



أكاديمية سدايا  
SDAIA Academy

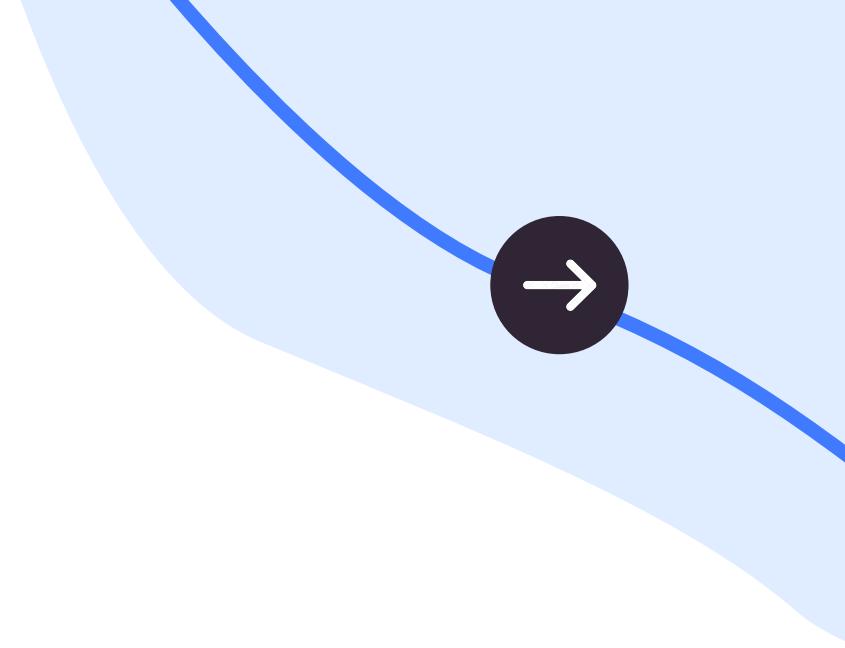
مستشفي الملك خالد  
التخصصي للعيون  
King Khaled Eye  
Specialist Hospital



# EYES DISEASE CLASSIFICATION

by Maram Alfaifi and Tahani Almutairi





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## Introduction

The Kingdom's Vision 2030 contains many goals such as the transforming health sector program to ensure the continued development of health care services in the Kingdom and to focus efforts in this vital sector.

Therefore, King Khalid Eye Specialist Hospital wishes to develop the (ROP) program. We are cooperating with them to help them solve their problem. We will explain its Workflow, and the algorithms that we use in the project.





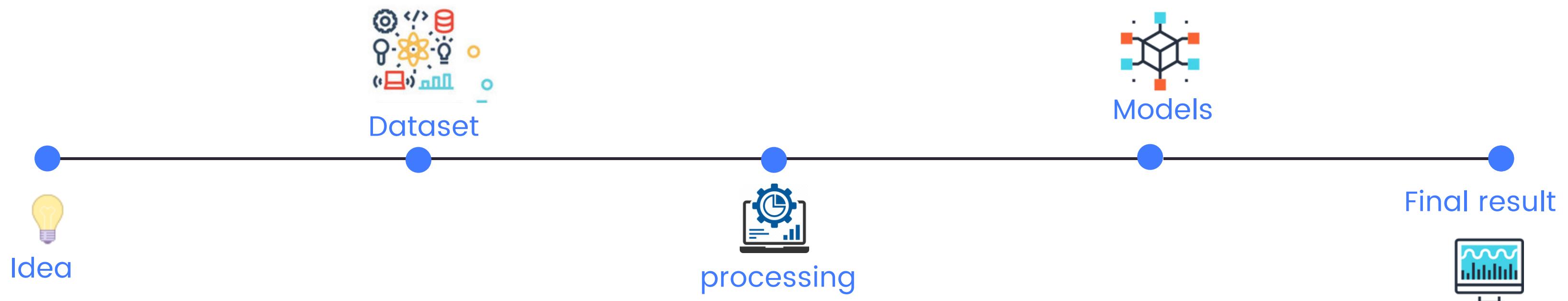
## Problem Statement

The (ROP system) takes a lot of time and meetings for a number of doctors and consultations to diagnose the child's condition. We want to build a model that diagnoses eye diseases. When a picture of the patient's eye is inserted, a prediction is made to know the patient's diagnosis.



# WORKFLOW

project process



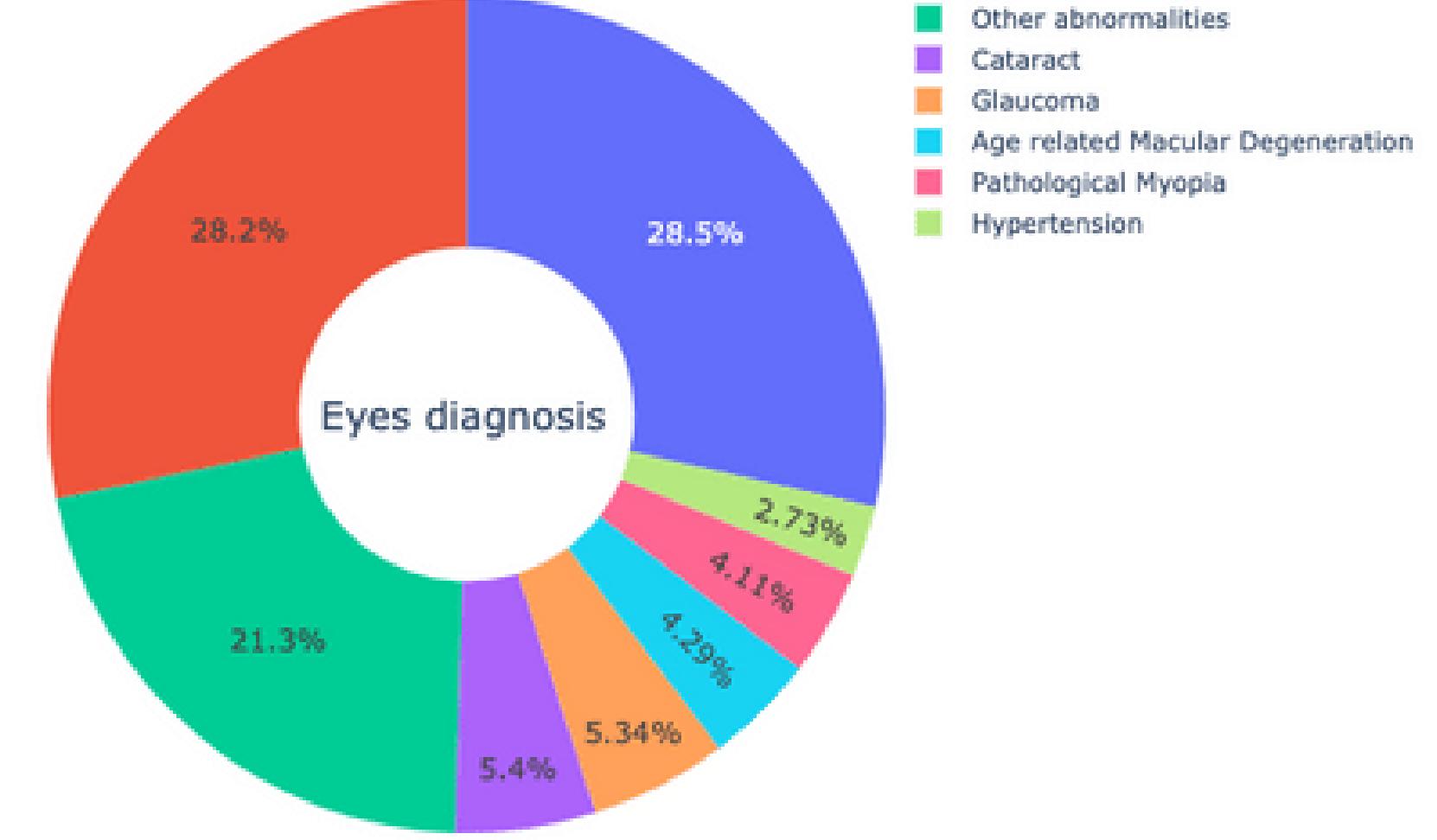
# Processing

- Exploratory Data Analysis (EDA)
- Splitting data
  - – 60% Train, 20%Test, 20% Validation
- Resize image 224x244
- Feature Engineering
- Feature scaling



## DATASET

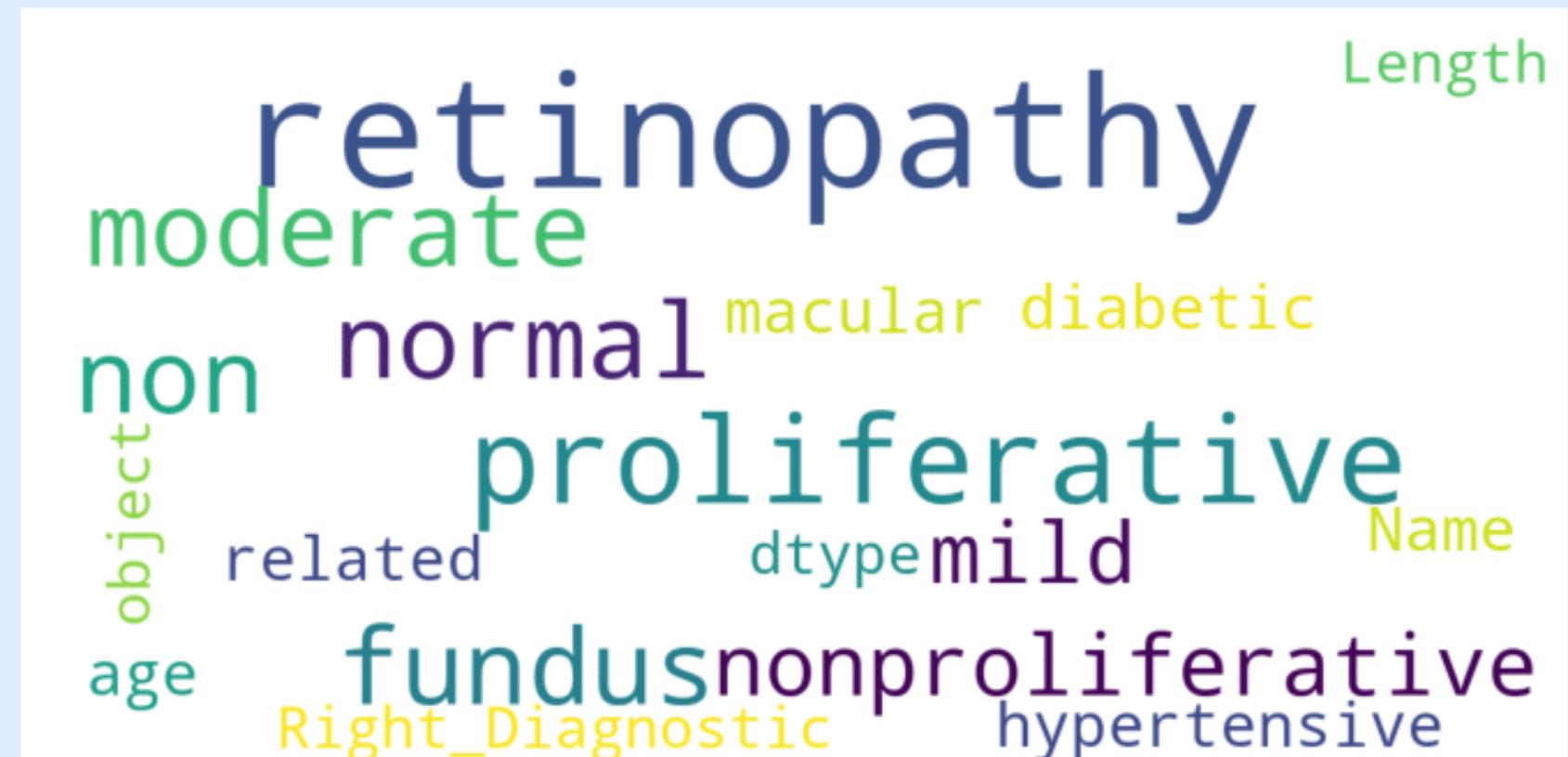
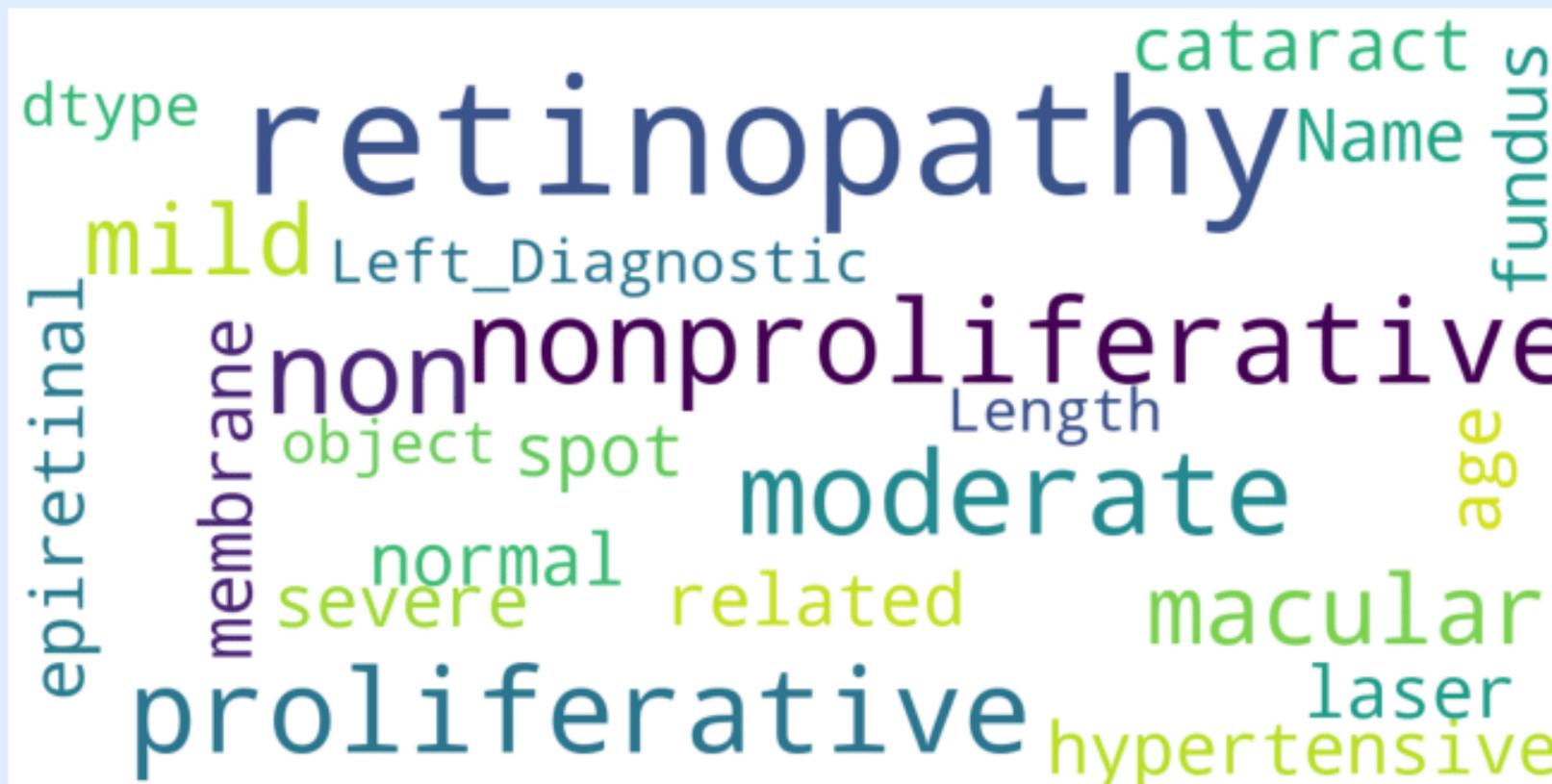
- The dataset was imported from the Kaggle website.
- It contains more than 7000 Eyes Disease images.
- The images have been taken of the retinal fundus, according to conditions whose symptoms they display.



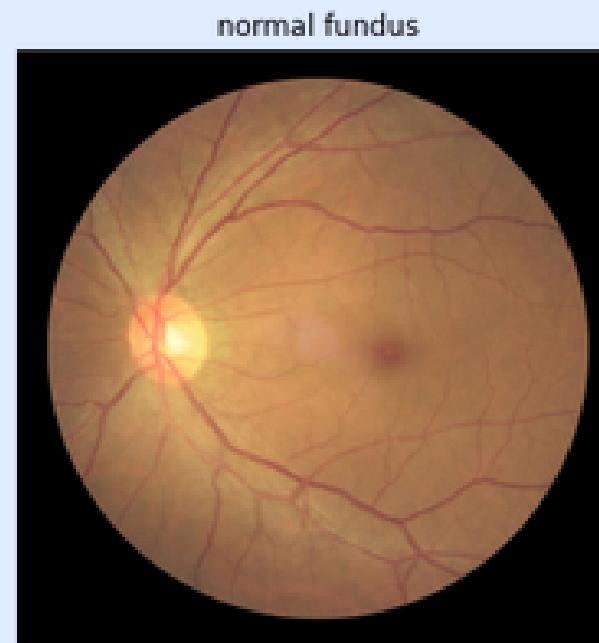
# NLP



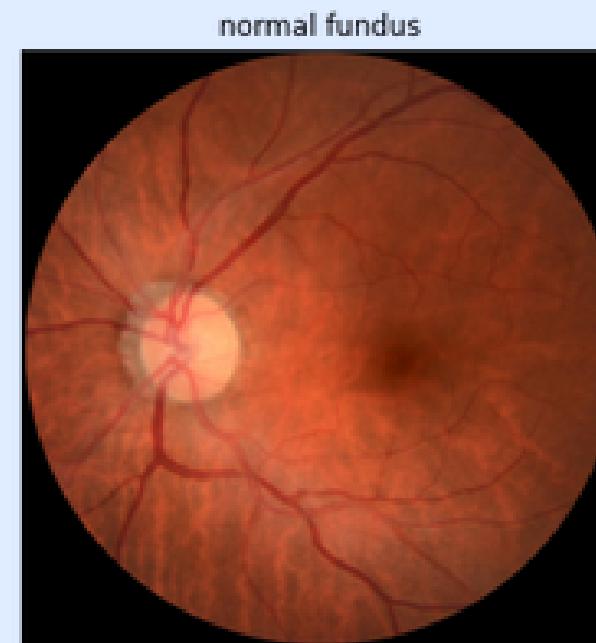
Prevalent words in Left and right eye diagnosys:



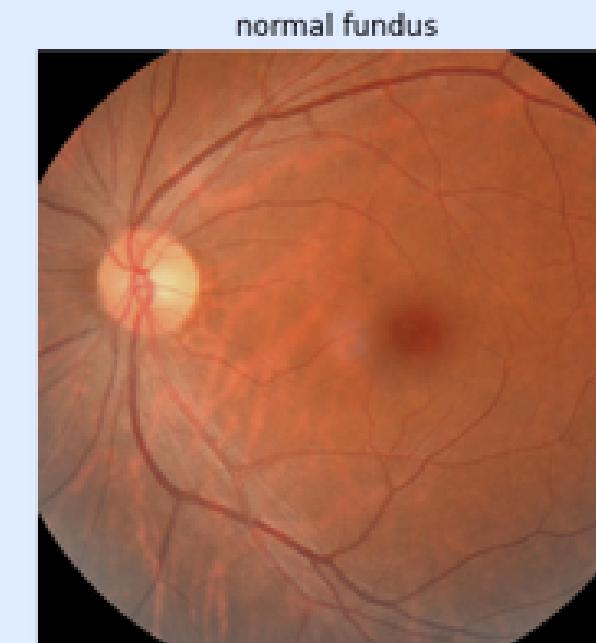
# NORMAL FUNDUS



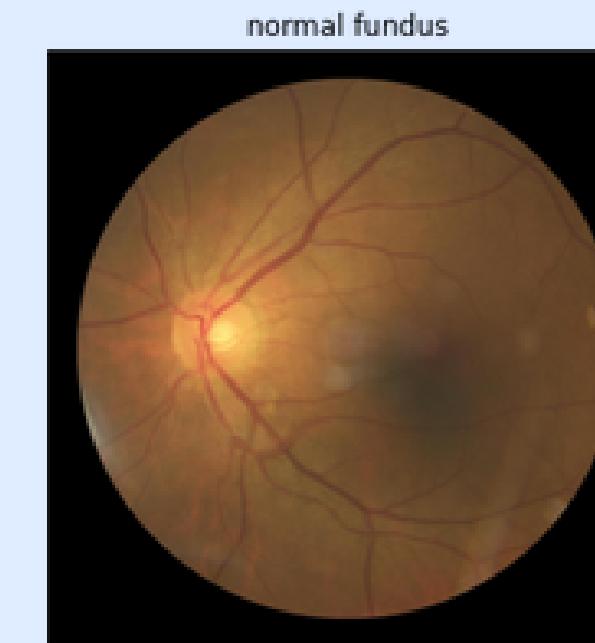
normal fundus



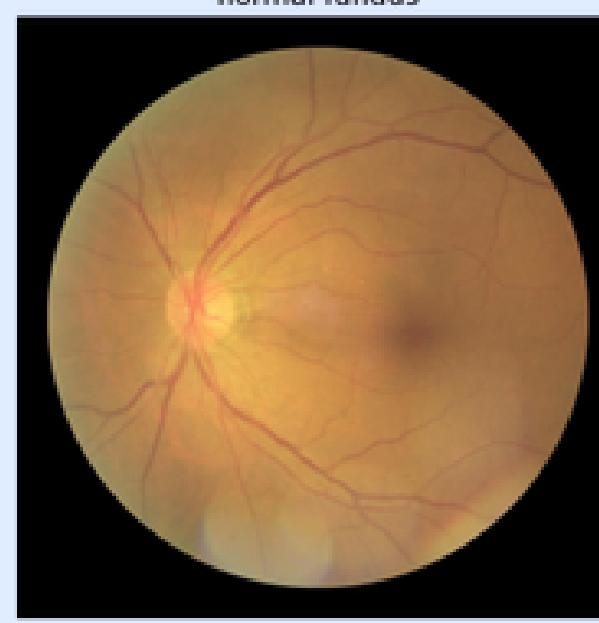
normal fundus



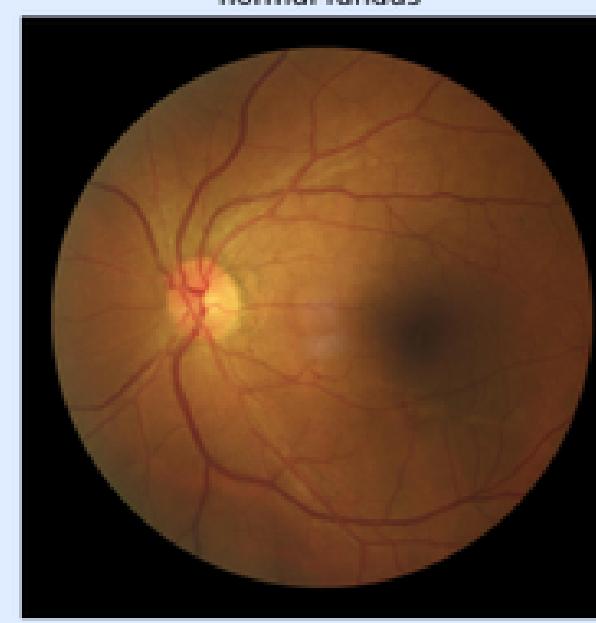
normal fundus



normal fundus



normal fundus



normal fundus



normal fundus

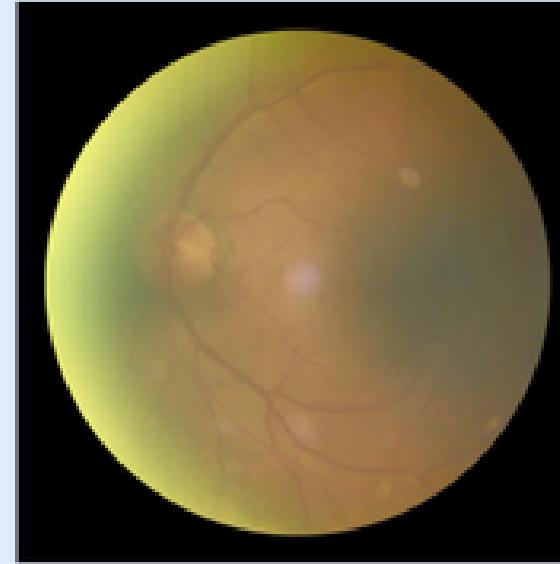


normal fundus

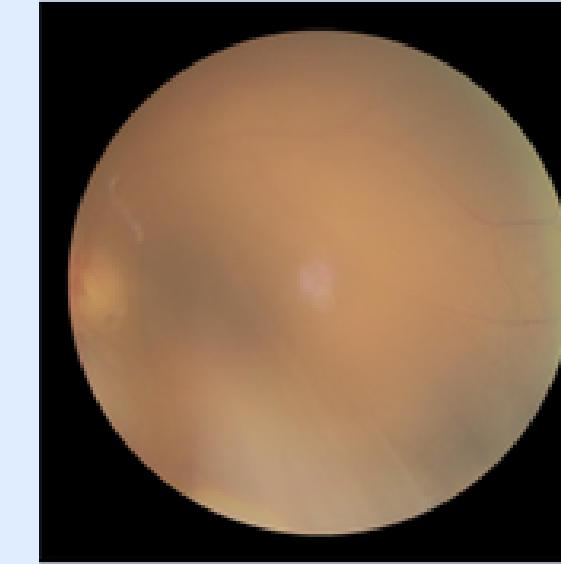


# CATARACT FUNDUS

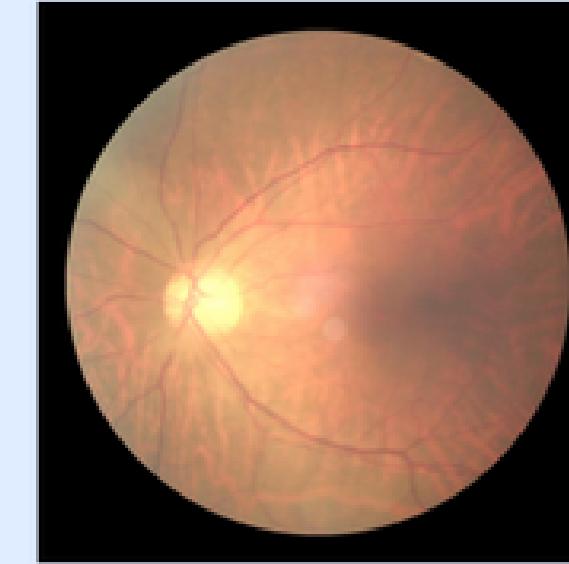
moderate non proliferative retinopathy,  
cataract



cataract

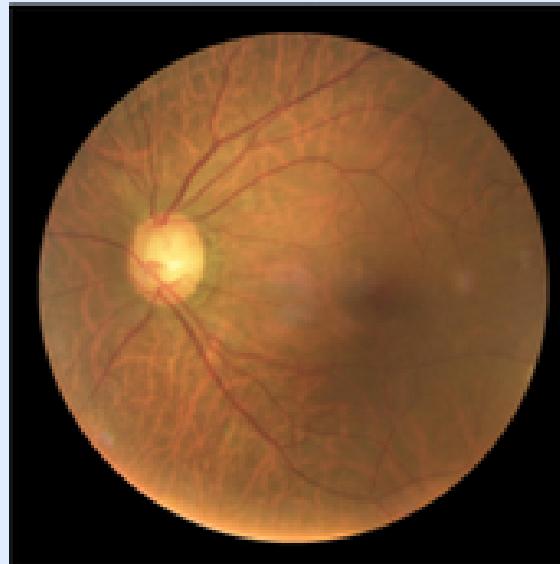


cataract

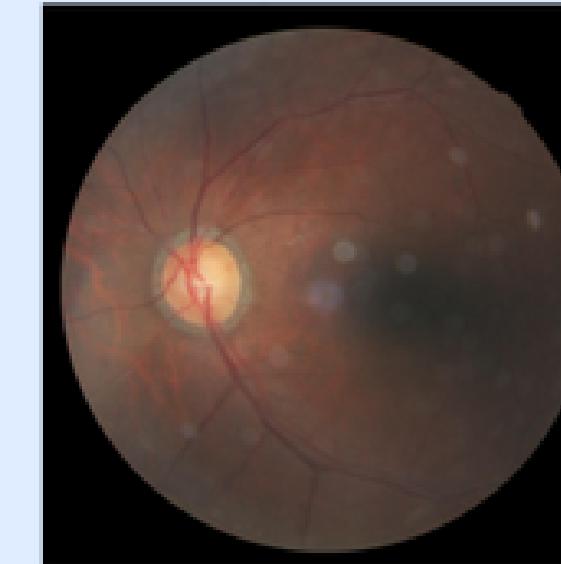


# GLAUCOMA FUNDUS

suspected glaucoma



glaucoma



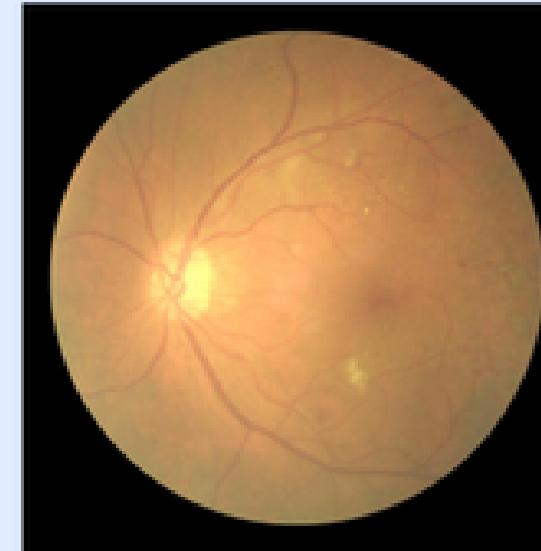
glaucoma





# DIABETES FUNDUS

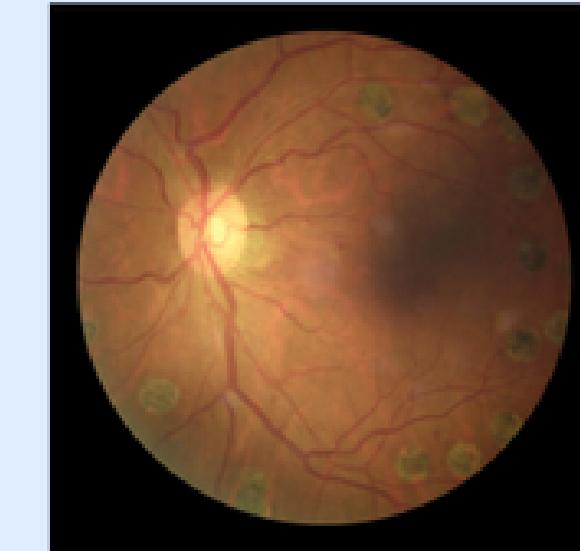
moderate non proliferative retinopathy



macular epiretinal membrane, mild nonproliferative retinopathy



moderate non proliferative retinopathy, laser spot

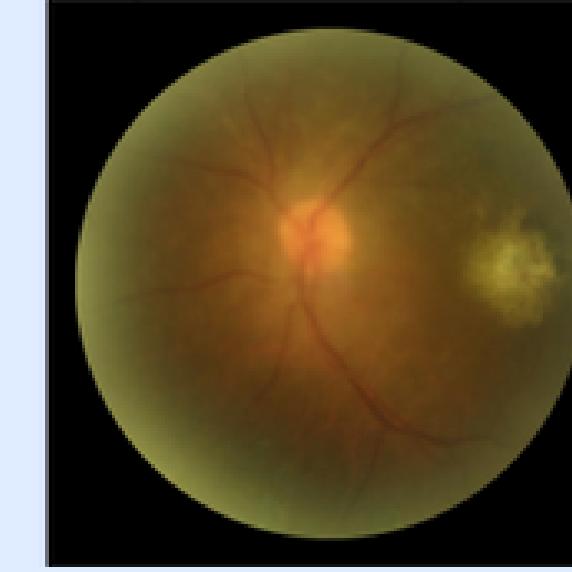


# AGE-RELATED MACULAR DEGENERATION (AMD)

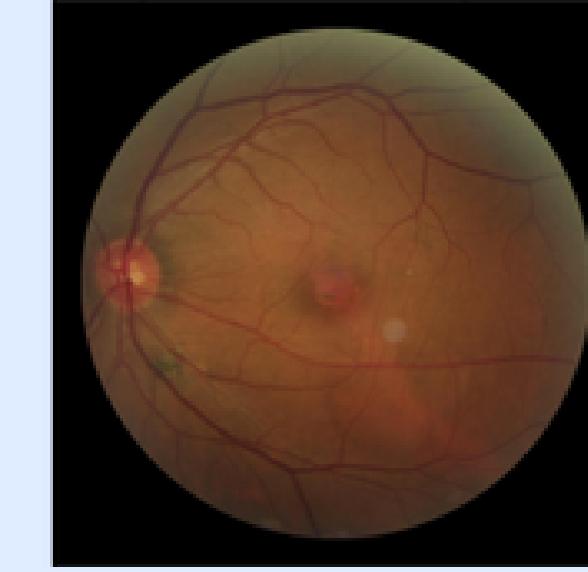
dry age-related macular degeneration



wet age-related macular degeneration



wet age-related macular degeneration



# HYPERTENSIVE FUNDUS



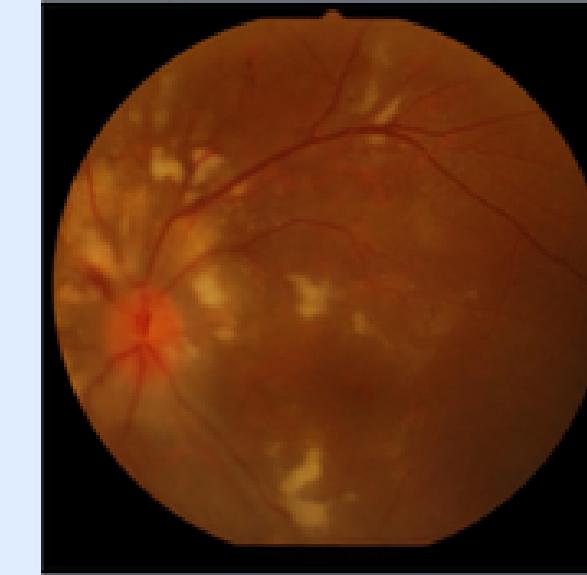
moderate non proliferative retinopathy,  
hypertensive retinopathy



hypertensive retinopathy



hypertensive retinopathy

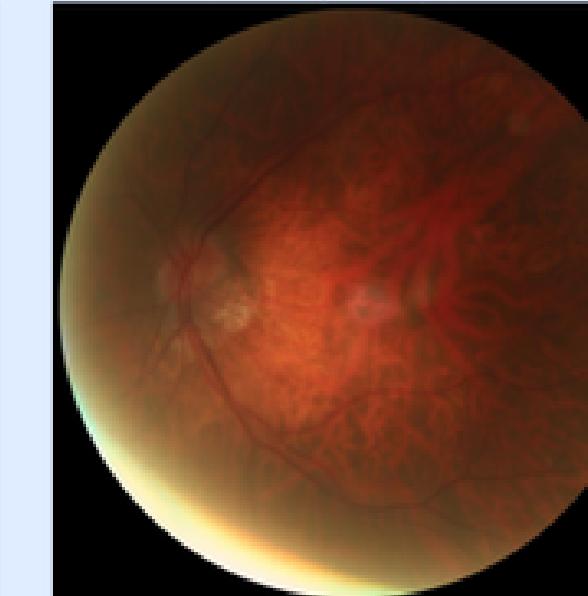


# PATHOLOGICAL MYOPIA

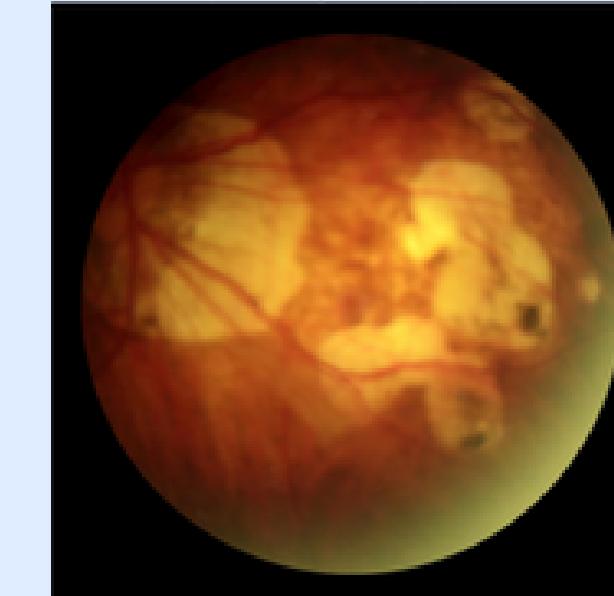
pathological myopia



pathological myopia



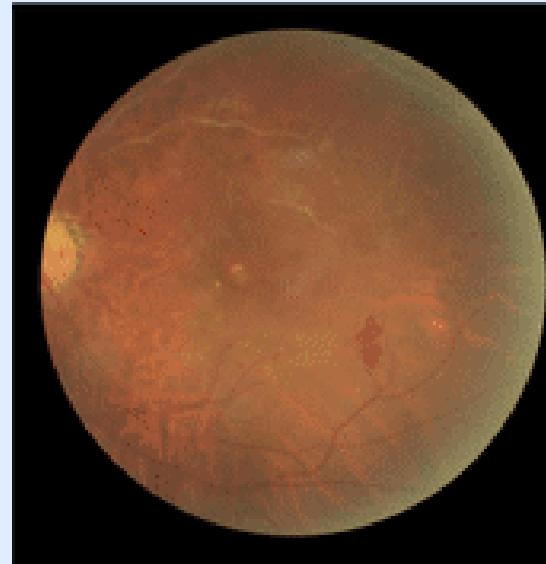
pathological myopia



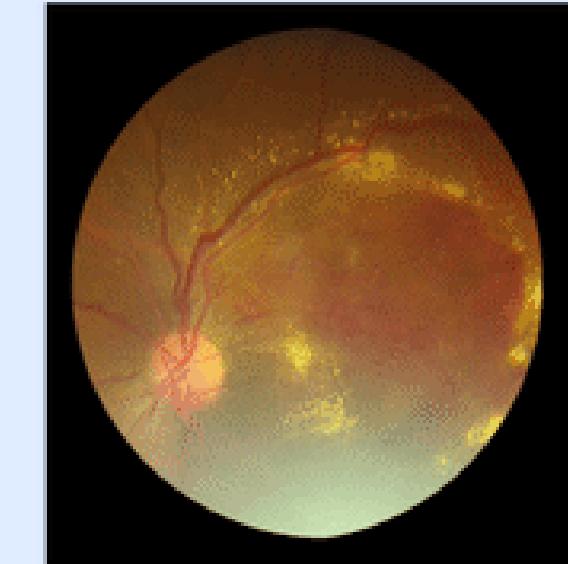
# OTHER ABNORMALITIES



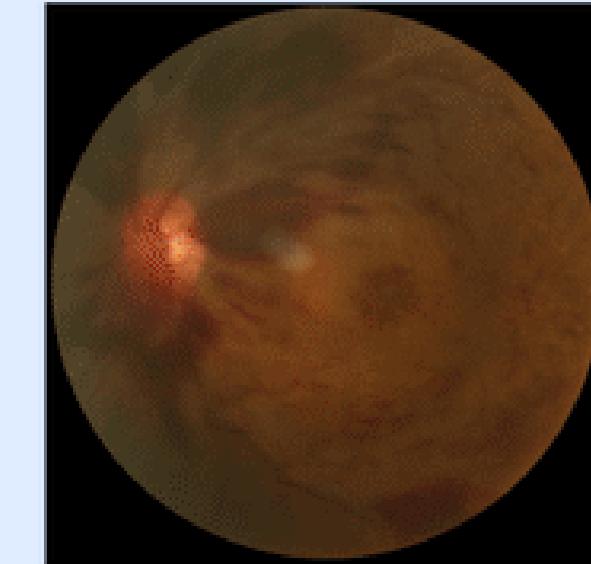
branch retinal vein occlusion



branch retinal vein occlusion



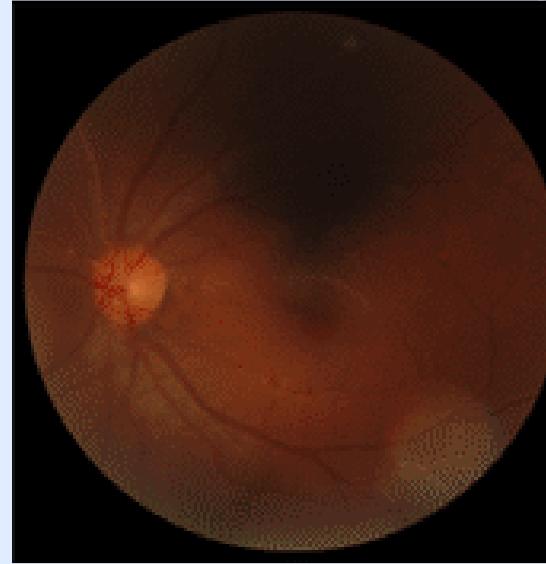
central retinal vein occlusion



depigmentation of the retinal pigment epithelium



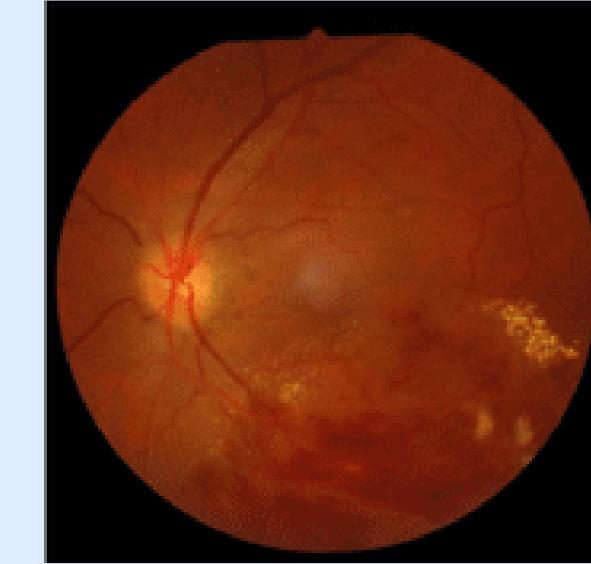
suspected retinal vascular sheathing



branch retinal vein occlusion



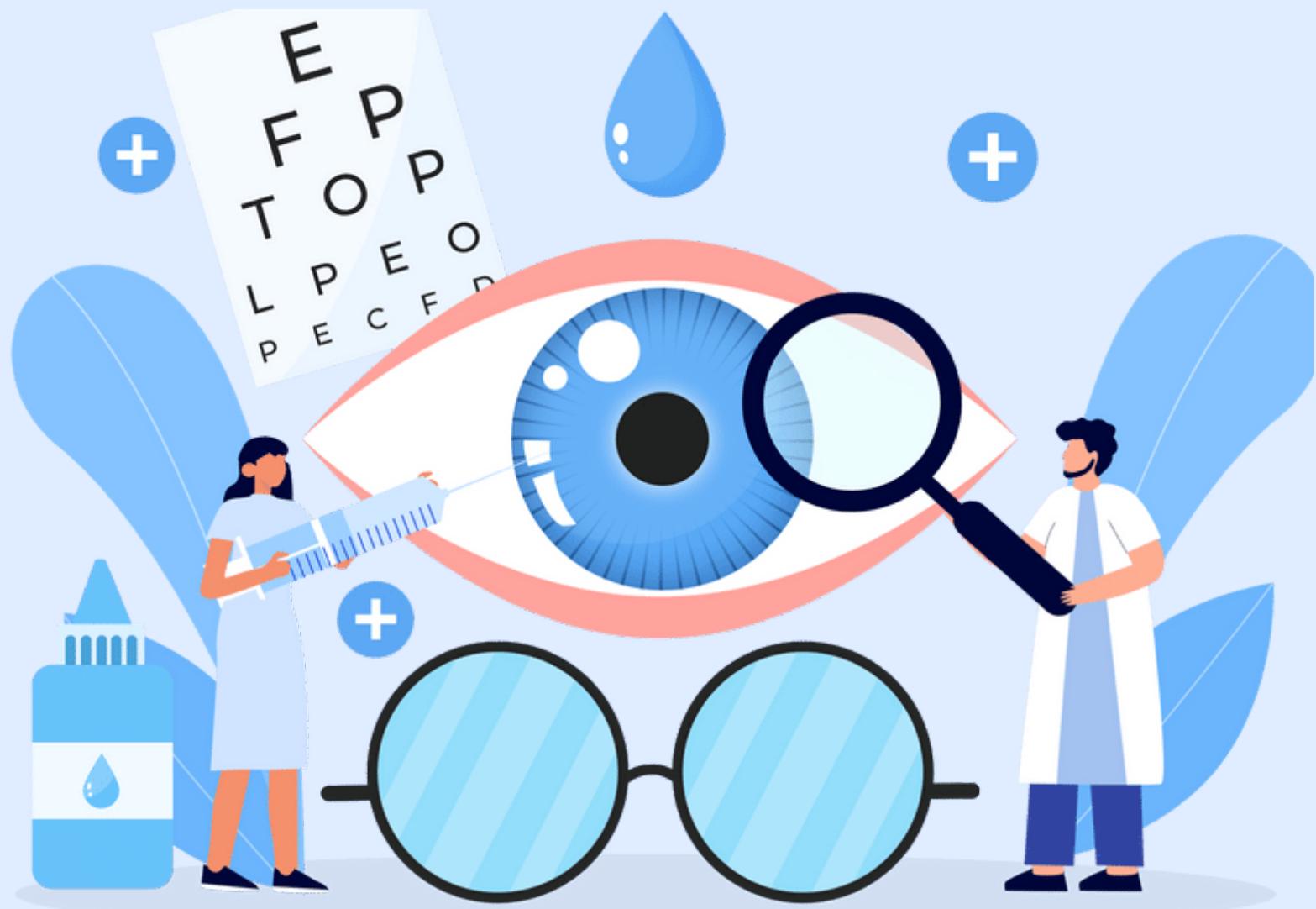
moderate non proliferative retinopathy,  
branch retinal vein occlusion



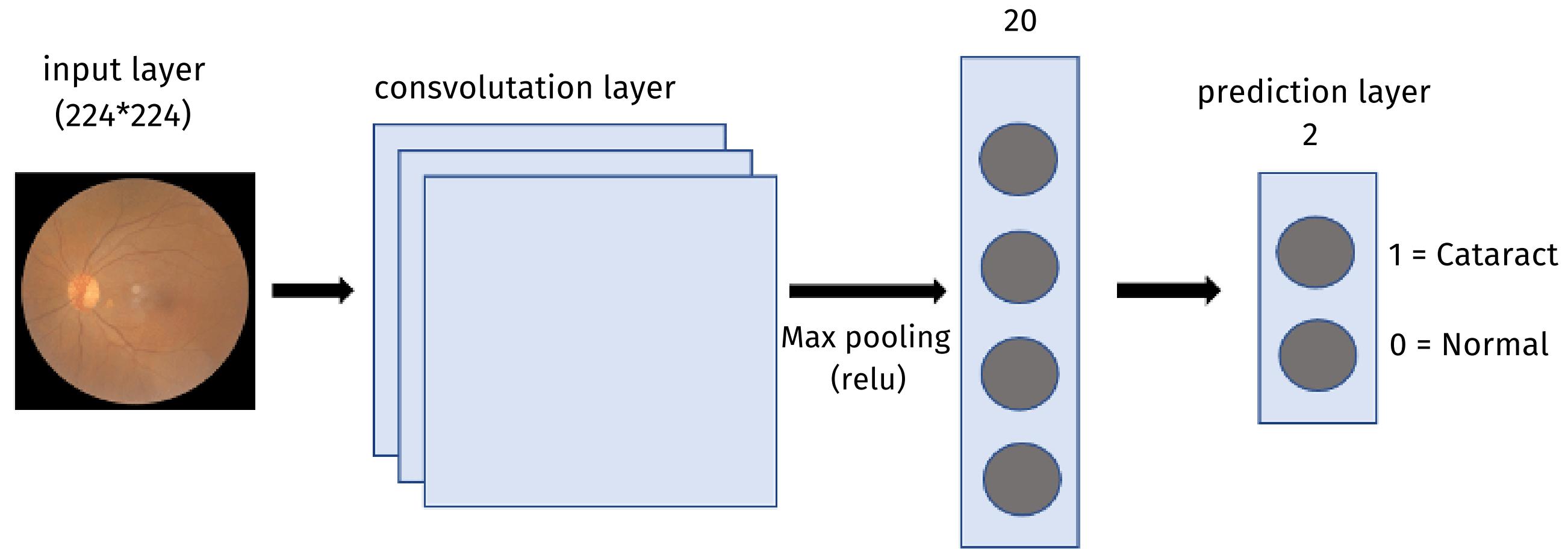
branch retinal vein occlusion



# CATARACT MODELS



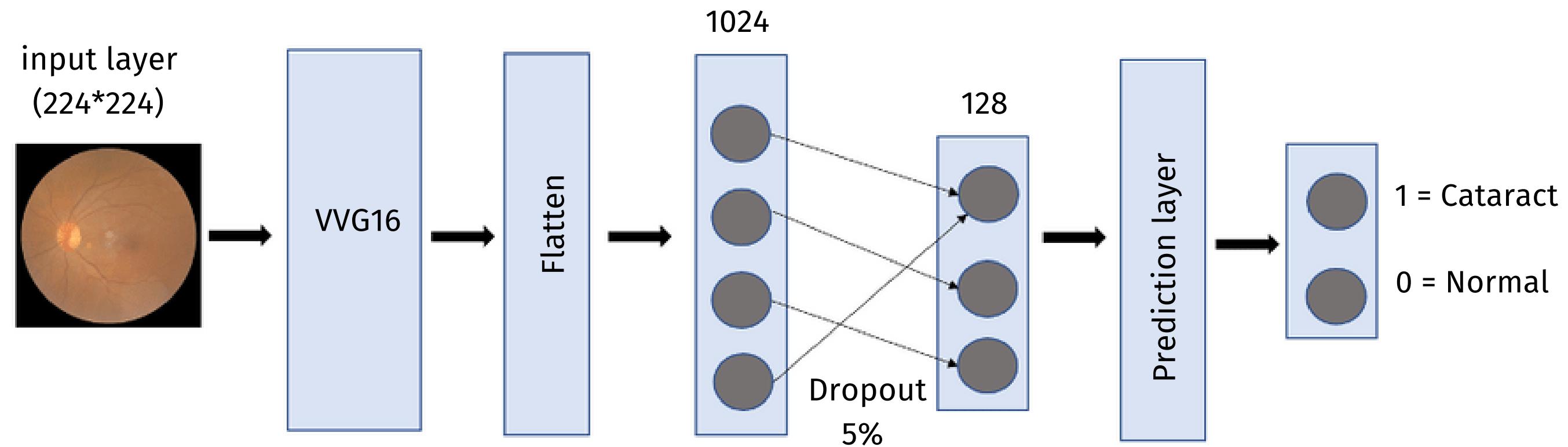
# Baseline CNN Model



Training Accuracy = 0.65

Validation Accuracy = 0.70

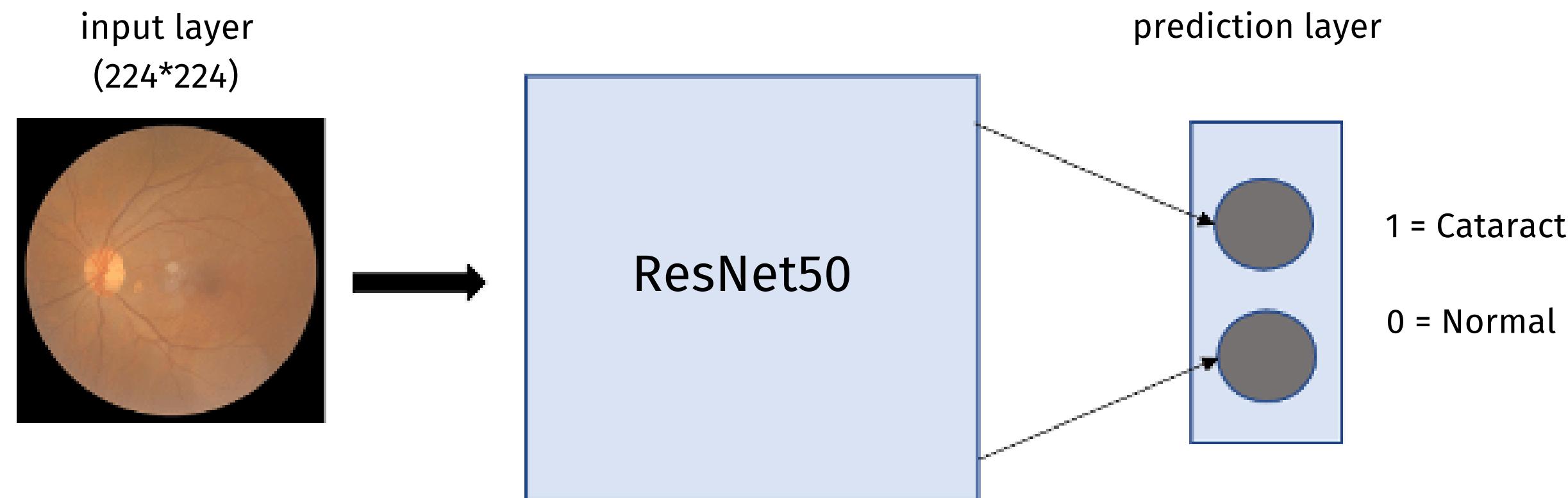
# VVG16 Model



Training Accuracy = 0.82

Validation Accuracy = 0.78

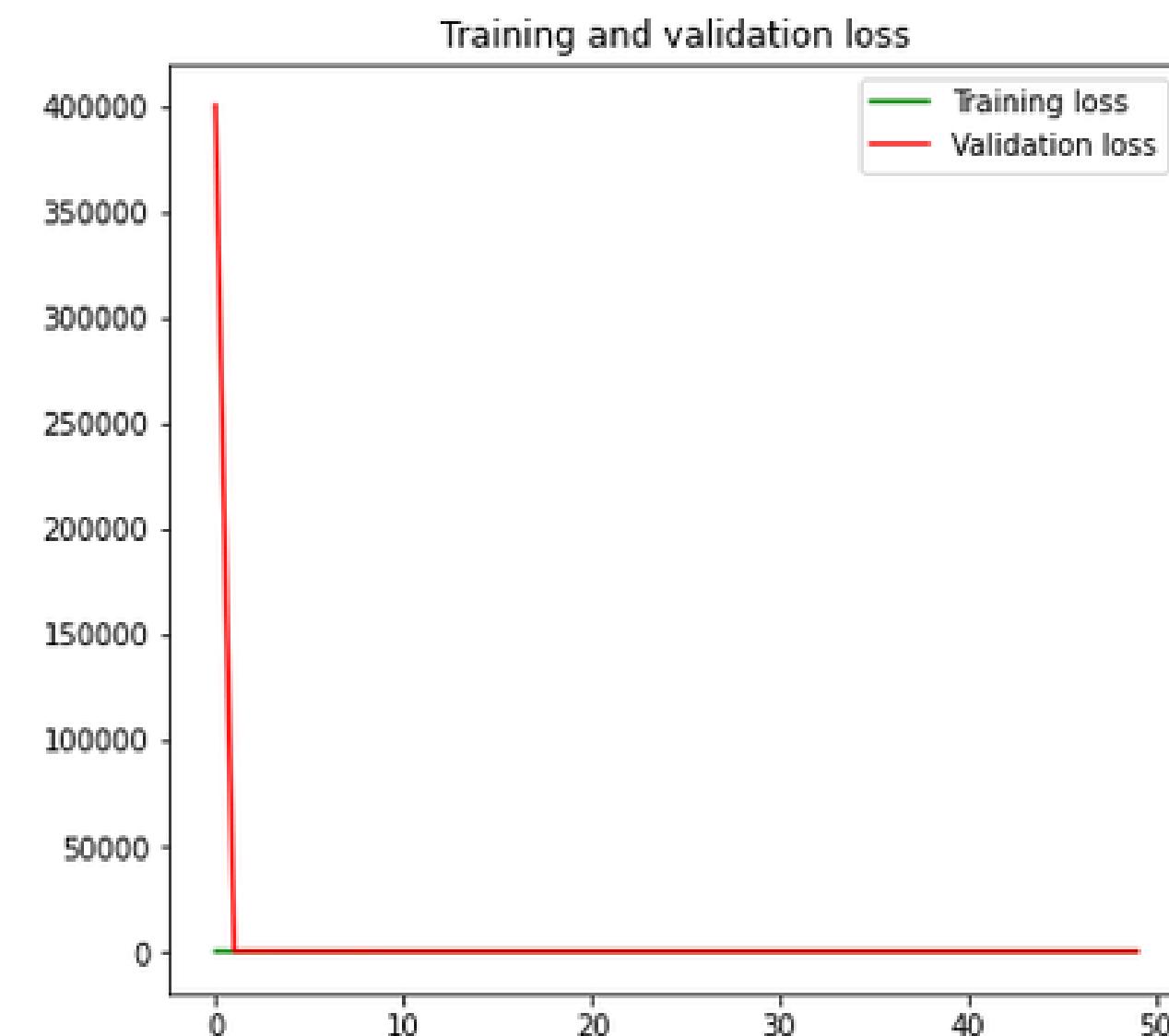
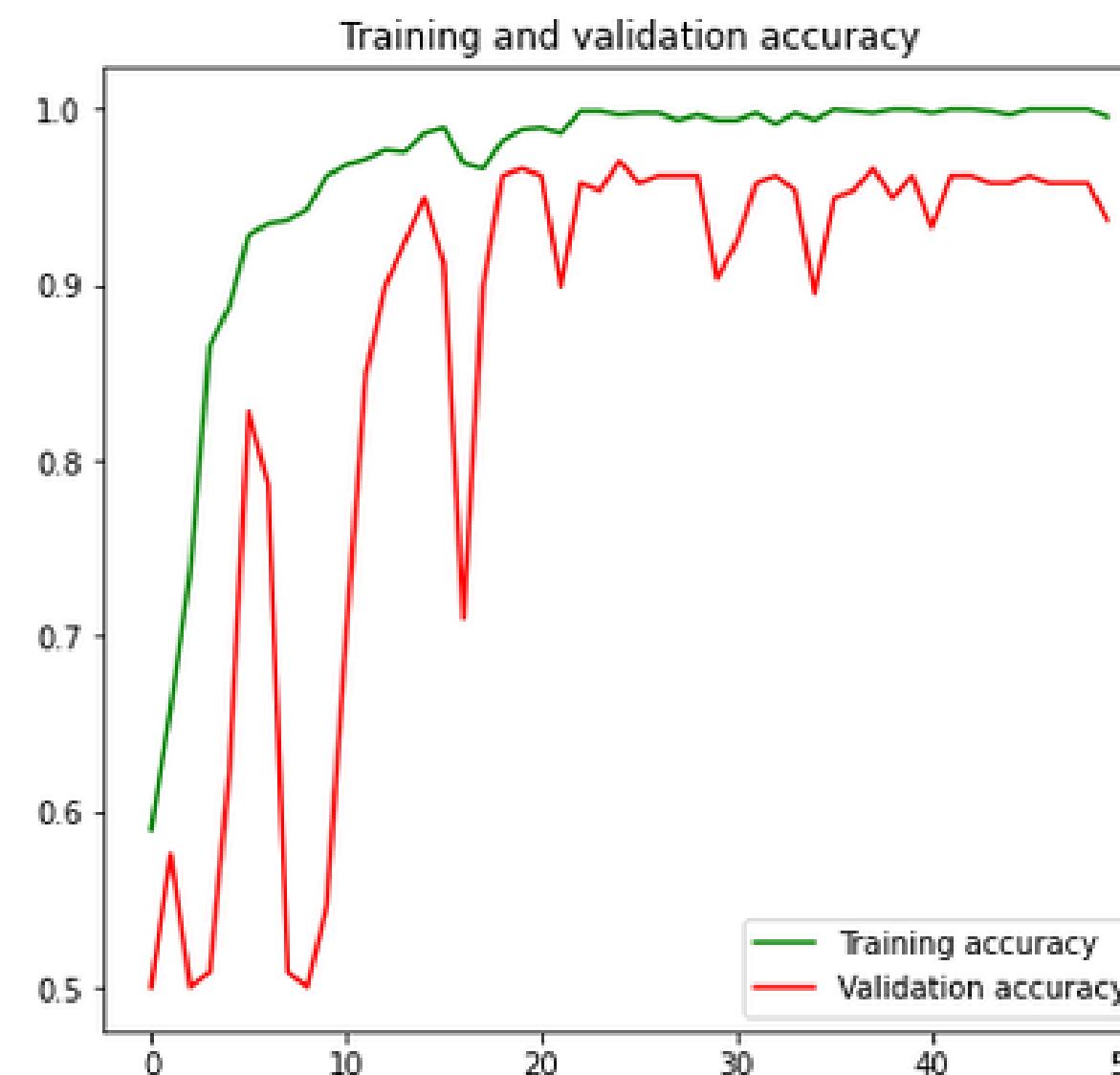
## ResNet50 Model



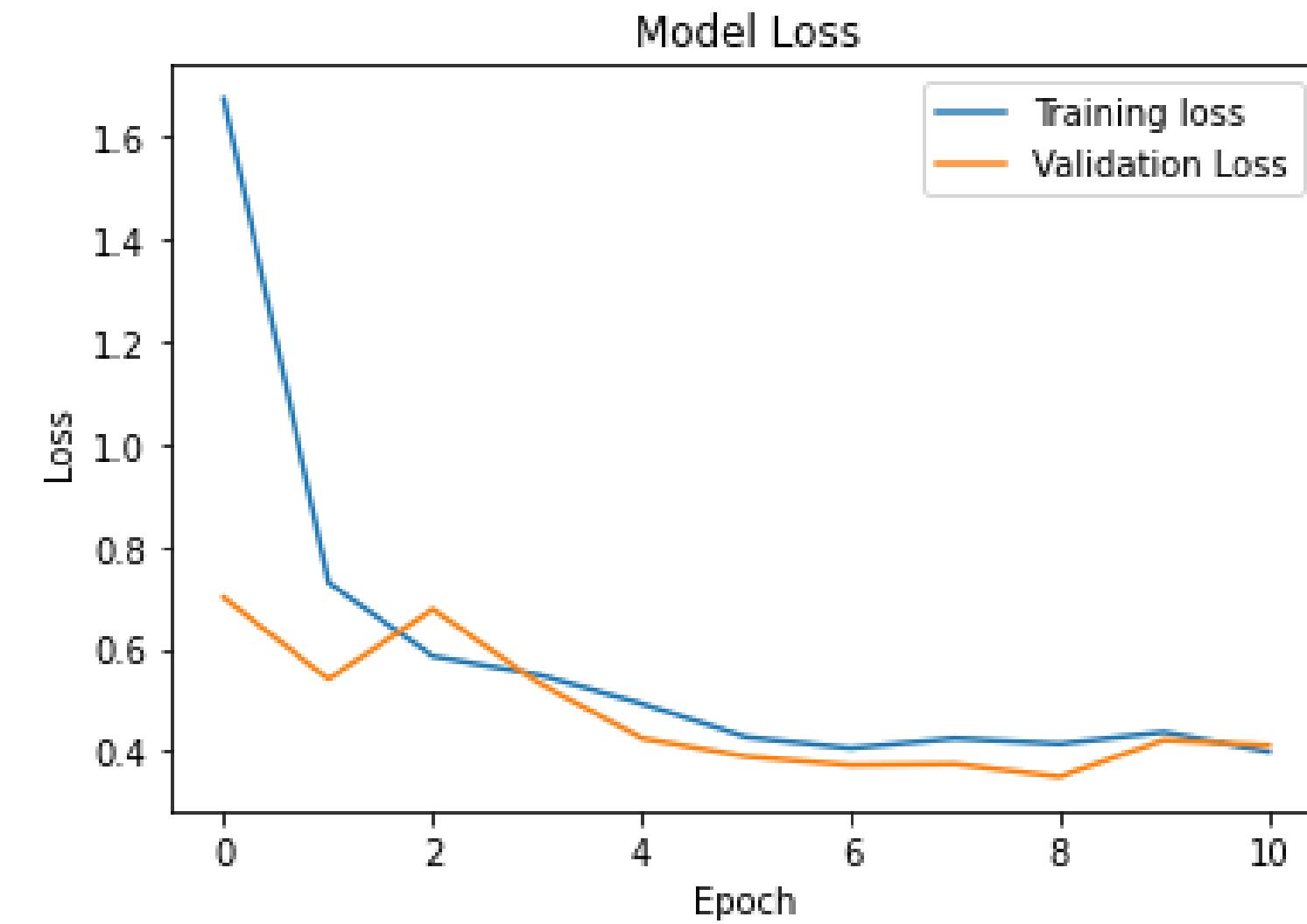
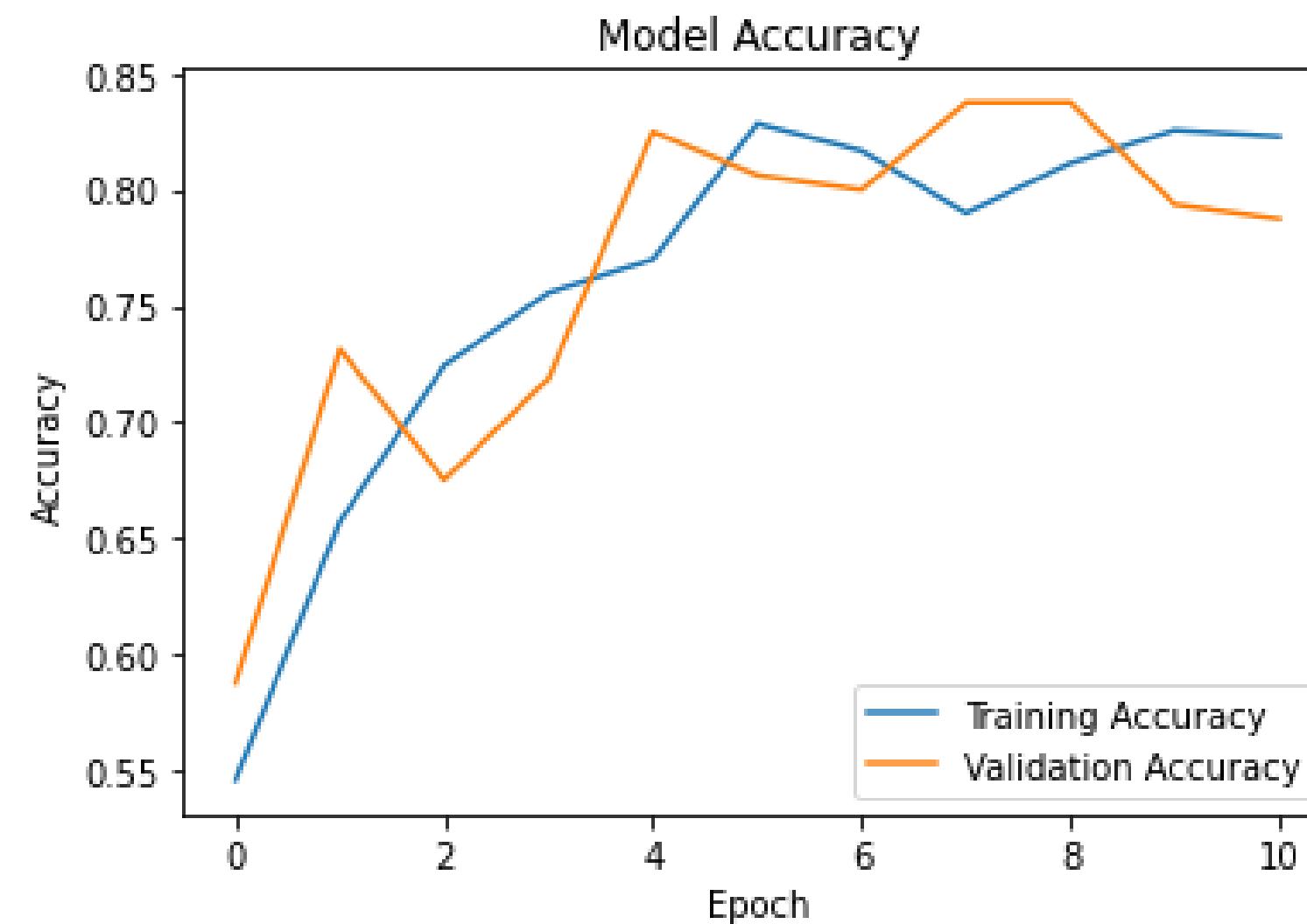
Training Accuracy = 0.99

Validation Accuracy = 0.93

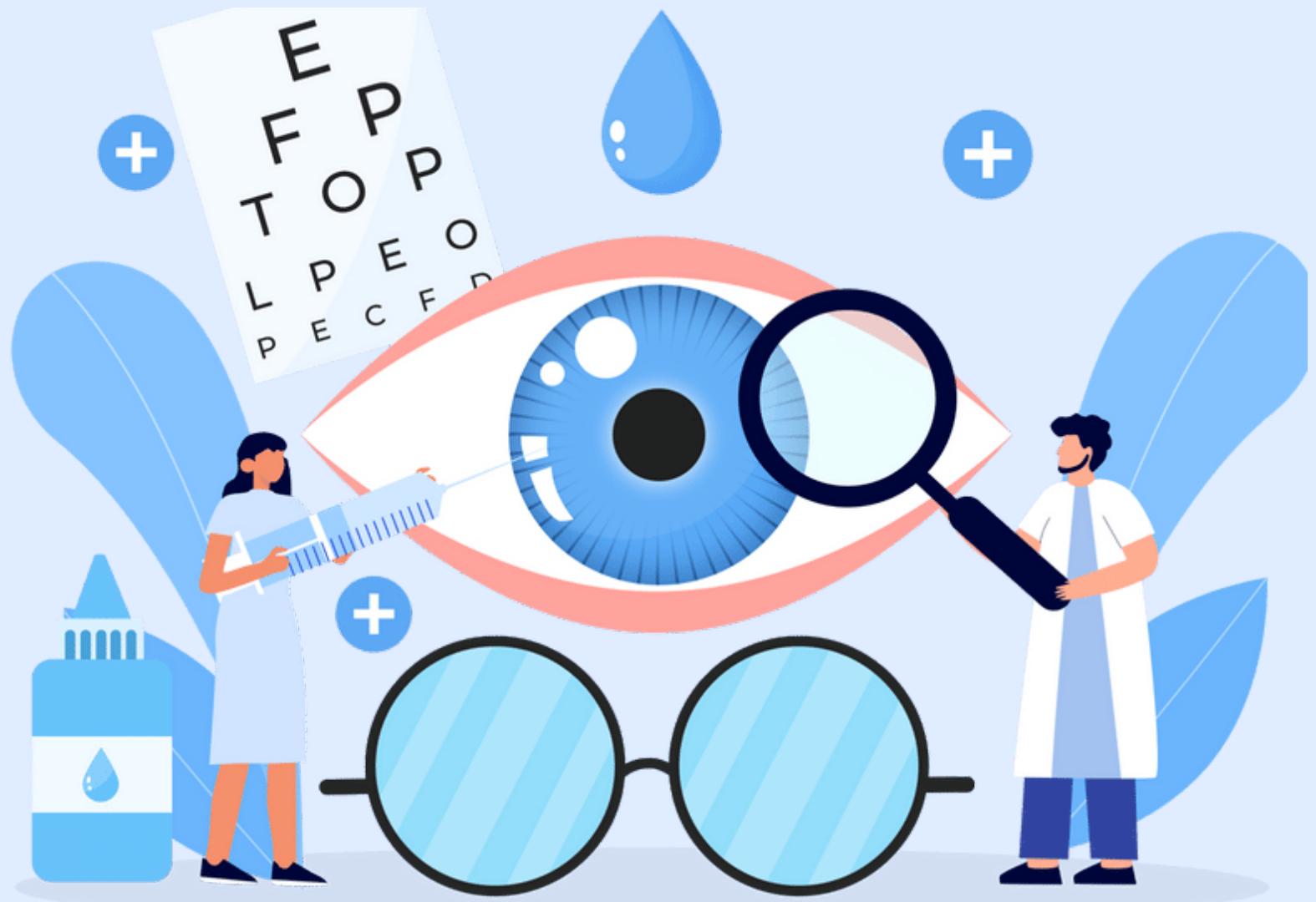
# ResNet50



# VVG16



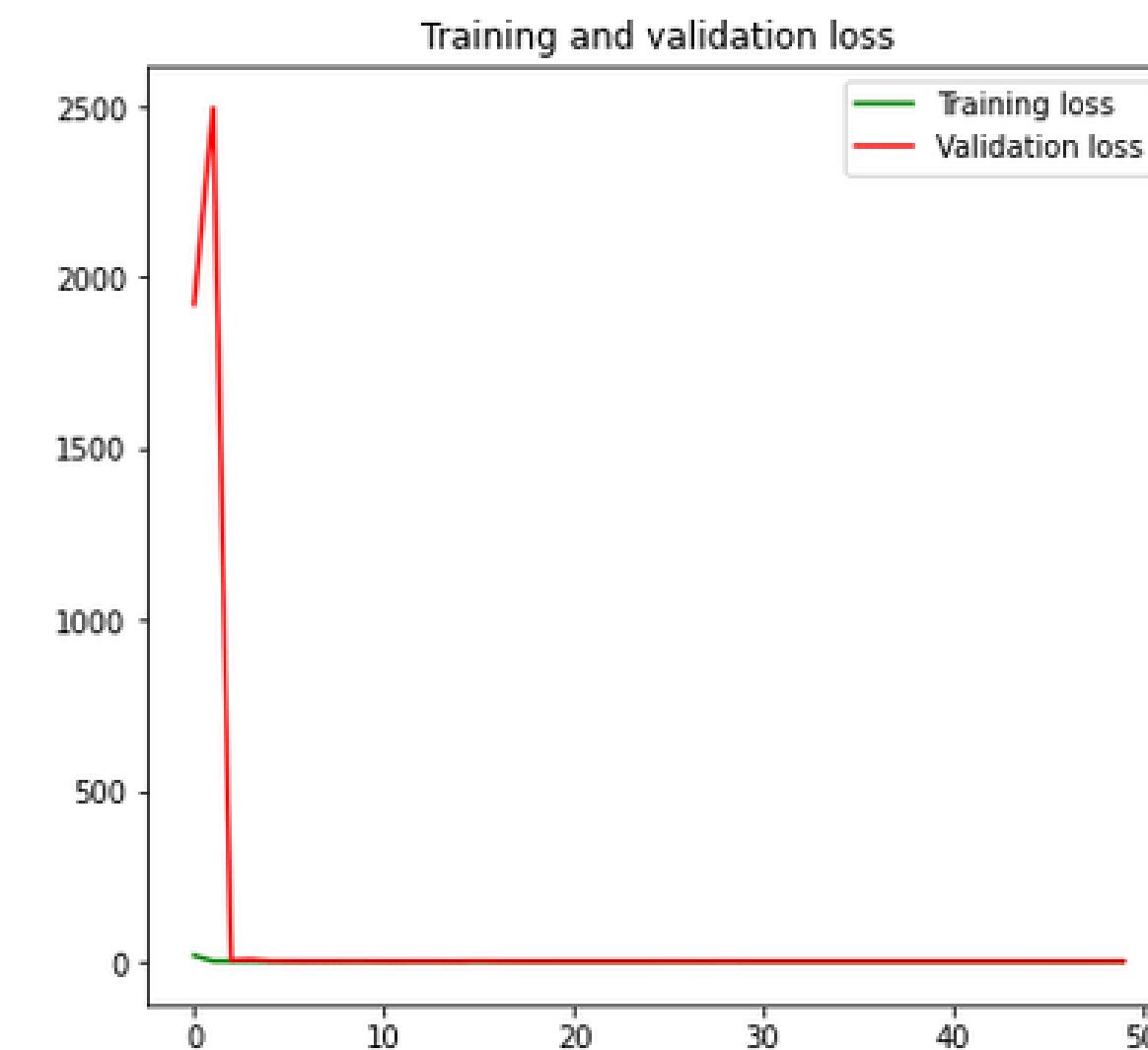
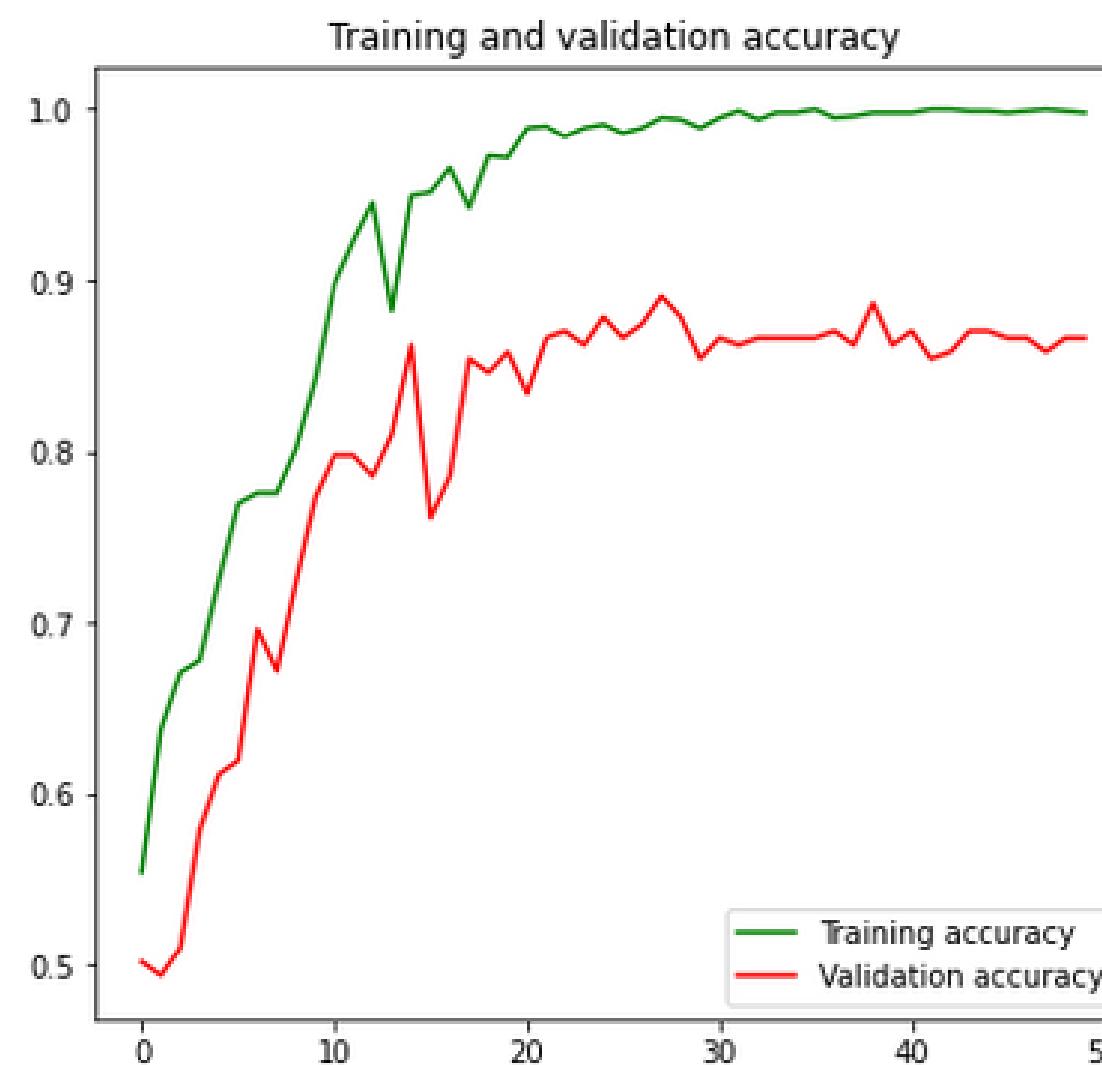
# GLAUCOMA MODELS



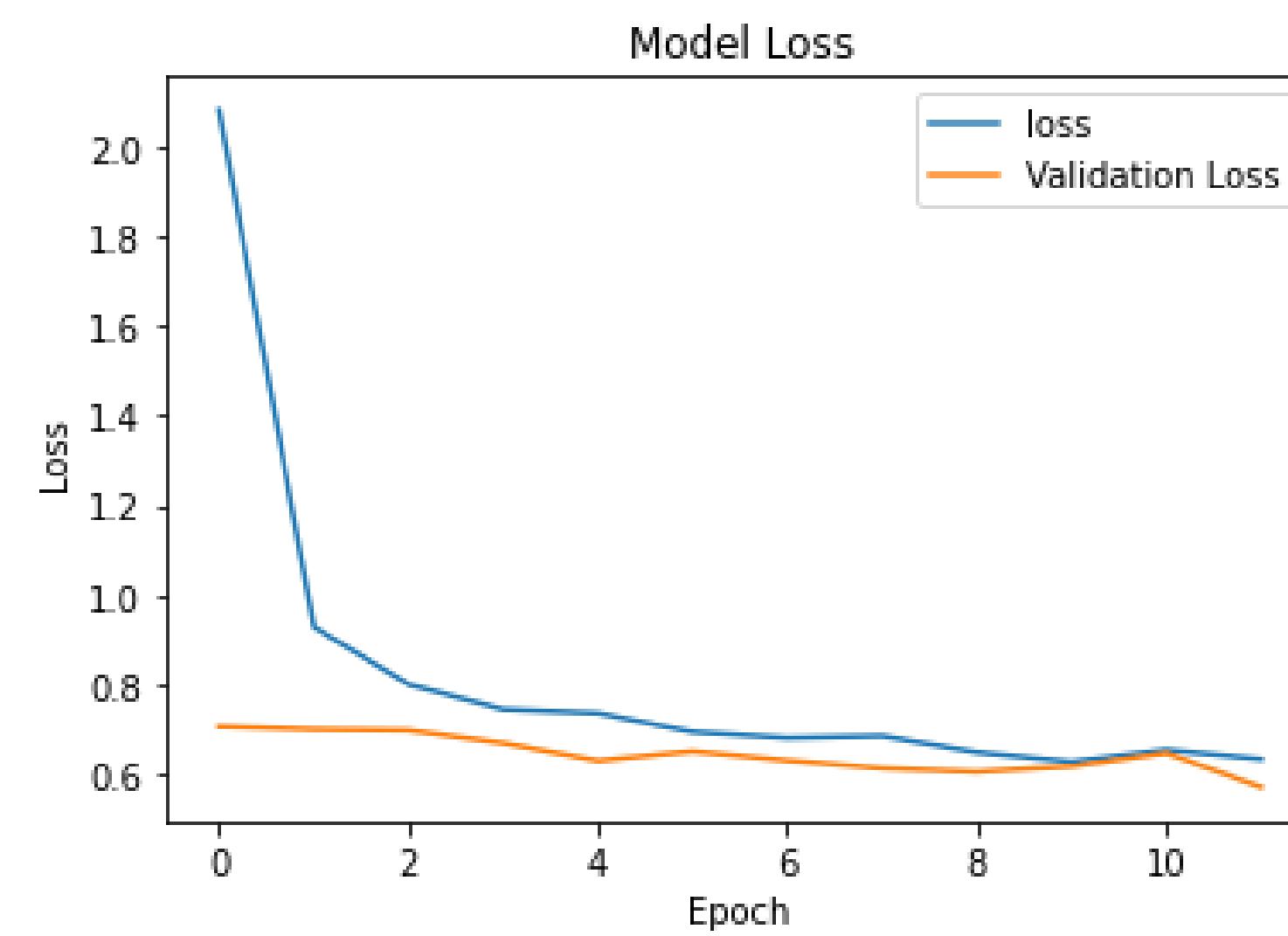
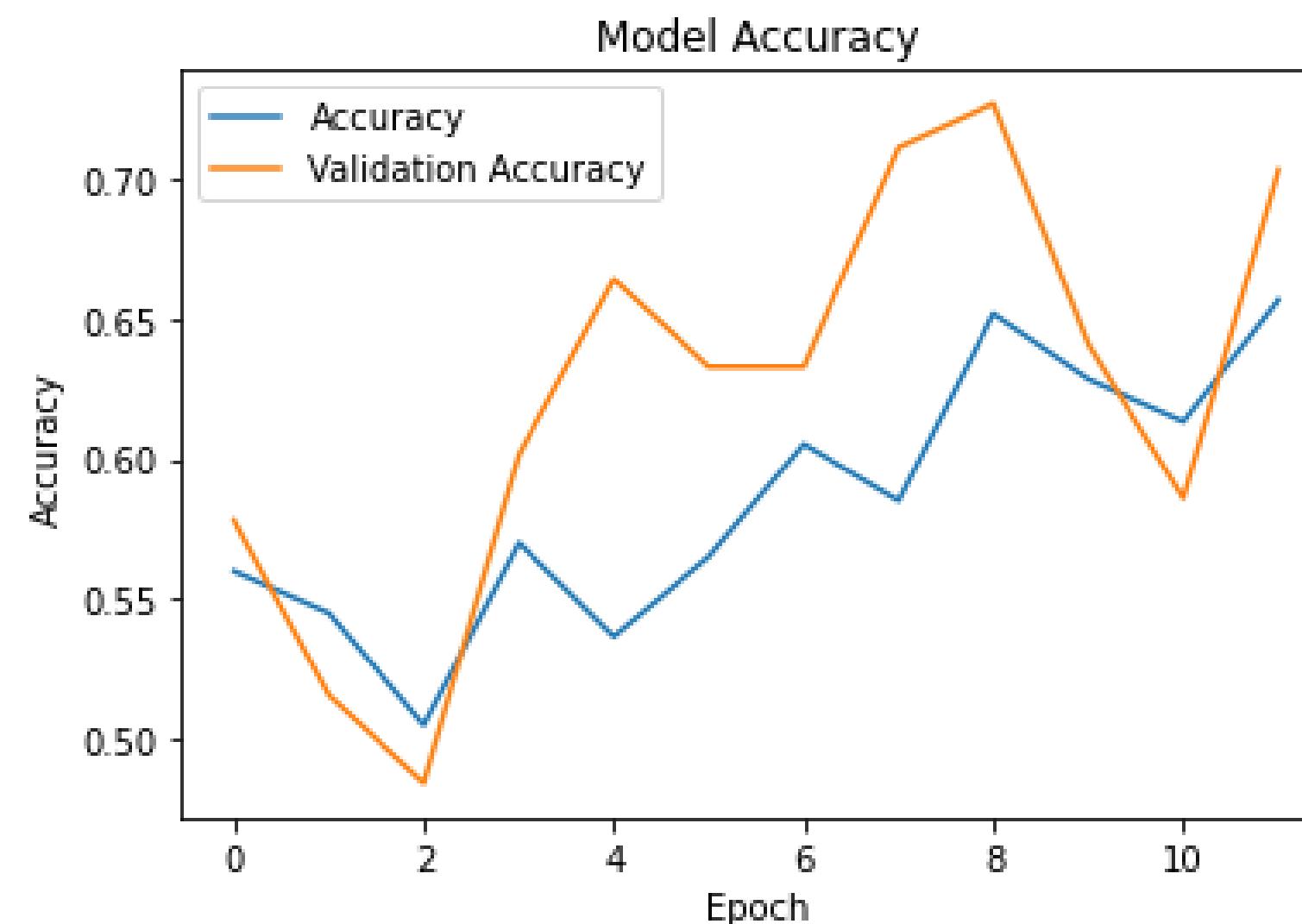
# GLAUCOMA

Models	Training Accuracy	Validation Accuracy
Baseline CNN Model	0.62	0.61
ResNet50	0.99	0.86
VGG16	0.65	0.70

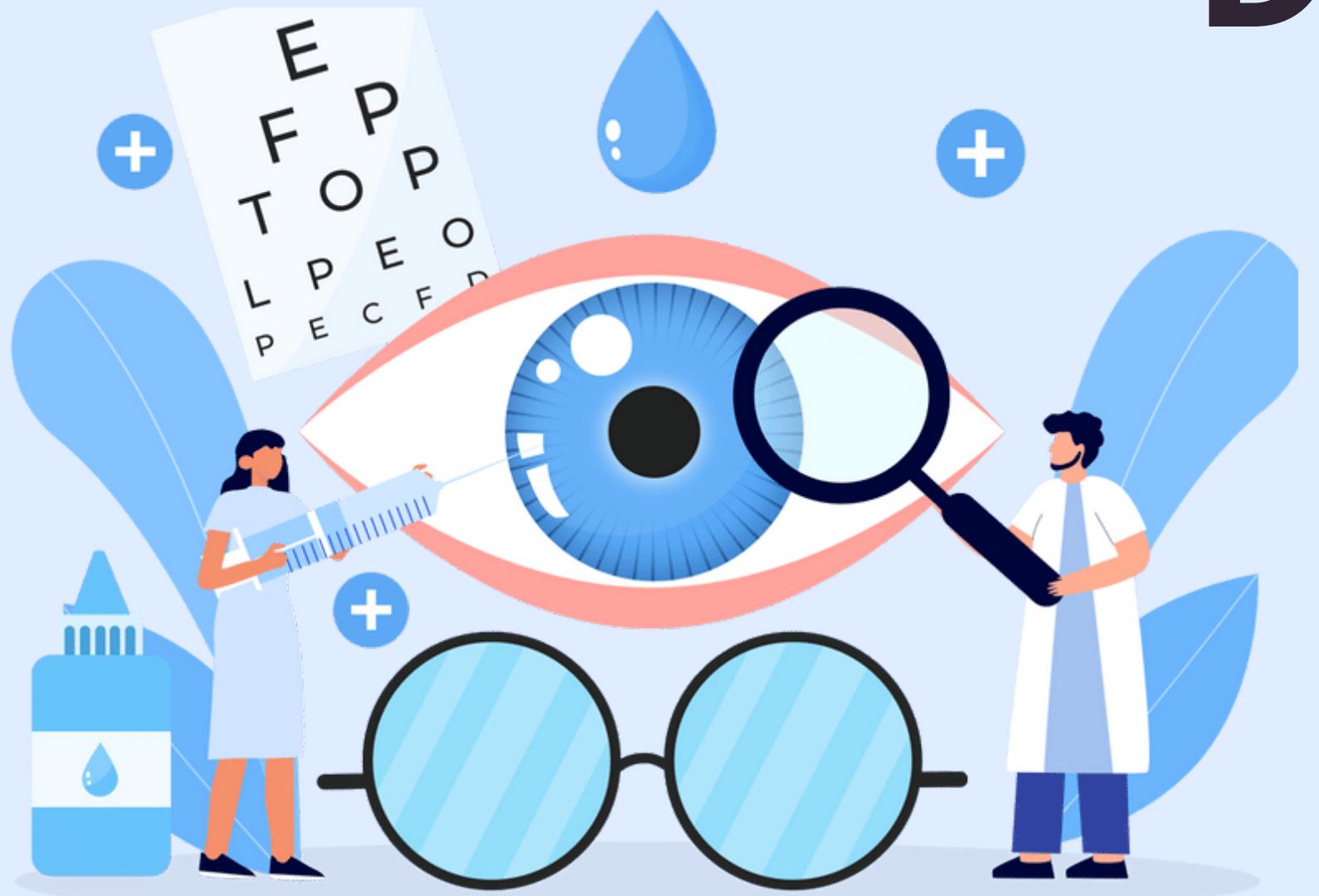
# ResNet50



# VVG16



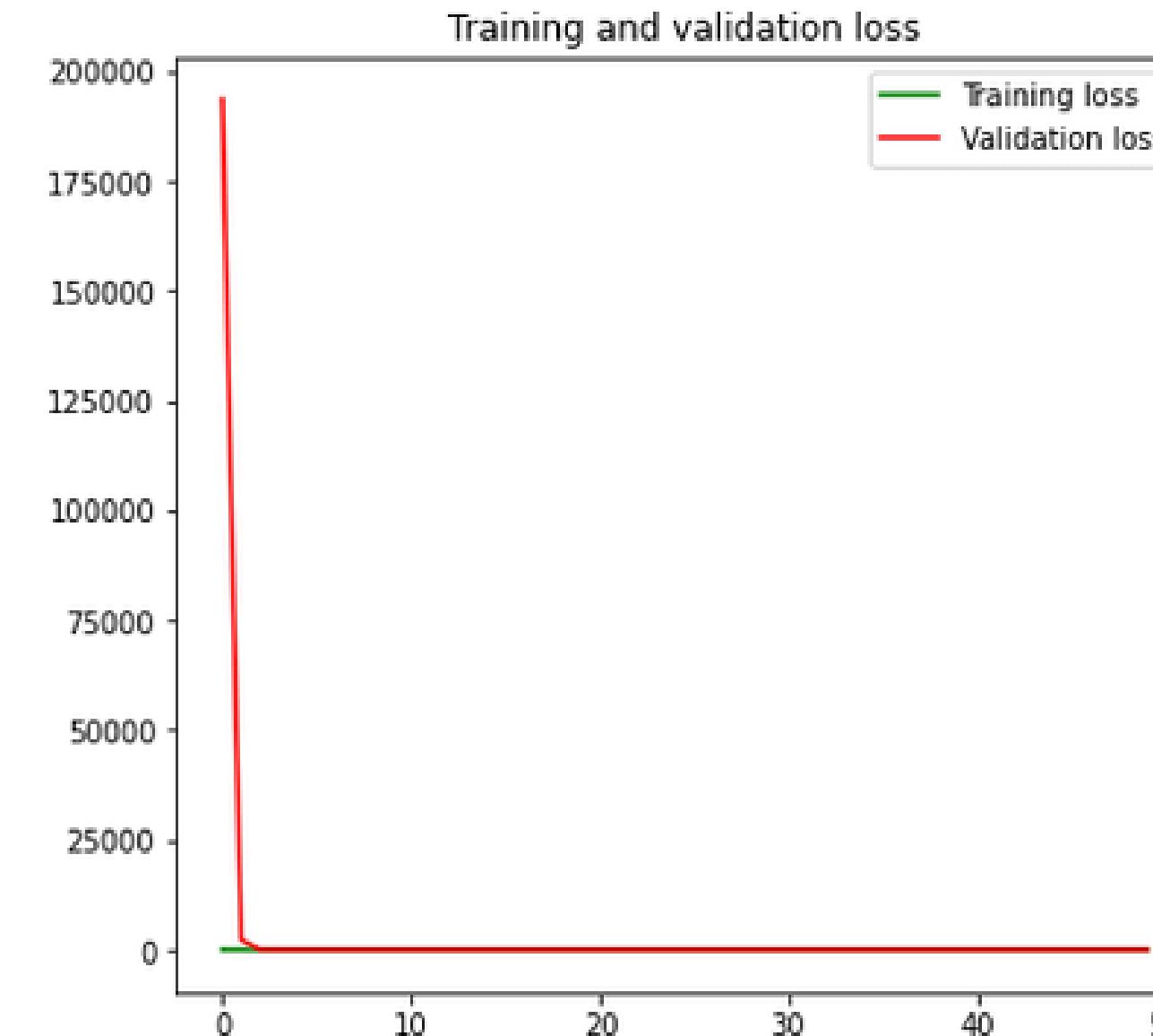
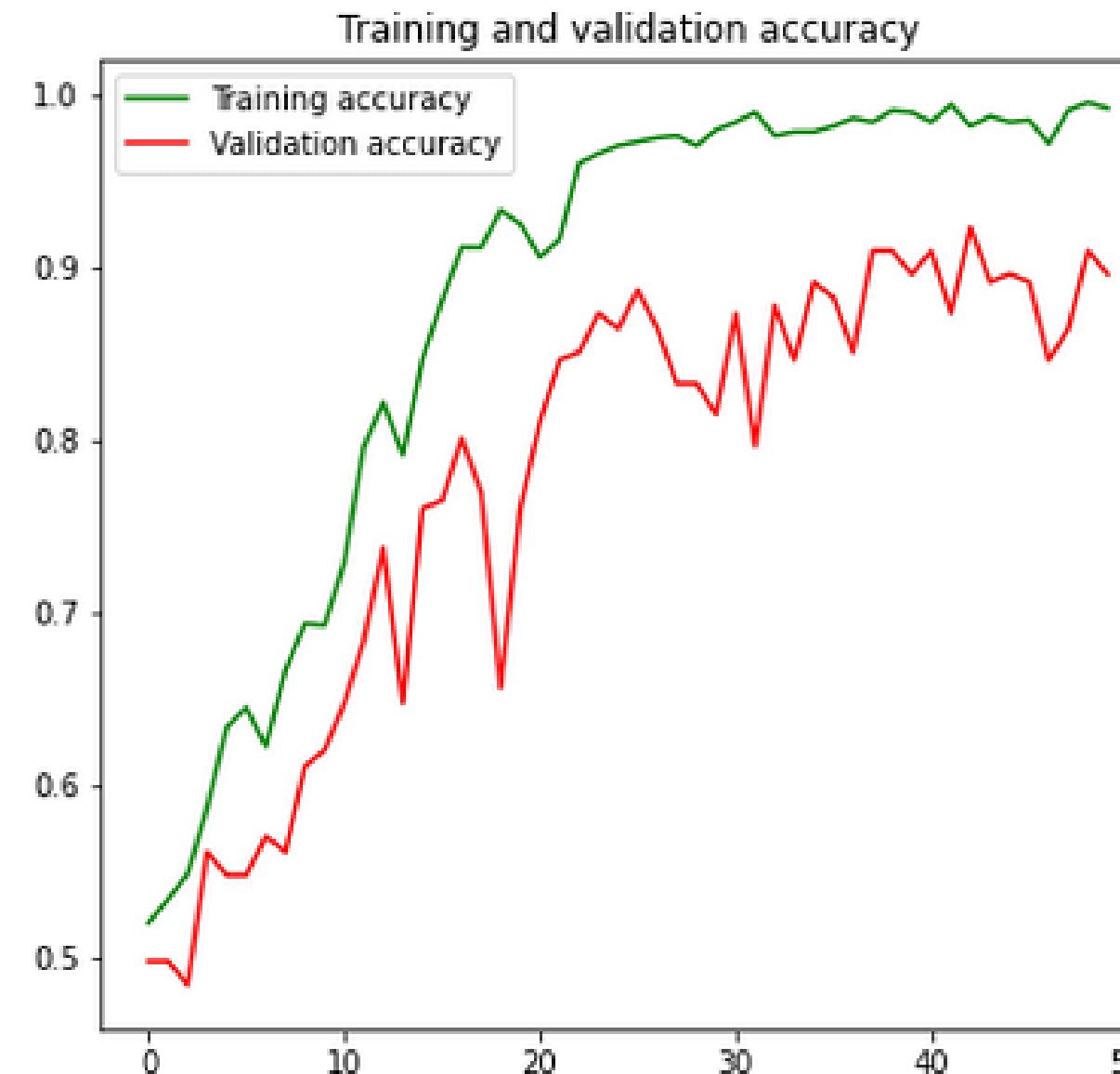
# AGE RELATED MACULAR DEGENERATION MODELS



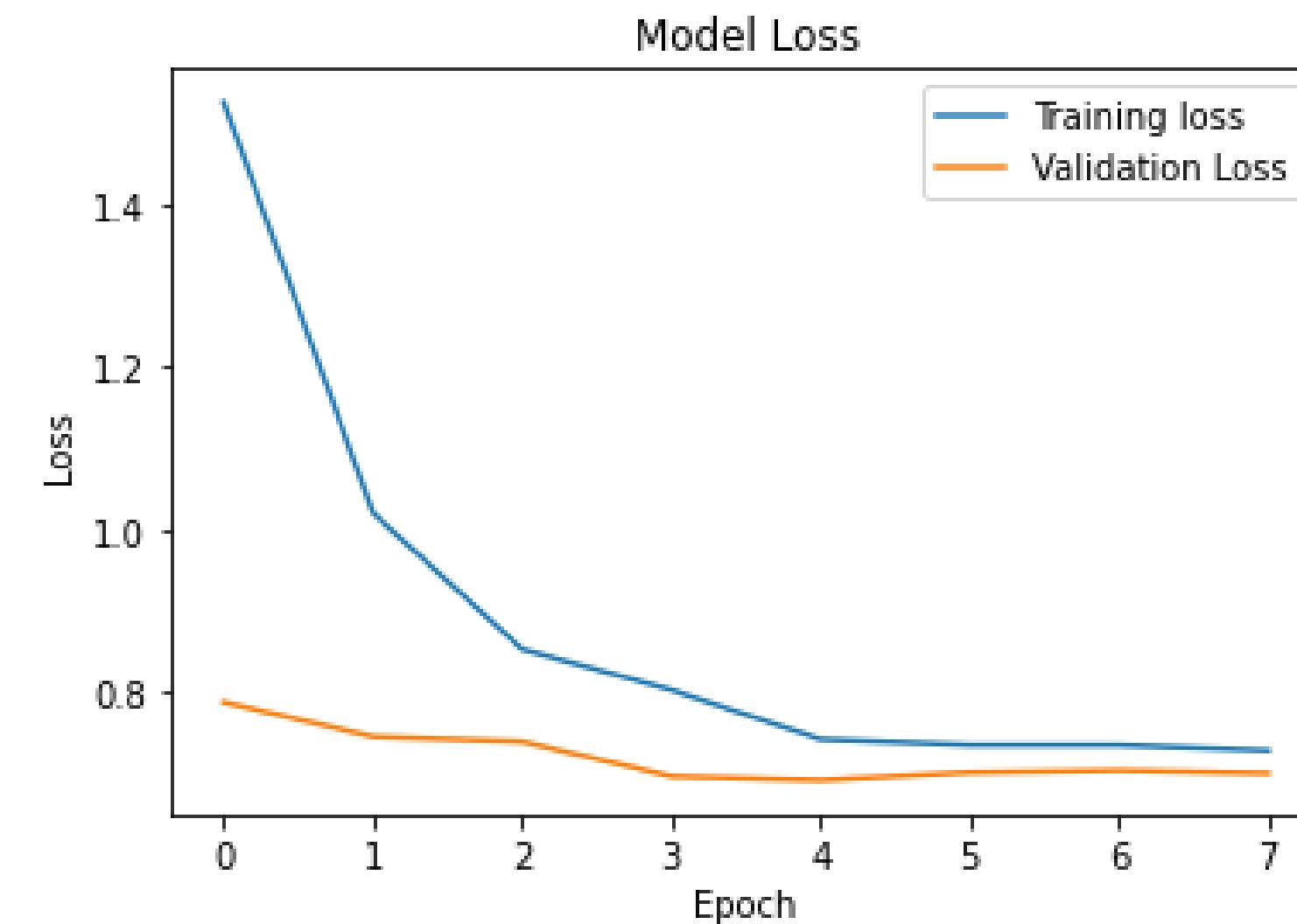
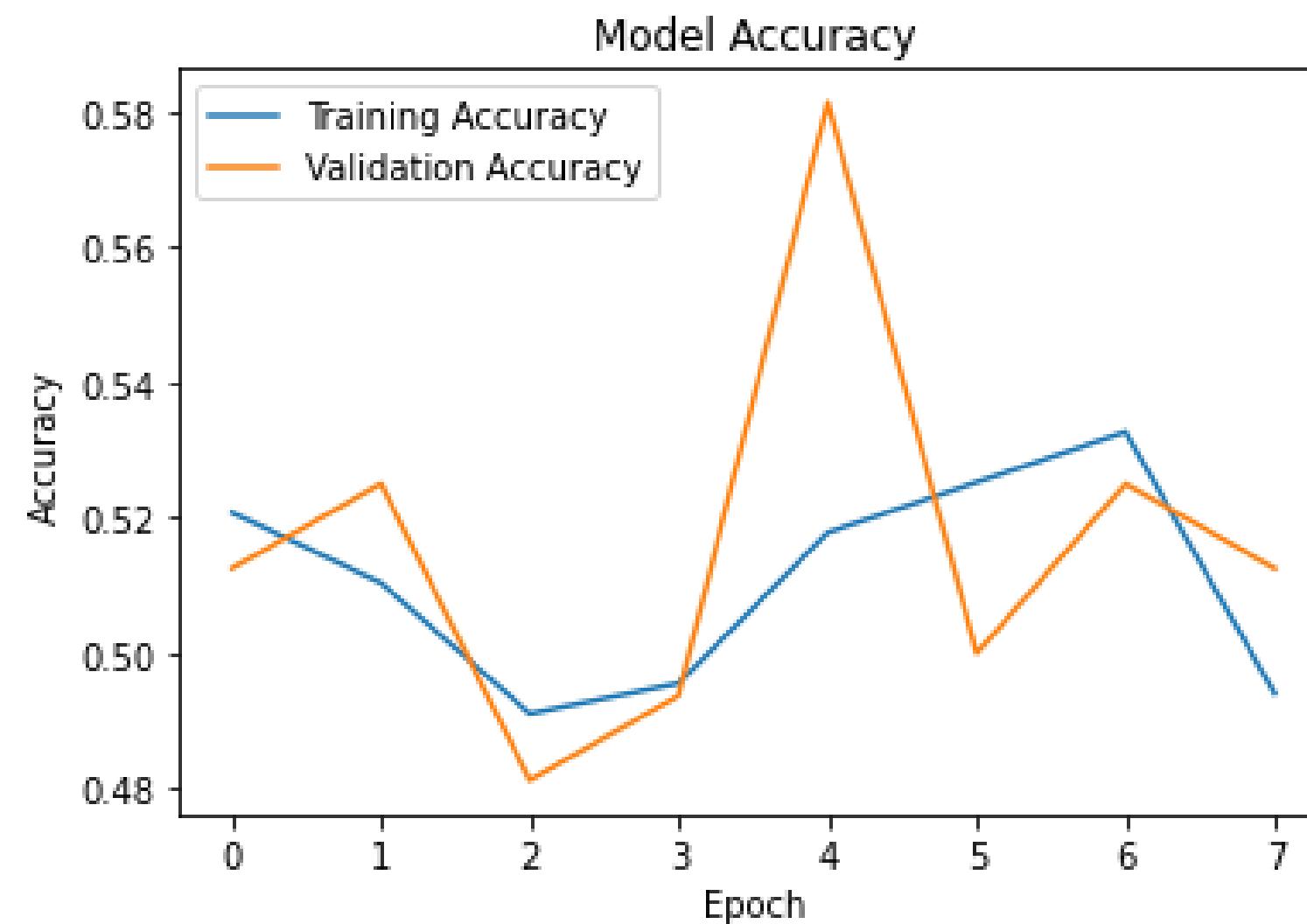
# AGE RELATED MACULAR DEGENERATION

Models	Training Accuracy	Validation Accuracy
Baseline CNN Model	0.51	0.50
ResNet50	0.99	0.89
VGG16	0.54	0.48

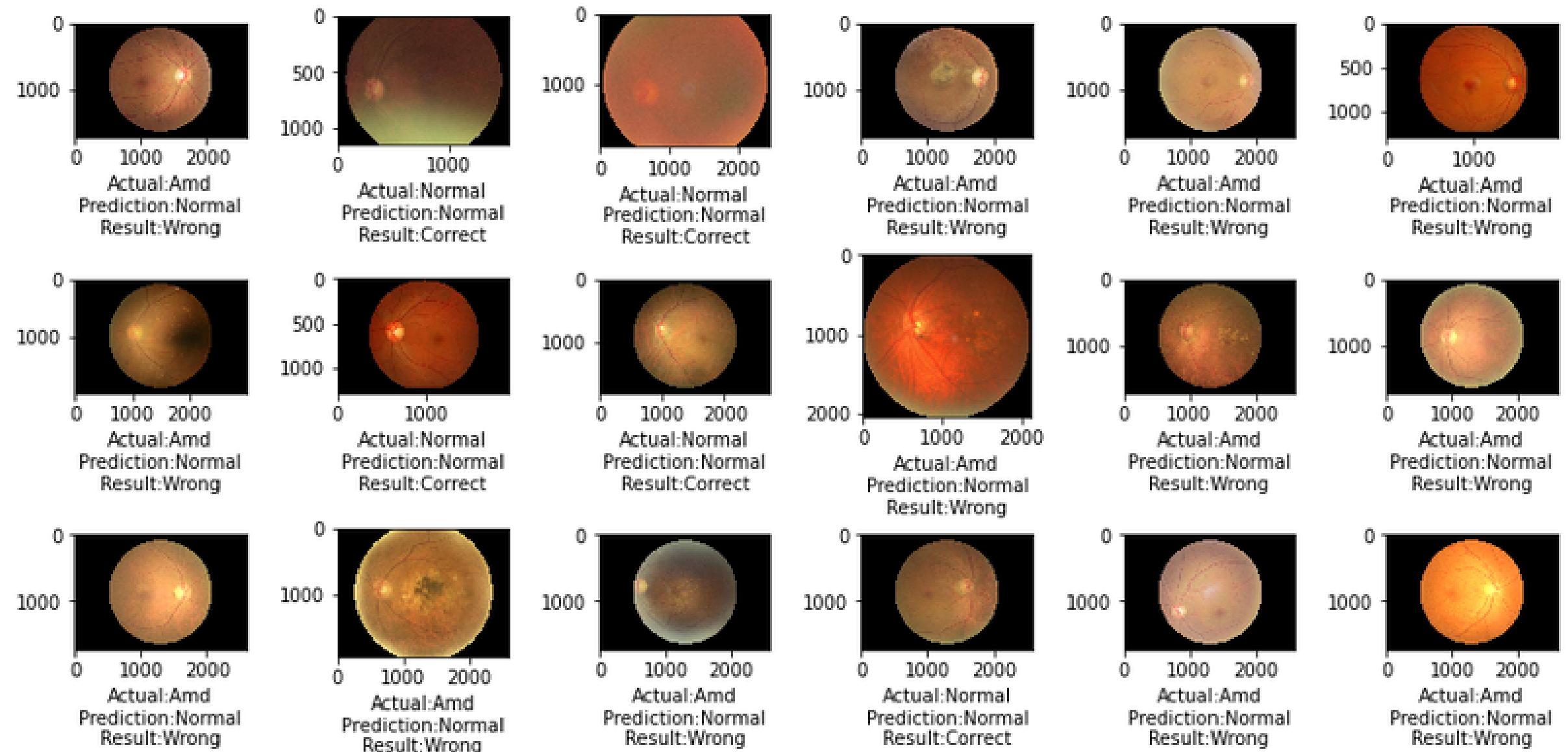
# ResNet50



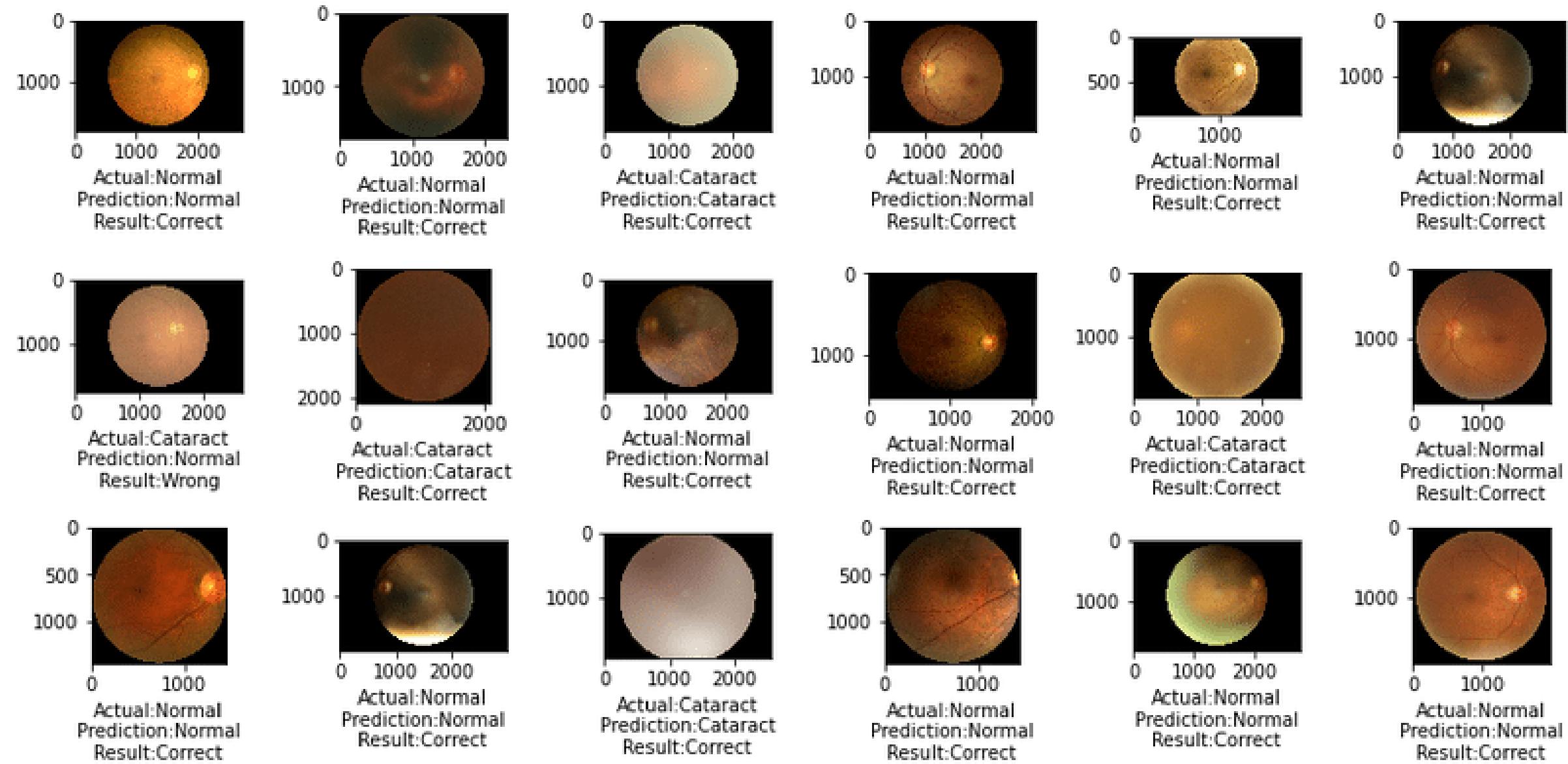
# VVG16



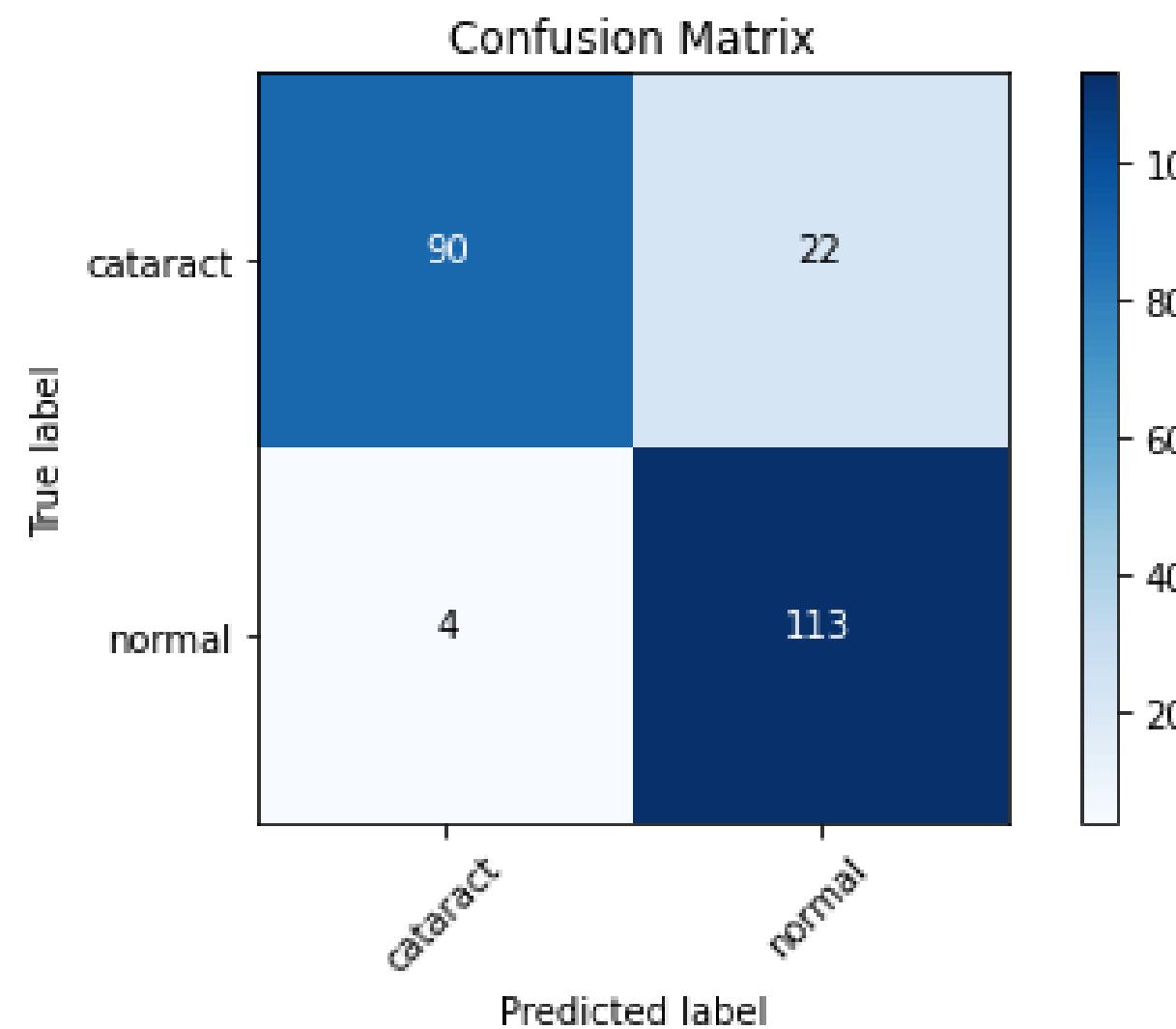
# BAD PREDICT RESULT



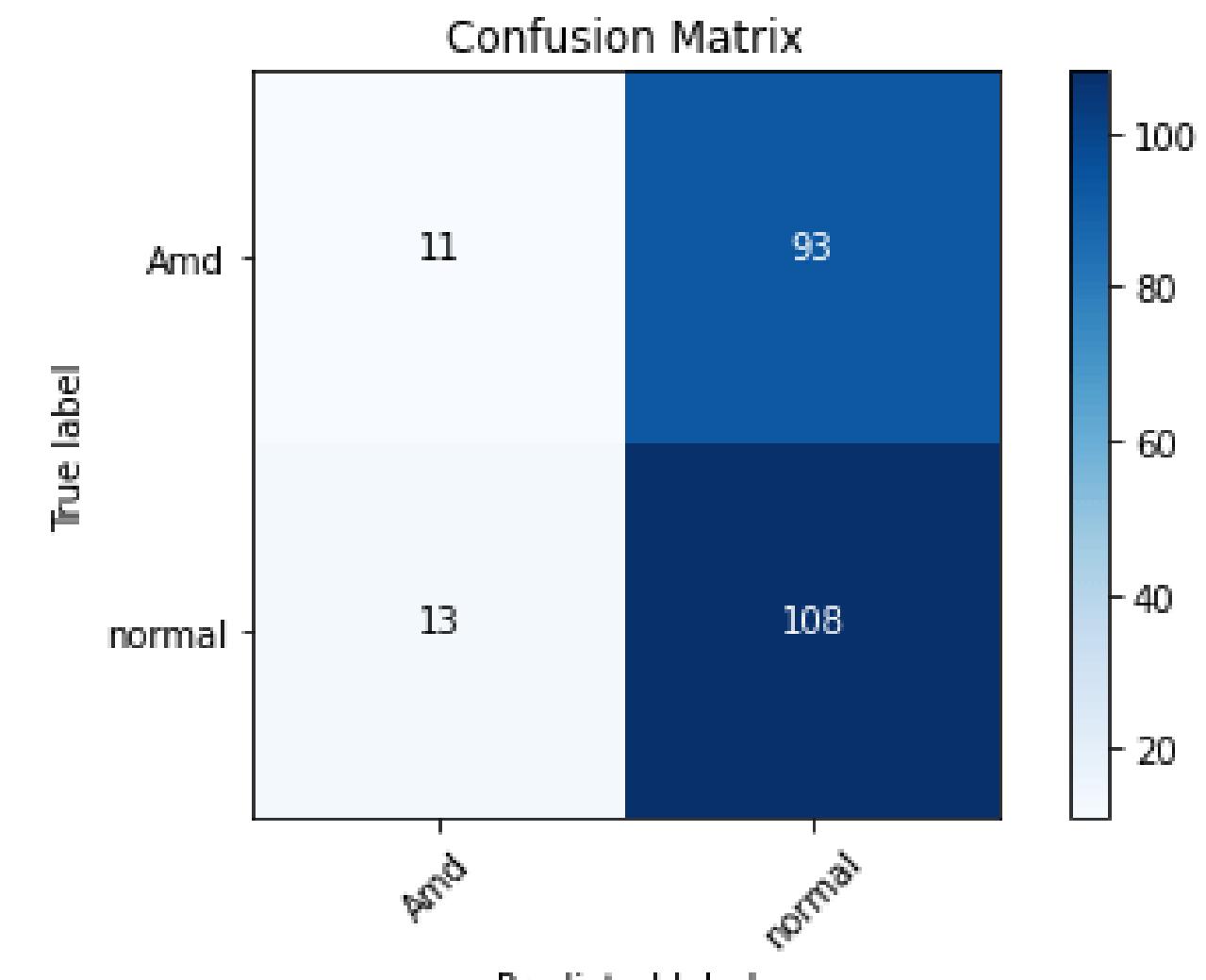
# GOOD PREDICT RESULT



# confusion matrix



Good



Bad

## Counclusion



Finally, as seen the results of ResNet50 are the best model, as reports have proven that the ResNet50 is the best in the medical field.

## FutureWork:

- Increase classification such as (Amblyopia, Strabismus,etc)
- Increase the number of picture





Thank You  
any Qustion?





