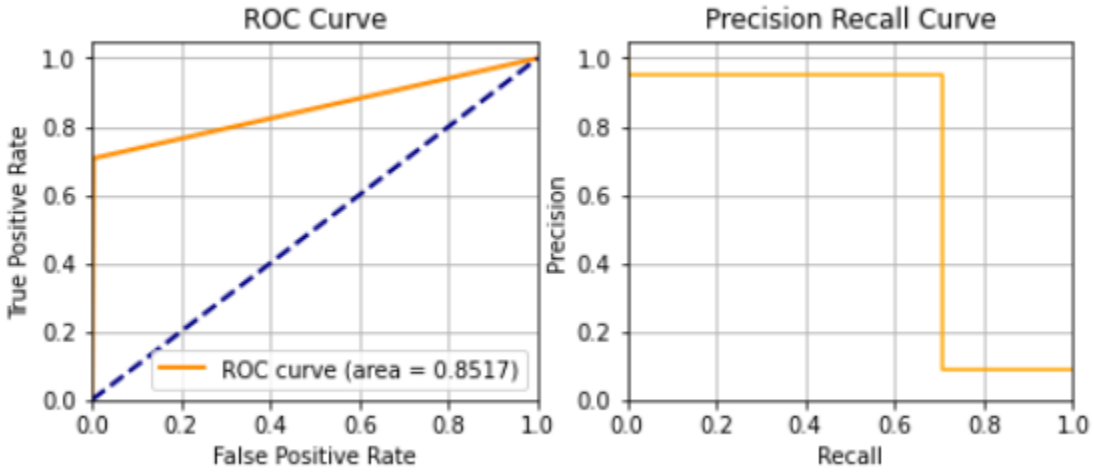


Results




```
[ ]  print(classification_report(val_set3.classes, y_pred))
```

	precision	recall	f1-score	support
0	0.97	1.00	0.98	583
1	0.95	0.71	0.81	58
accuracy			0.97	641
macro avg	0.96	0.85	0.90	641
weighted avg	0.97	0.97	0.97	641

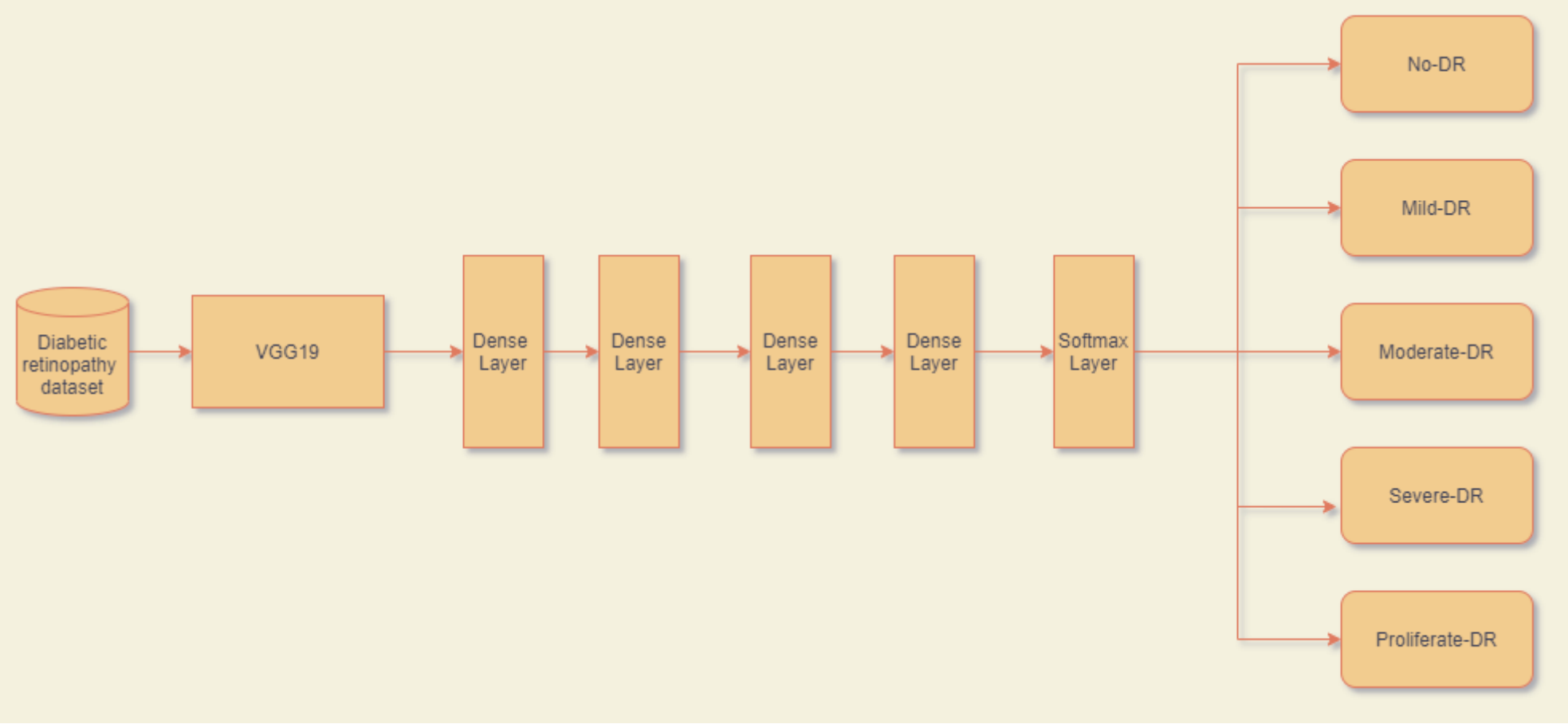


Diabetes Retinopathy model

Kaggle dataset link: https://www.kaggle.com/sovitrath/diabetic-retinopathy-224x224-2019-data/code

Kaggle dataset api : kaggle datasets download -d sovitrath/diabetic-retinopathy-224x224-2019-data

The dataset have images belonging to two classes glaucoma and non- glaucoma



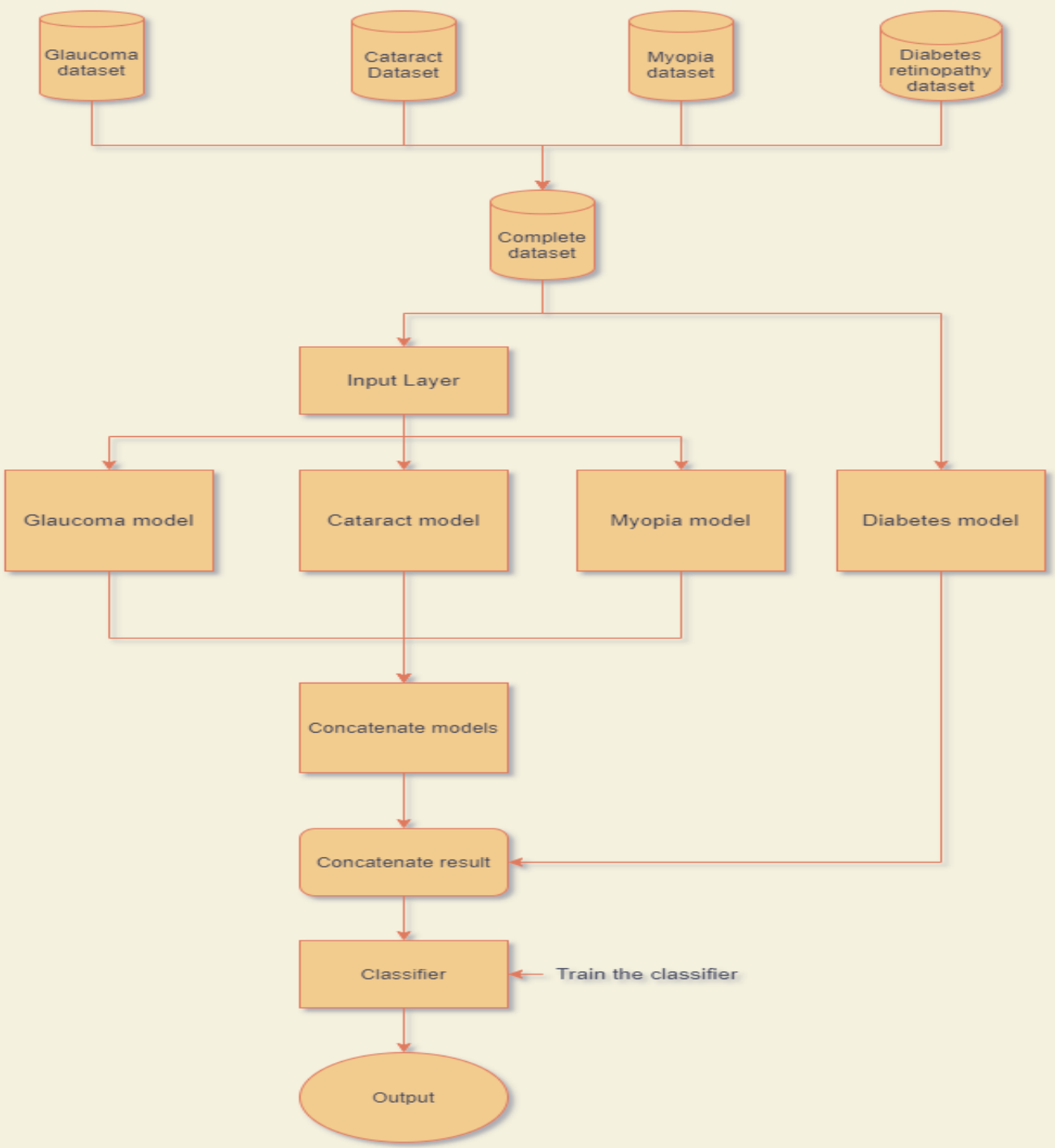
Results

Classification Report

	precision	recall	f1-score	support
Mild	0.71	0.61	0.65	59
Moderate	0.74	0.92	0.82	159
No_DR	1.00	0.97	0.98	288
Proliferate_DR	0.66	0.53	0.59	47
Severe	0.73	0.37	0.49	30
accuracy			0.85	583
macro avg	0.77	0.68	0.71	583
weighted avg	0.86	0.85	0.85	583

Combined model for detection of glaucoma , cataract, myopia and 5 stages of diabetic retinopathy

We merge all the above datasets to create a dataset of all images for the combined model



Results

Confusion Matrix

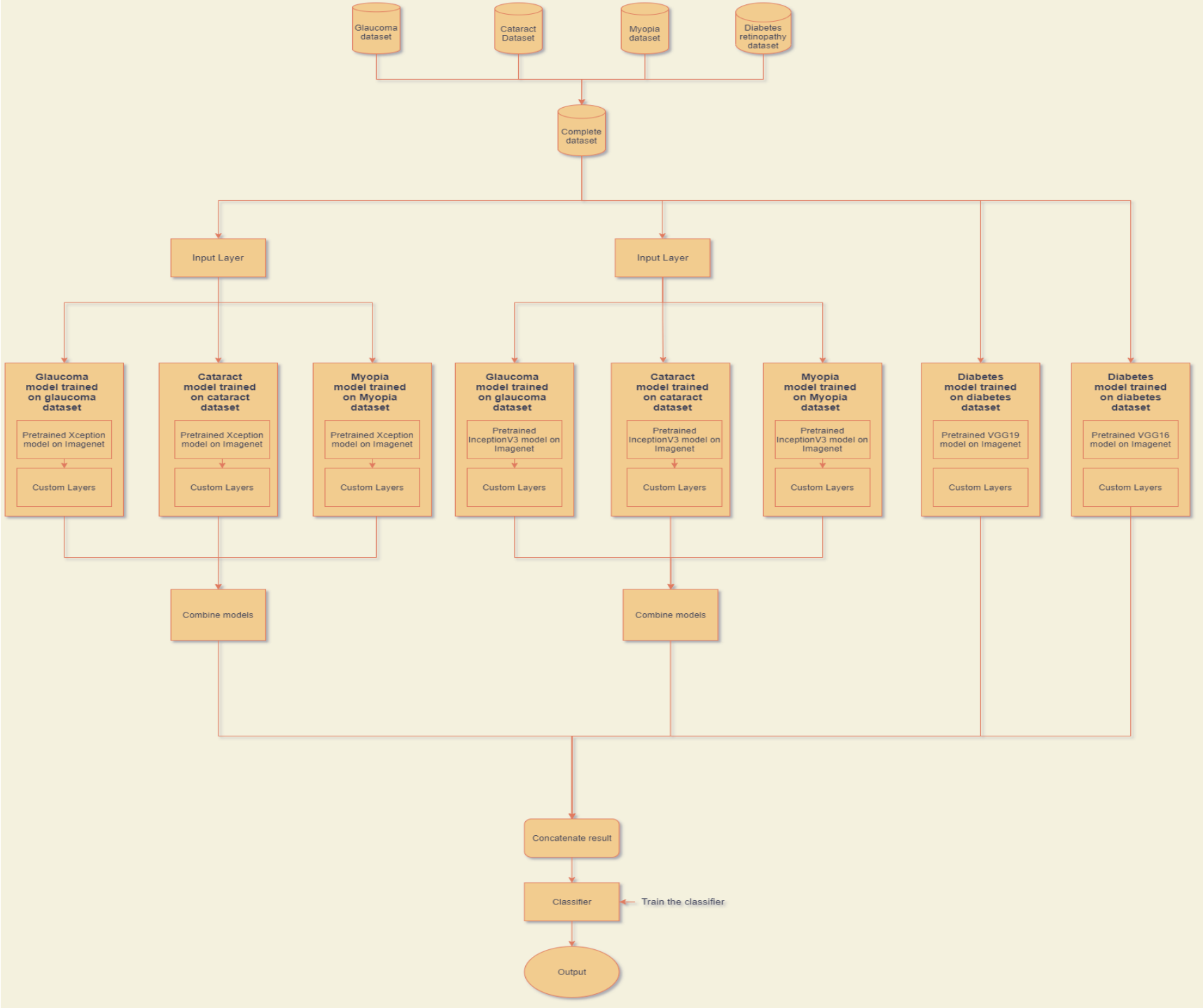
```
[[ 54   2   1   0   3  19   0   0]
 [  0  66   0   0   0  36   0   1]
 [  0   1  43   0   4   4   6   0]
 [  0   0   0  44  23   5   2   0]
 [  0   0   0  14 166   4  10   6]
 [ 19  30   4   8  21 557   3   1]
 [  0   0   2   2  16   2  26  11]
 [  0   1   0   0  13   0   3  22]]
```

Classification Report

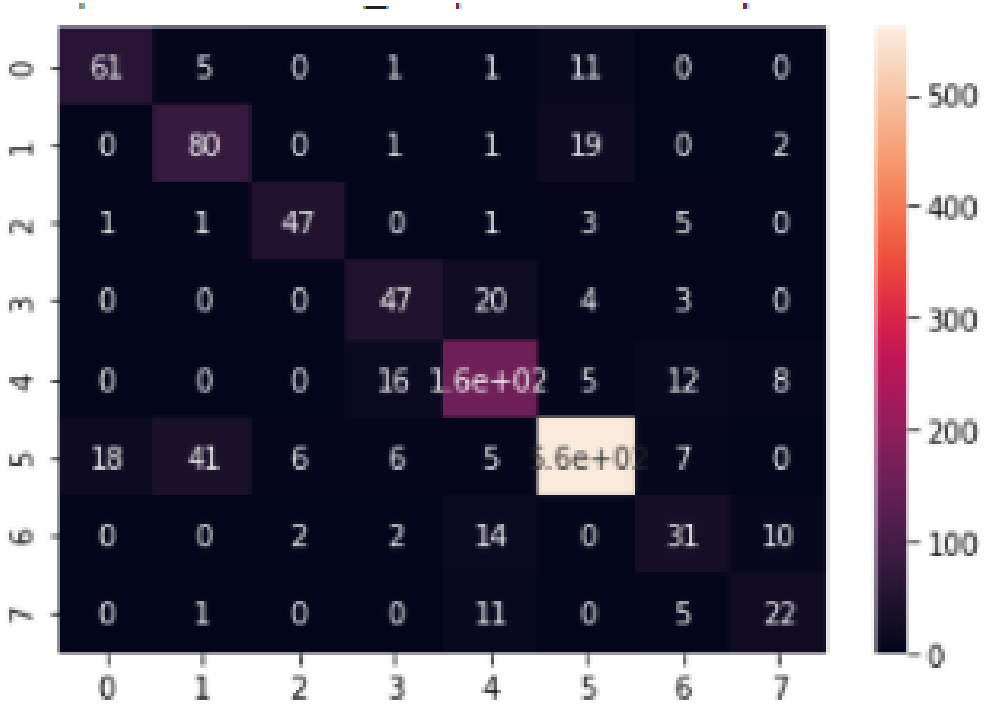
	precision	recall	f1-score	support
C	0.74	0.68	0.71	79
G	0.66	0.64	0.65	103
M	0.86	0.74	0.80	58
Mild_DR	0.65	0.59	0.62	74
Moderate_DR	0.67	0.83	0.74	200
N	0.89	0.87	0.88	643
Proliferate_DR	0.52	0.44	0.48	59
Severe_DR	0.54	0.56	0.55	39
accuracy			0.78	1255
macro avg	0.69	0.67	0.68	1255
weighted avg	0.78	0.78	0.78	1255

Combined ensemble model for detection of glaucoma, cataract, myopia and 5 stages of diabetic retinopathy.

Ensemble of several models is used to predict the disease



Results

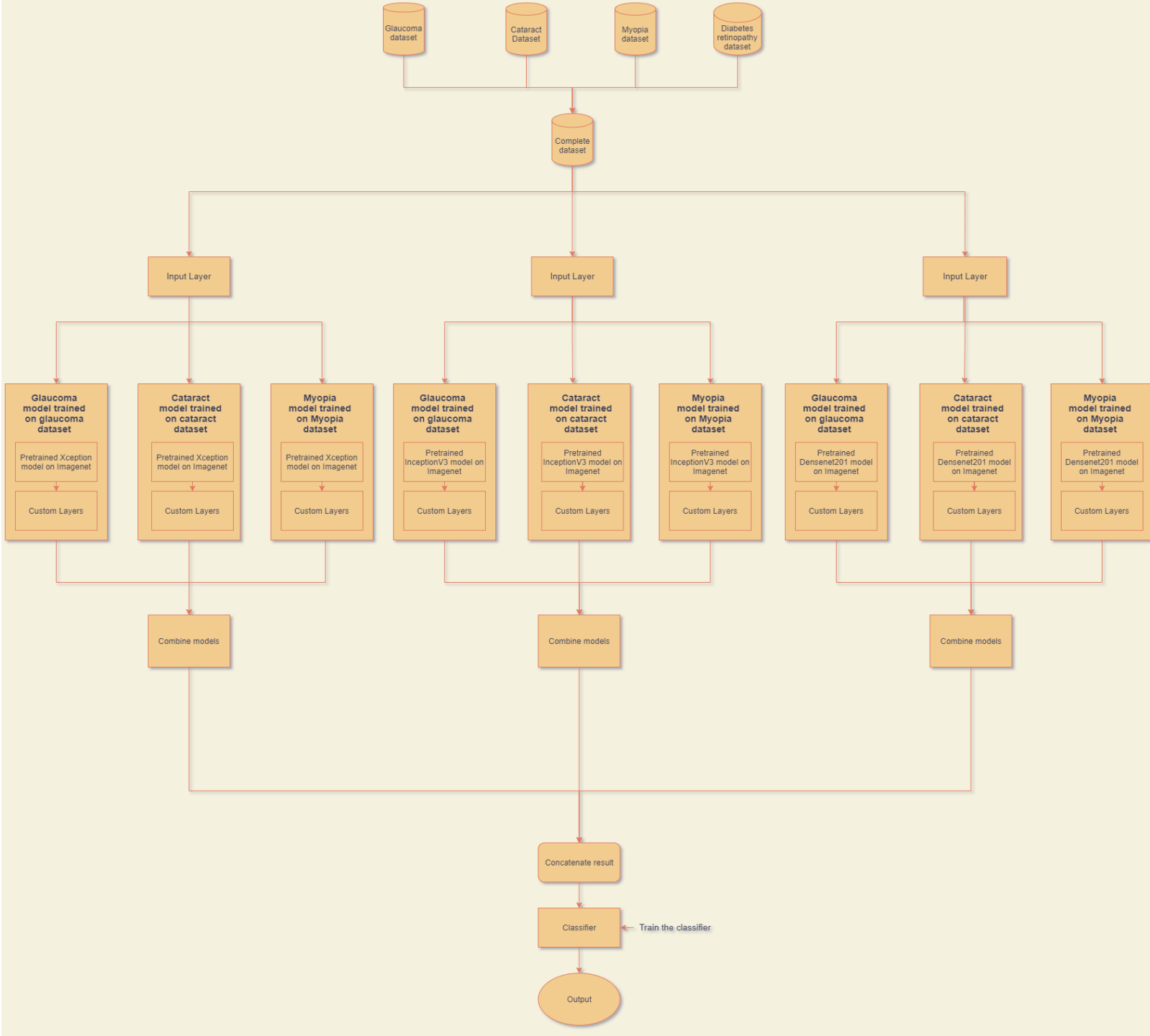


Classification Report

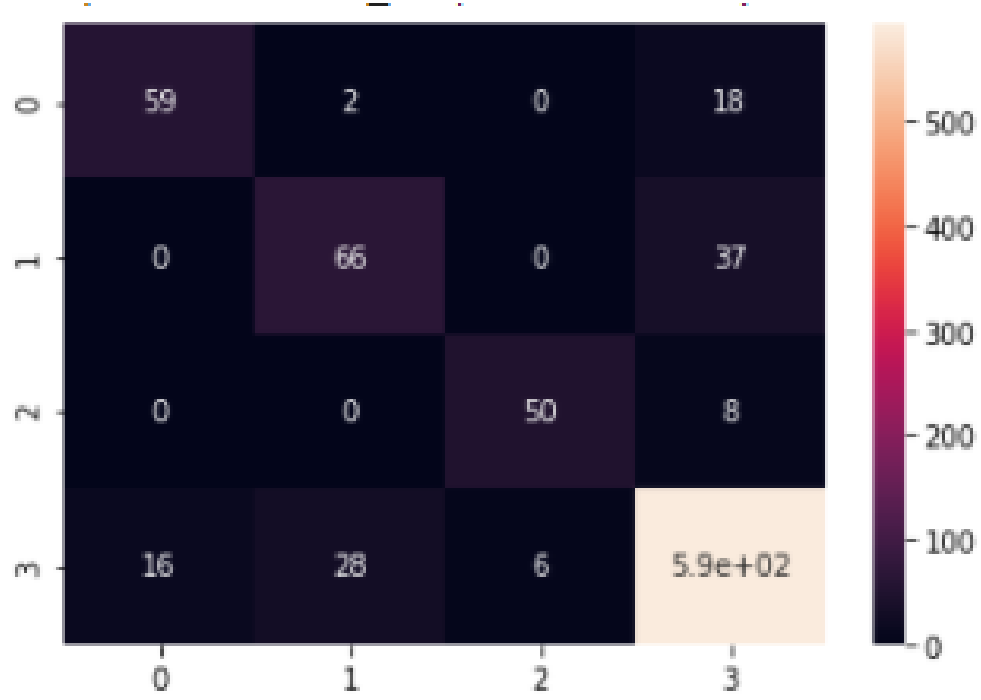
	precision	recall	f1-score	support
C	0.76	0.77	0.77	79
G	0.62	0.78	0.69	103
M	0.85	0.81	0.83	58
Mild_DR	0.64	0.64	0.64	74
Moderate_DR	0.75	0.80	0.77	200
N	0.93	0.87	0.90	643
Proliferate_DR	0.49	0.53	0.51	59
Severe_DR	0.52	0.56	0.54	39
accuracy			0.80	1255
macro avg	0.70	0.72	0.71	1255
weighted avg	0.81	0.80	0.81	1255

Combined ensemble model for detection of glaucoma, cataract and myopia.

Ensemble of several models is used to predict the disease



Results



Classification Report

	precision	recall	f1-score	support
C	0.79	0.75	0.77	79
G	0.69	0.64	0.66	103
M	0.89	0.86	0.88	58
N	0.90	0.92	0.91	643
accuracy			0.87	883
macro avg	0.82	0.79	0.80	883
weighted avg	0.87	0.87	0.87	883

Thank you