

# Melanoma Skin Cancer Classification

Group 1: The Phoenix

DSCI - 6002-01

Midterm Project

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University of New Haven  
West Haven, CT

# Our Team - The Phoenix



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So,

# What is Melanoma?

- Most dangerous type of skin cancer
- Commonly known as "black tumor"
- Grows quickly and has the ability to spread to any organ with highest risk of death

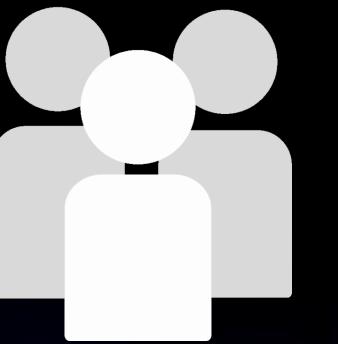
# Causes

- UV exposure
- Age
- Immune suppression

# Symptoms

- Change in appearance of a mole (uneven in color or has a blurred border)
- A small, scaly patch on the skin
- A bump, sore or rash that does not heal

# Statistics



1 person dies  
of melanoma  
every hour.

2nd most common  
form of cancer for  
people aged 15-29

Remains the most commonly  
diagnosed cancer in the United States,  
with over 5 million treated each year.

One in five  
Americans  
develop skin  
cancer in the  
course of a  
lifetime.

# Diagnosis

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- Diagnosed by physical examination
- Highly curable if diagnosed early
- Time consuming due to very less distinction between safe and tumorous lesions.

# Stages of Melanoma

## Stage 0

Melanoma confined to epidermal region of skin

## Stage II

Localized disease, thicker than Stage I

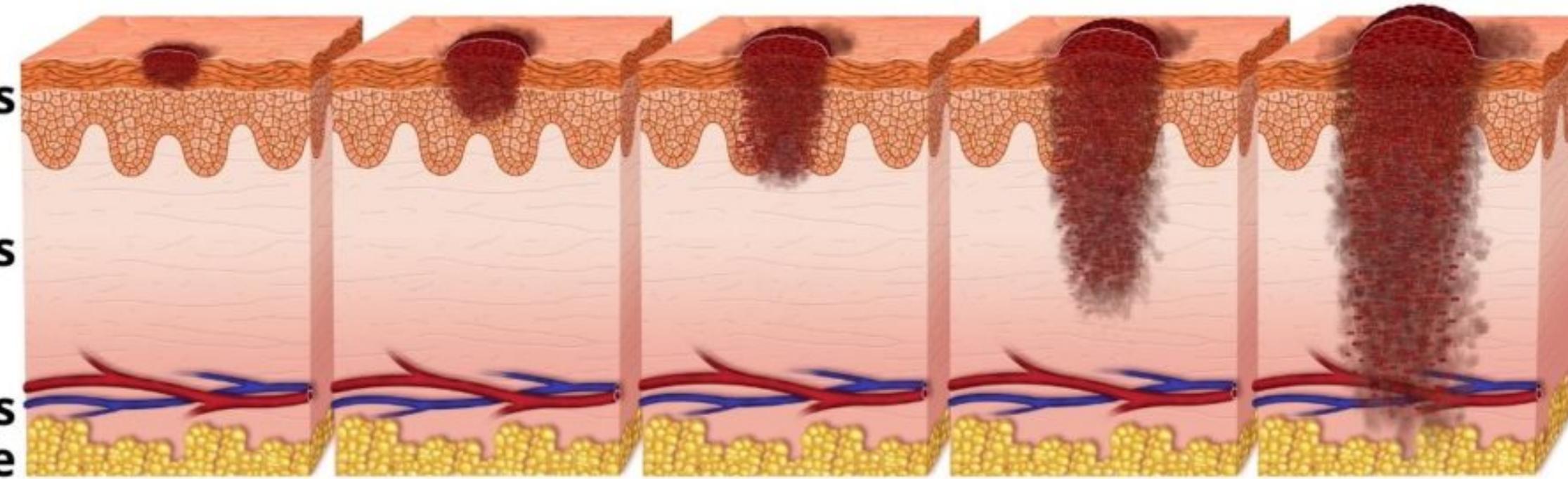
## Stage IV

Spread to other organs

Epidermas

Dermis

Subcutaneous  
Tissue



## Stage I

Localized disease,  
only in skin and very thin

## Stage III

Spread to lymph nodes

# Our Plan

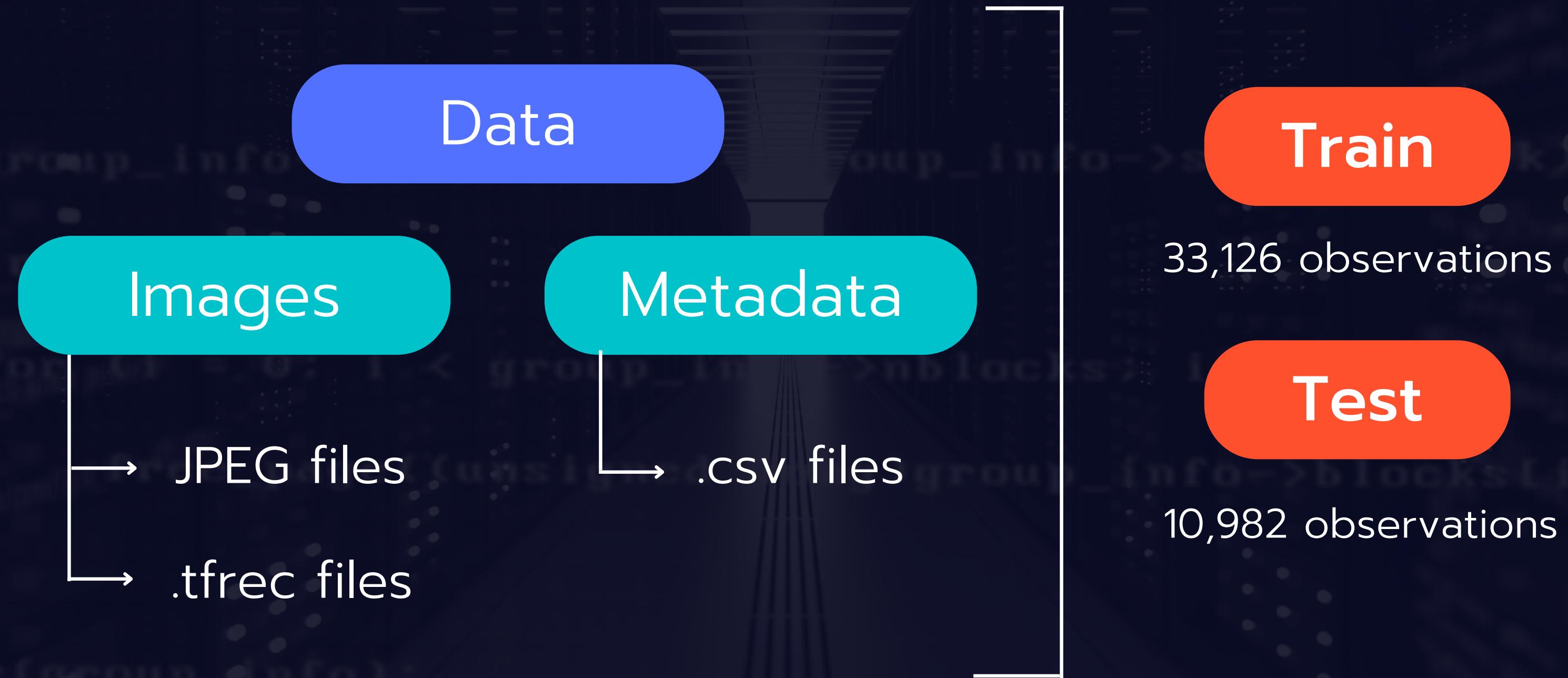
Build a melanoma skin  
cancer classification  
model

**Data Collection and  
Preprocessing**

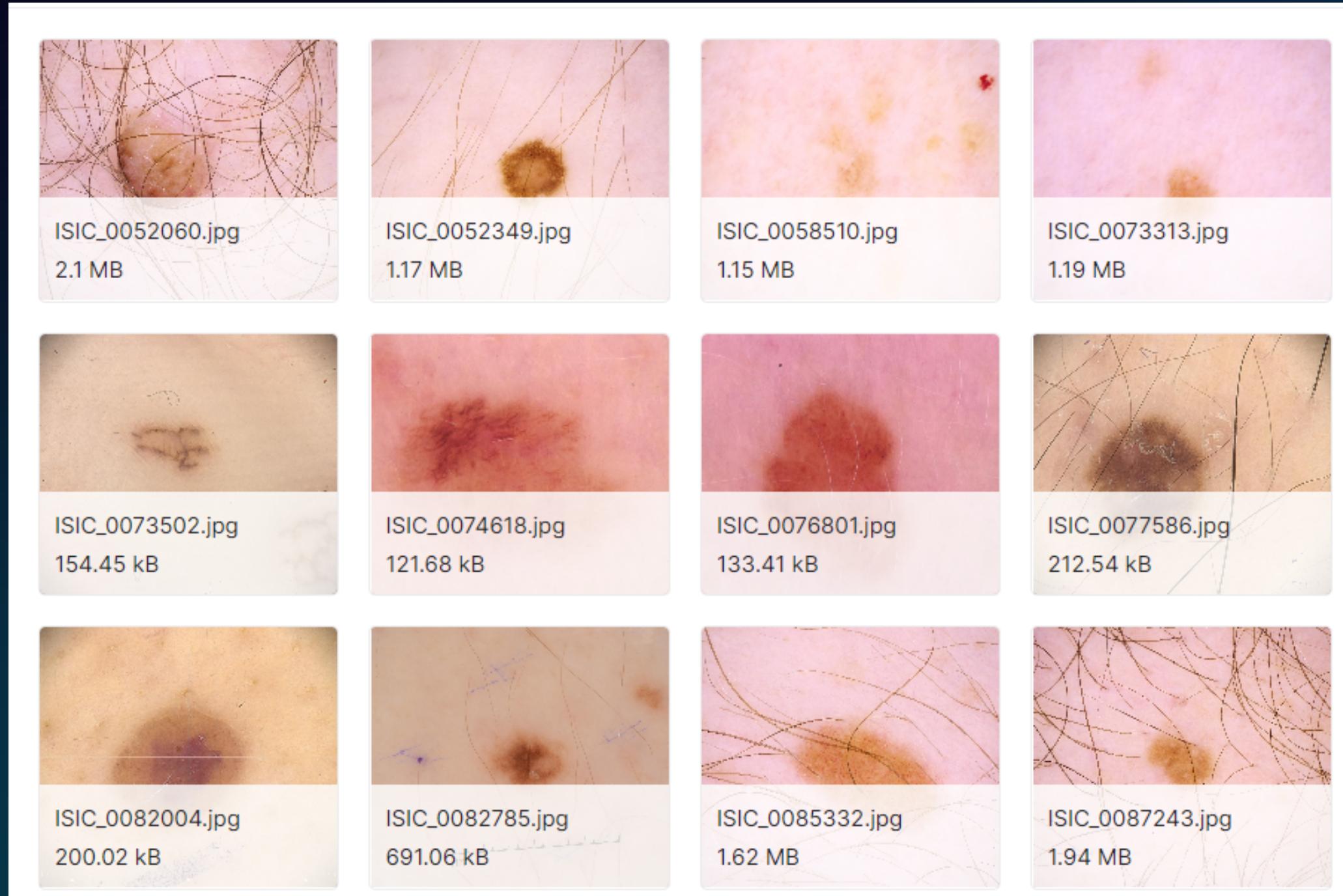
**Data Modeling**

**Model Evaluation and  
Deployment**

# Data Collection and Preprocessing



# Image Dataset



- **33,126 dermoscopic training images**
- **Images over 2,000 patients.**

# Image Metadata

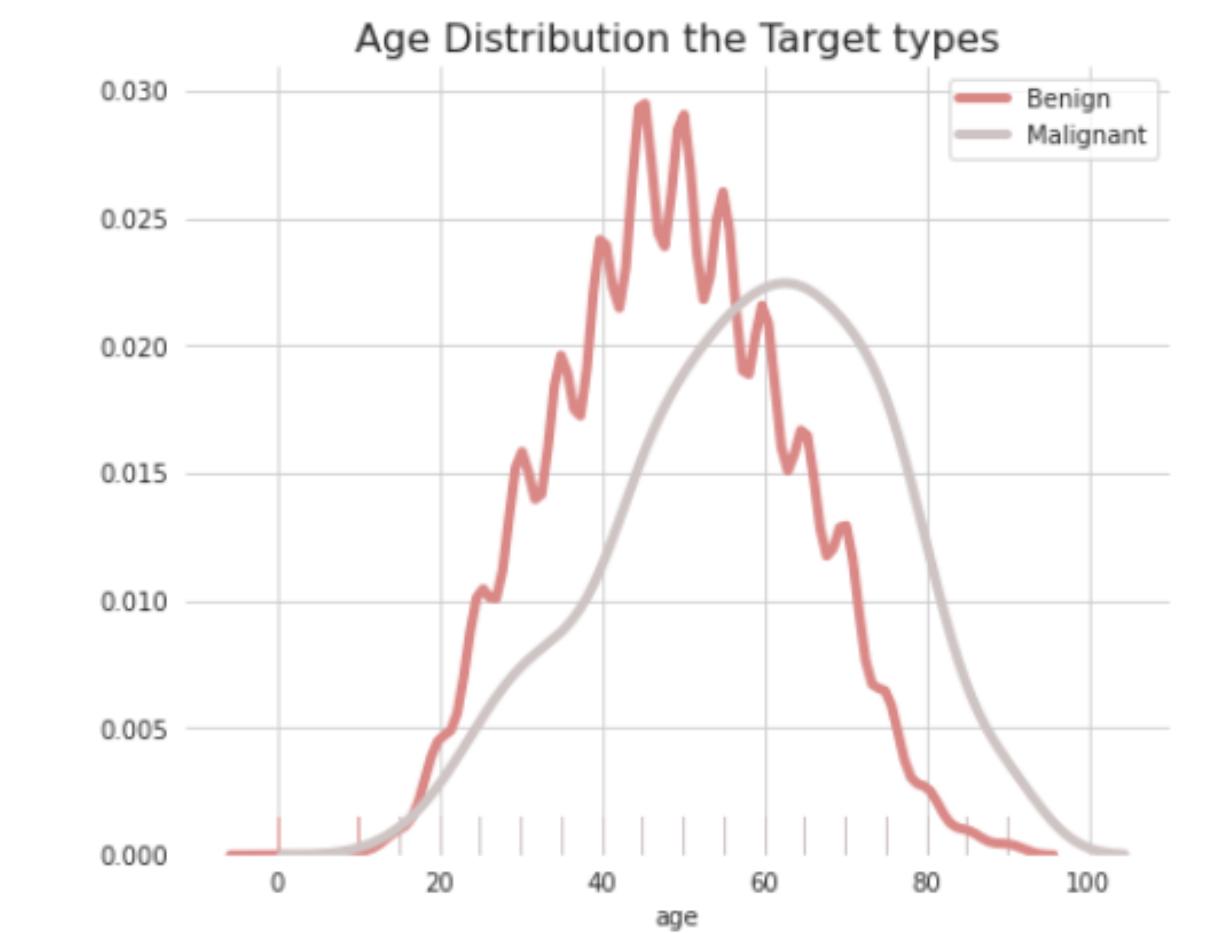
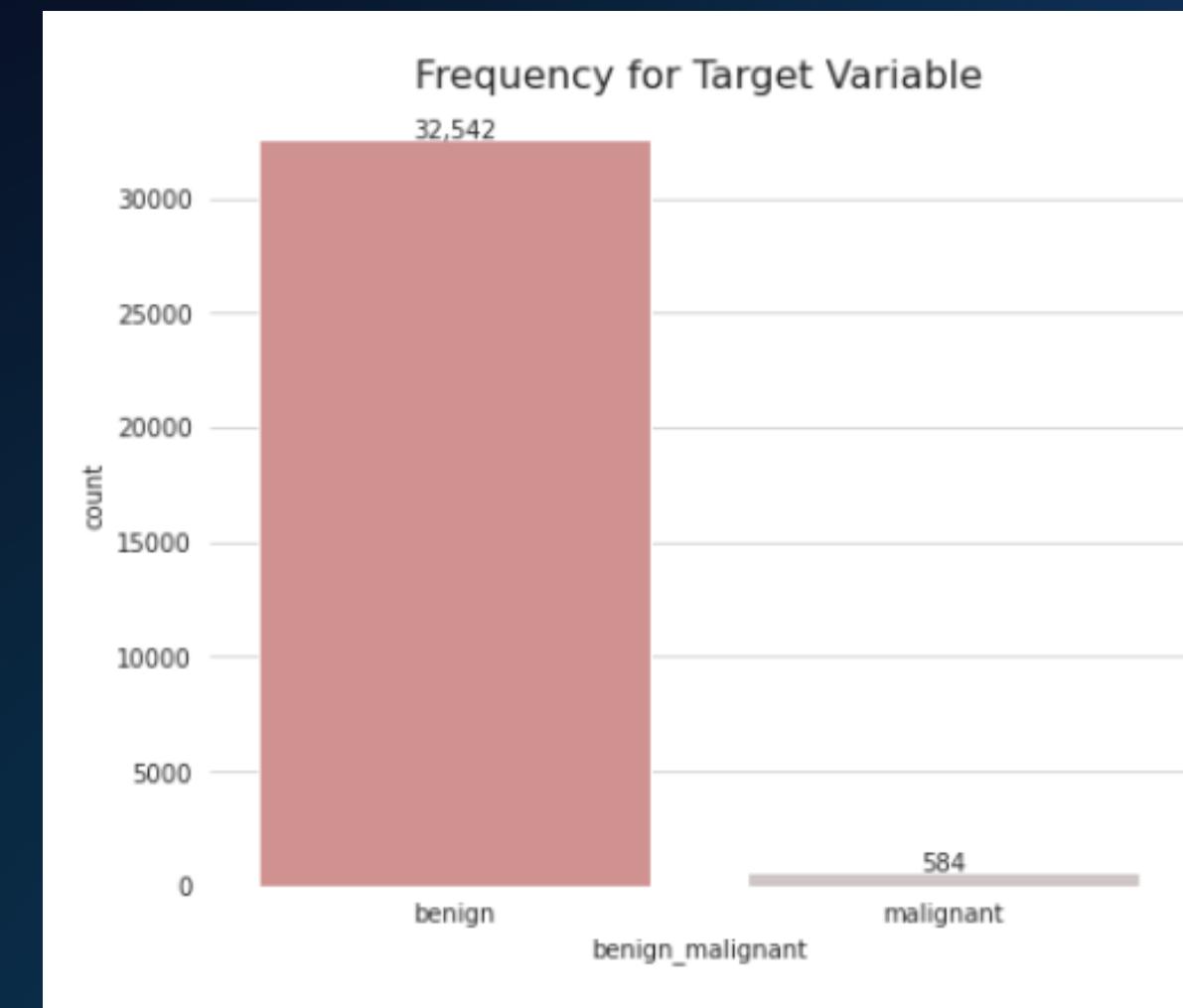
image_name	patient_id	sex	age_approx	anatom_site_general_challenge	diagnosis	benign_malignant	target
ISIC_2637011	IP_727996	male	45	head/neck	unknown	benign	0
ISIC_0015719	IP_307518	female	45	upper extremity	unknown	benign	0
ISIC_0052212	IP_284207	female	50	lower extremity	nevus	benign	0
ISIC_0068279	IP_689042	female	45	head/neck	unknown	benign	0
ISIC_0074268	IP_872331	female	55	upper extremity	unknown	benign	0
ISIC_0074311	IP_295048	female	40	lower extremity	unknown	benign	0
ISIC_0149568	IP_096237	female	55	upper extremity	melanoma	malignant	1
ISIC_0075663	IP_601720	female	35	torso	unknown	benign	0
ISIC_0075914	IP_762288	male	30	torso	unknown	benign	0
ISIC_0076262	IP_507553	female	50	lower extremity	unknown	benign	0
ISIC_0076545	IP_980260	male	55	upper extremity	unknown	benign	0

- Diagnosis: {Unknown, nevus, melanoma}
- Target: {0: Not Melanoma, 1: Melanoma}
- Benign\_malignant: {Benign: Not harmful, malignant: Harmful}

# Preprocessing the data

01

Explore and  
Analyze the  
data



# Preprocessing the data

02

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Remove/fill  
null values

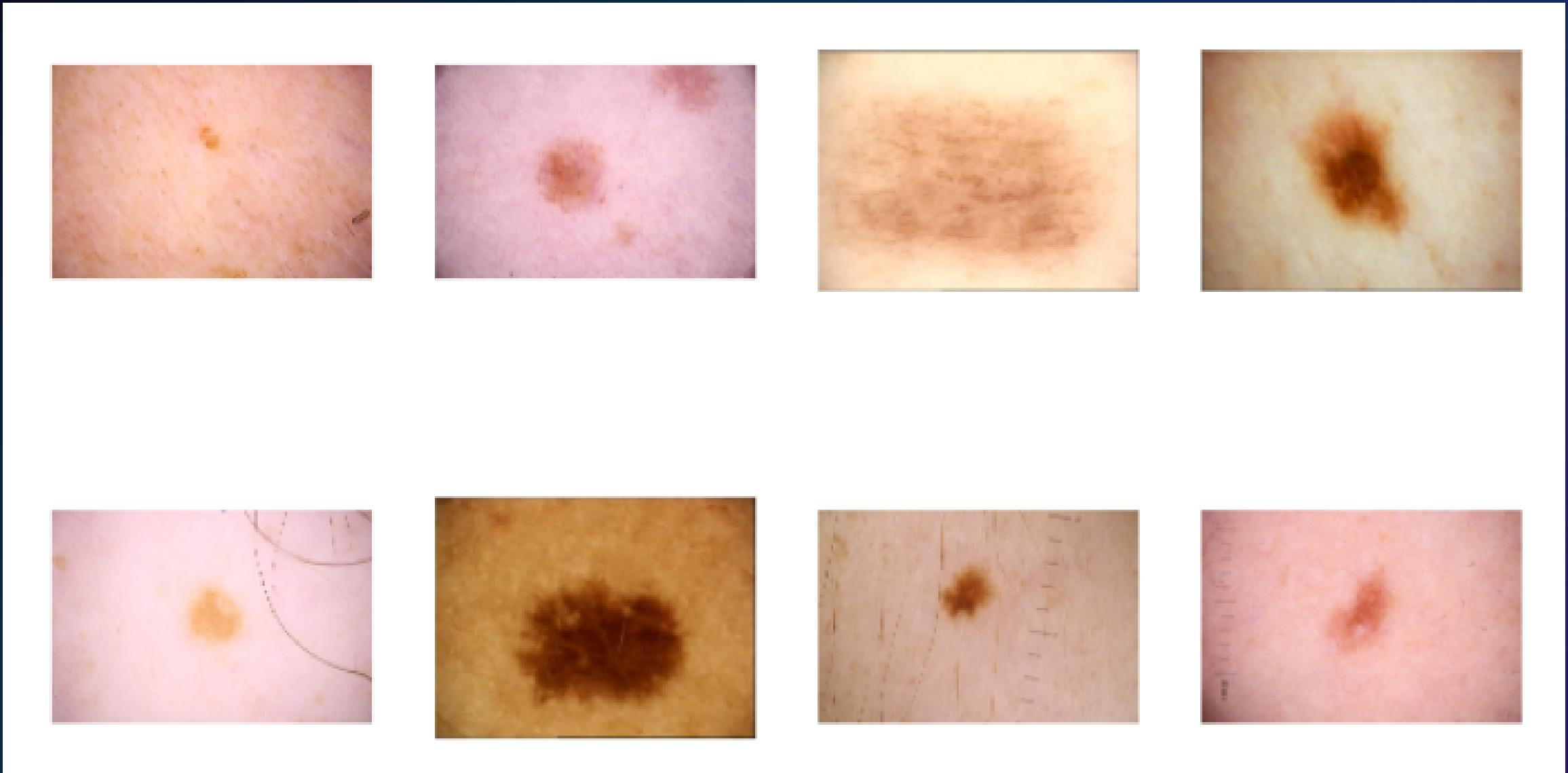
Column1	Column2	Column3
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Value 1.2	Value 2.2	Value 3.2
Value 1.3	Value 2.3	Value 3.3

# Preprocessing the data

03

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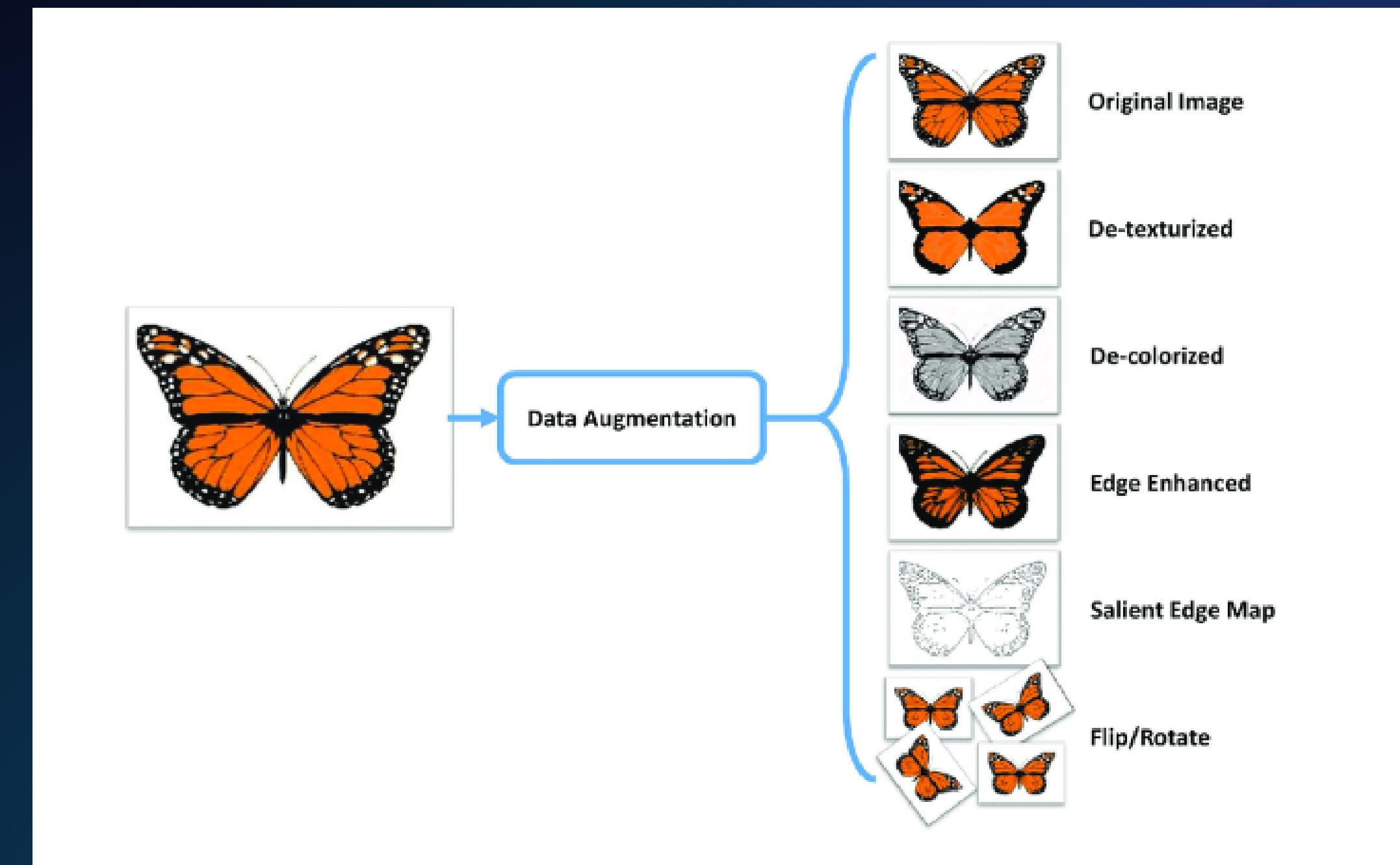
Image Data  
Augmentation



# Preprocessing the data

03

Image Data  
Augmentation



# Data Modeling

Building and Training a Deep Learning model

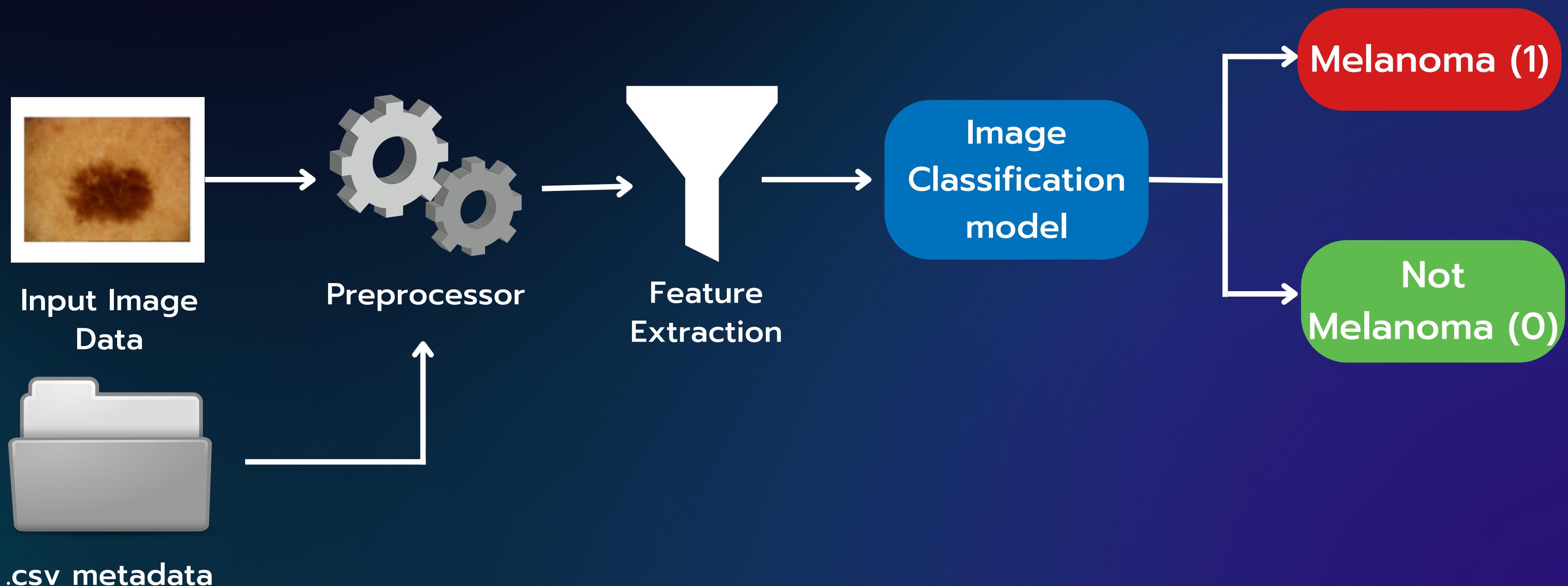


Build and Train an Image classification model

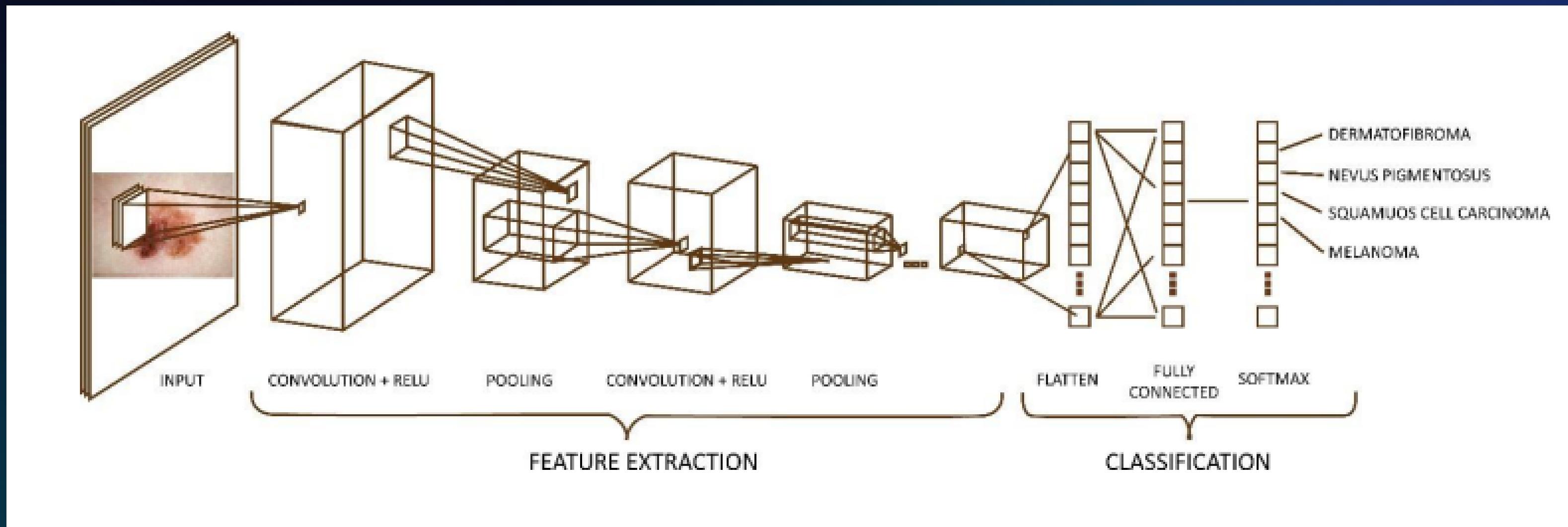


Evaluate the performance and deploy the model

# Training an Image classification model



# Image Classification Model



Convolutional Neural Network (CNN)

# Layers of CNN Architecture

- Input Layer
- Convolution Layer
- Pooling layer.
- Fully connected(FC) layer.
- Softmax/logistic layer.
- Output layer.

# Model Evaluation and Deployment

## Evaluating results

- Train/Test Split
- 5-Fold Cross Validation

## Measuring Metrics

- Accuracy
- Precision
- Recall
- F1-Score
- AUC/ROC

## Improving performance

- Hyperparameter tuning
- Grid Search CV

# THANK YOU