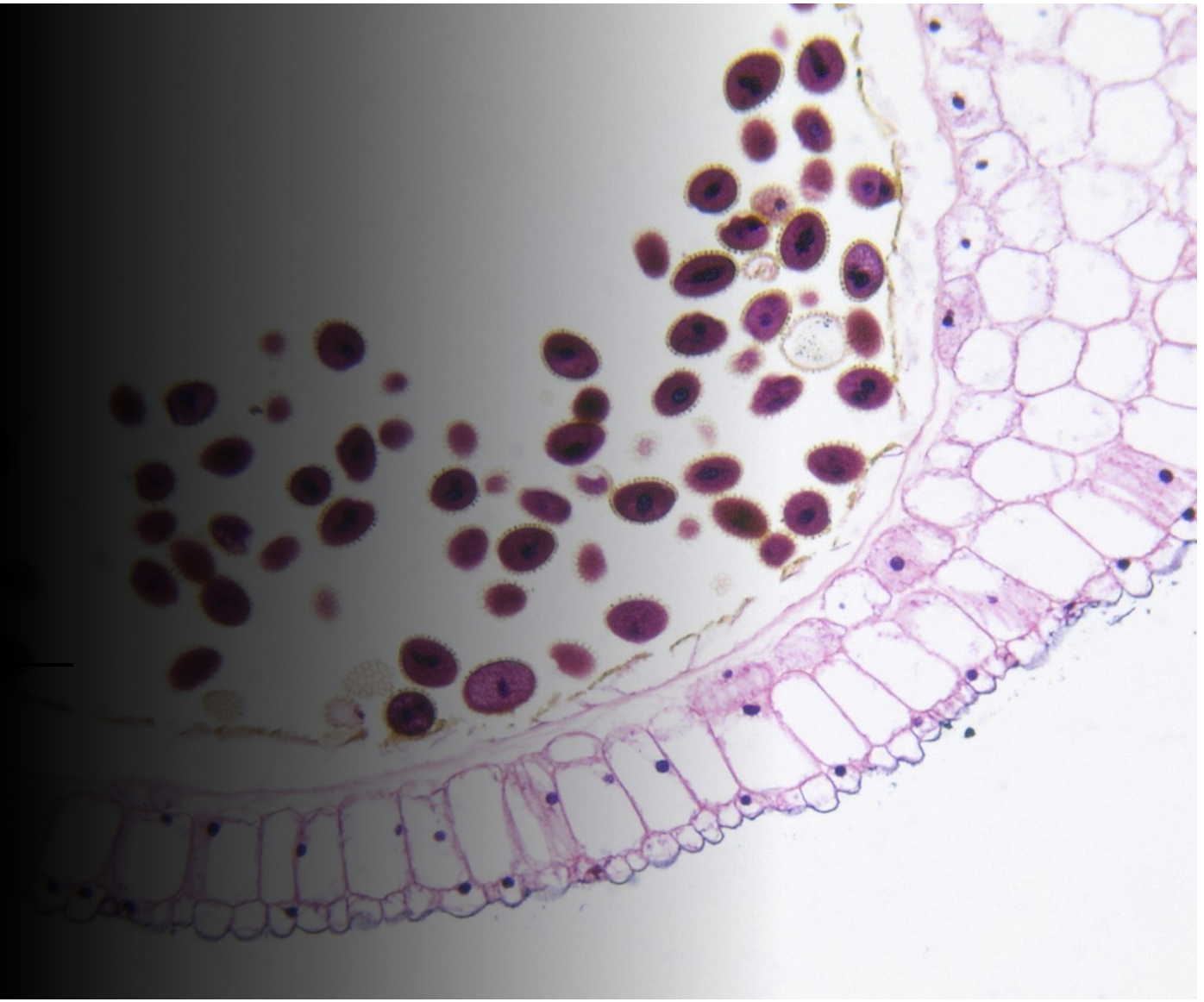
Skin Cancer Classification



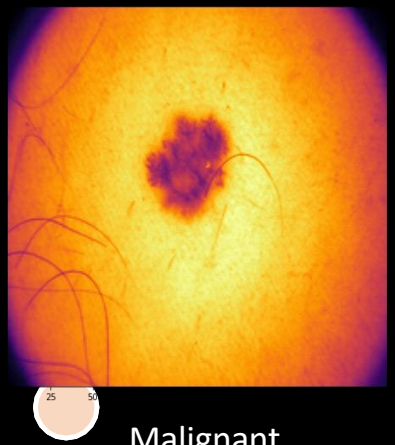
Team Members: Adithya Harsha

Arun Subbiah

Objective

- Training computer vision models for distinguishing between malignant & benign skin cancer.
- Basic Convolutional Neural Network (CNN),
- Pre-trained EfficientNet V2 B0
- Pre-trained Vision Transformer.

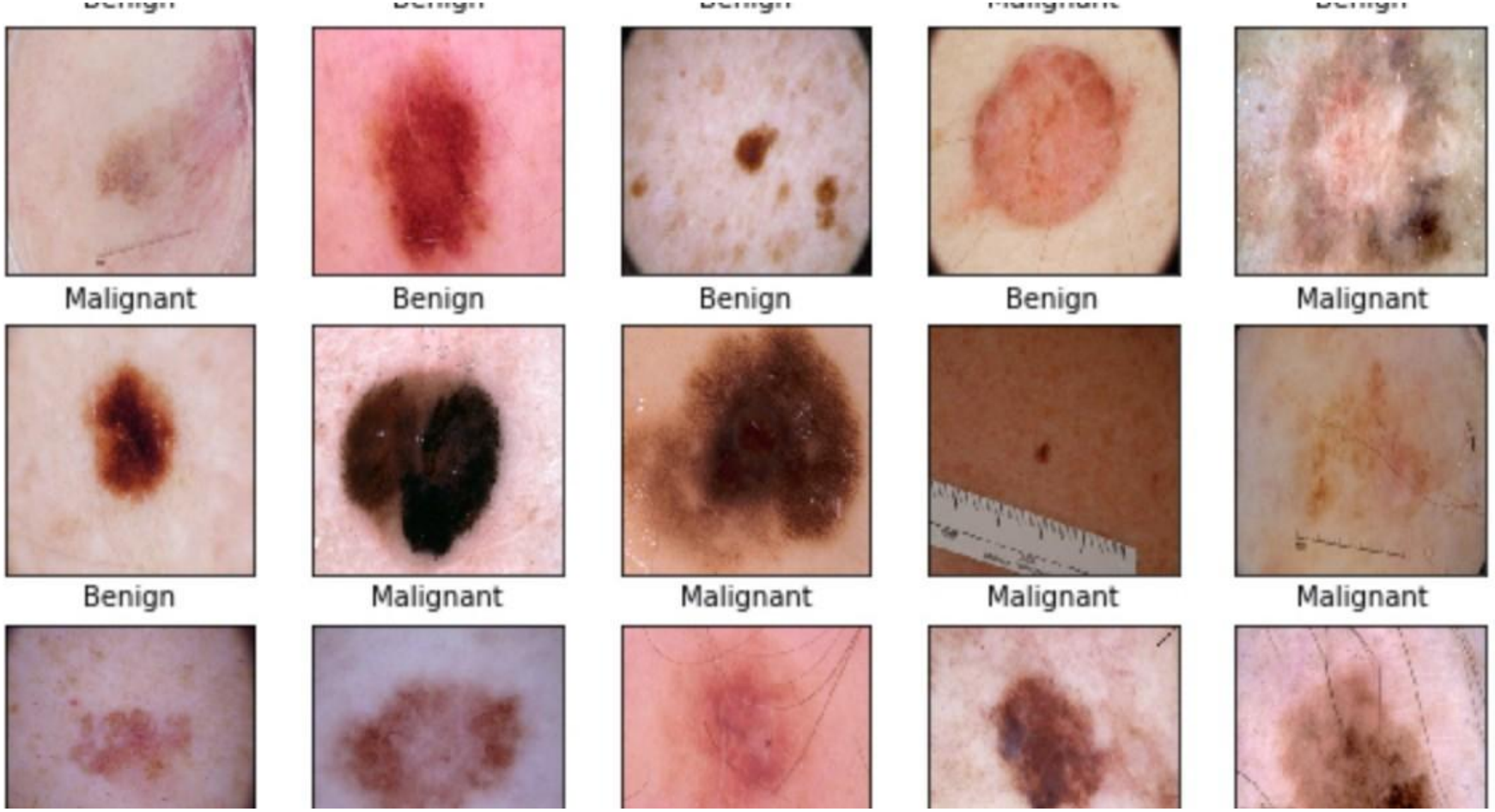
Data Set



Malignant

Benign

- International Skin Imaging Collaboration (ISIC) Skin Cancer Detection Dataset.
- The ISIC is an academia and industry partnership designed to facilitate the application of digital skin imaging to help reduce melanoma mortality.
- Using the Kaggle data set version

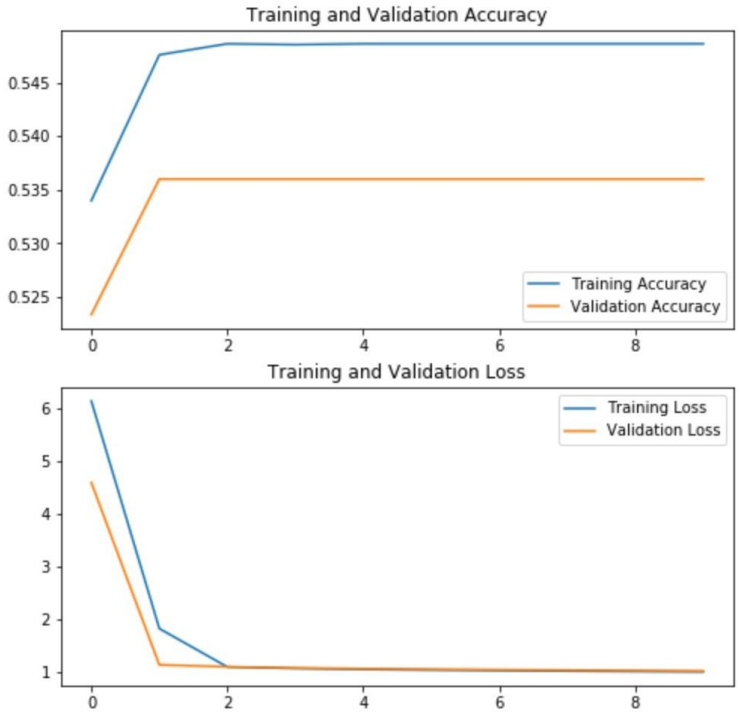

Malignant
Benign
Benign
Benign
Malignant
Benign
Malignant
Malignant
Malignant
Malignant

Methods

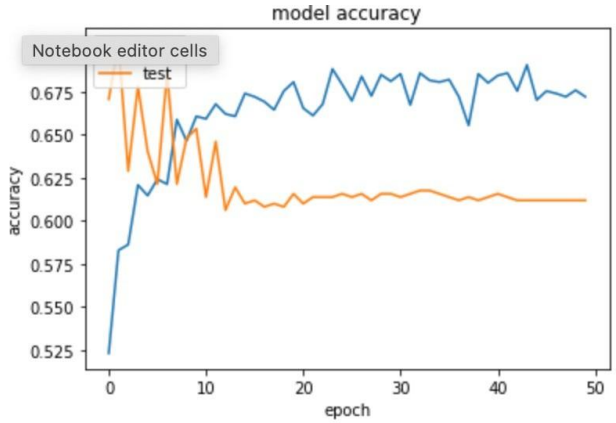
The process of building and evaluating the skin cancer classification model unfolds through a meticulously designed series of 9 steps. Each step contributes to the model's robustness, accuracy, and adaptability, making it a comprehensive tool for dermatological diagnostics.

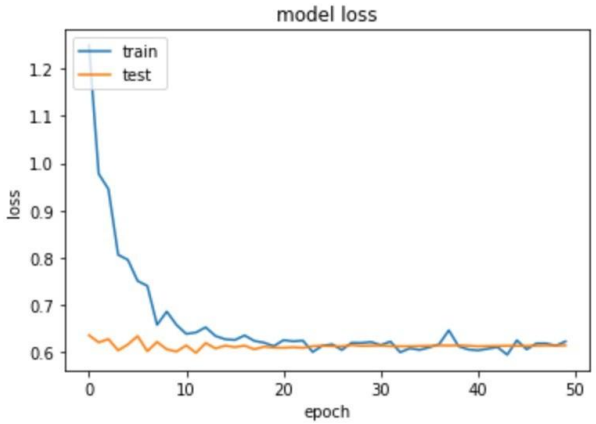
- Step 1: Importing Essential Libraries
- Step 2: Loading Pictures and Making Dictionary of Images and Labels
- Step 3: Categorical Labels
- Step 4: Normalization
- Step 5: Train and Test Split
- Step 6: CNN Model Building
- Step 7: Cross-Validating Model
- Step 8: Testing Model
- Step 9: ResNet50

Result Model one:

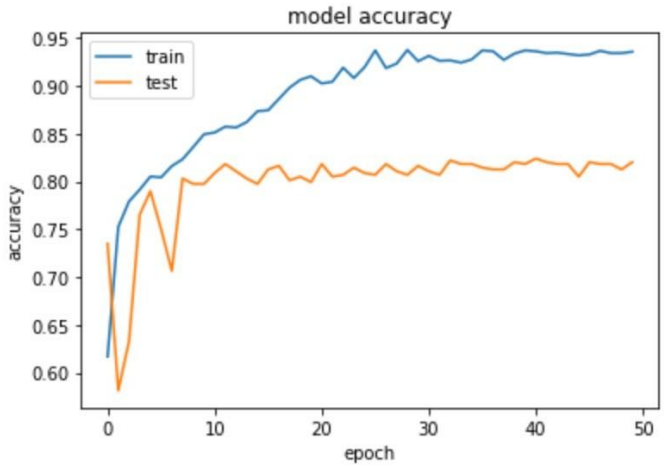


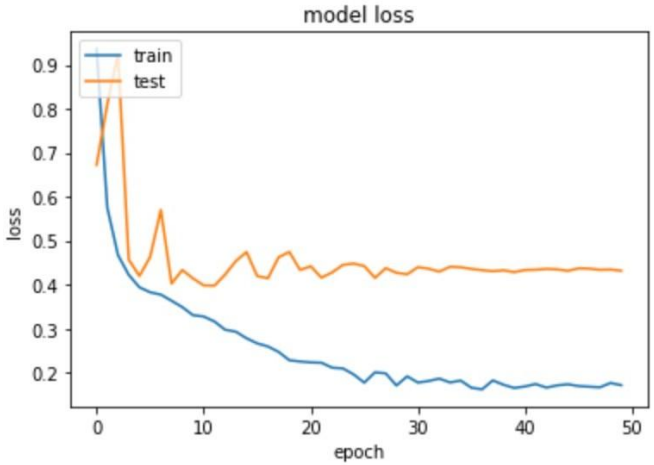
Result of CNN with hyperparameters changed





ResNet50


model accuracy
train
test
accuracy
epoch
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0
10
20
30
40
50


model loss
train
test
loss
epoch
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
10
20
30
40
50

Conclusions

- In conclusion, this study demonstrates the efficacy of ResNet50, a deep learning model, in visually classifying skin moles into benign and malignant categories, addressing a critical need in dermatological diagnostics. Leveraging a carefully curated dataset from the ISIC Archive, the ResNet50 model outperforms traditional CNN architectures, achieving an impressive accuracy of 93.55% on the validation set. By harnessing the power of artificial intelligence, this study advances the field of automated dermatological diagnostics, setting a standard for future research and emphasizing the role of advanced machine learning in improving patient outcomes in the diagnosis of skin cancer.