# Detection of Skin Cancer and Credibility Assessment using Explainable AI

## Goal

- Emphasize the importance of XAI in providing transparent and understandable diagnostic processes in dermatology.
- Focus on the credibility and dependability of AI systems in medical diagnostics.
- Early detection to help reduce future health problems associated with late-stage skin cancer.

## Importance

- Transparency: SHAP and LIME provide insights into AI decisions, enhancing transparency and understanding.
- Trustworthiness: Verifying AI predictions with these tools builds trust in their accuracy and reliability.
- Patient Safety: Reduces misdiagnosis risk by not solely relying on AI predictions.

## Workflow, Problems and Solution

Data collection and Pre-processing

Explanatory Data Analysis

Model Building

Model Analysis

Credibility Assessment with SHAP

**Idea and Analysis:**

Introduced an advanced skin cancer detection system employing deep learning with the integration of SHAP for enhanced explainability.

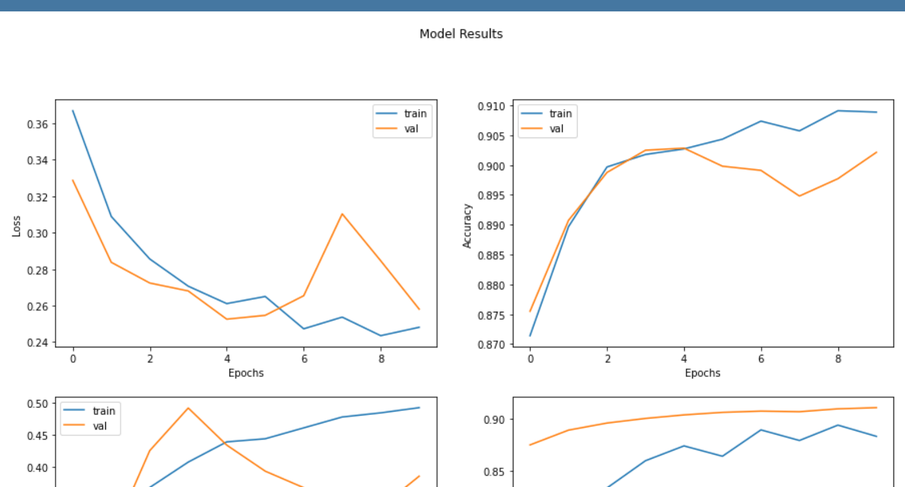
**Problems in existing studies:**

- Lack transparency and interpretability that leads to mistrust in automated diagnoses
- Models struggle with high false negative rates and data imbalance, which affects diagnostic accuracy and patient outcomes

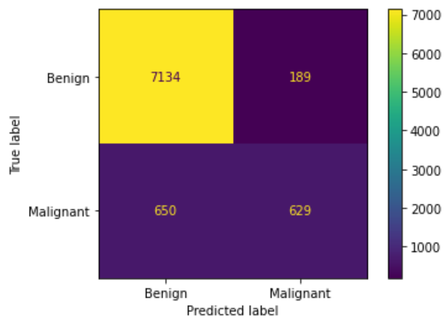
**Solutions in our project:**

- These challenges are addressed by using SHAP(SHapley Additive exPlanations)
- Provides clear, interpretable predictions that demystify the model's decision-making process
- Better management of imbalanced data thus improved model performance with higher accuracy and lower false negative rates

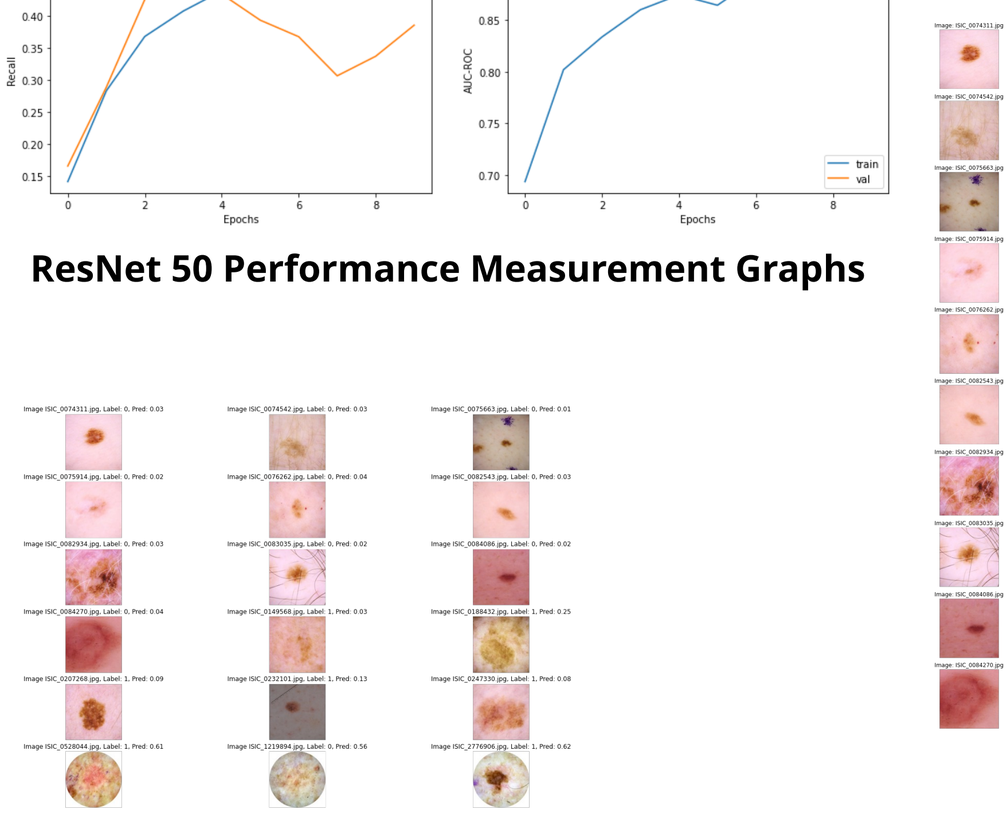
## Results



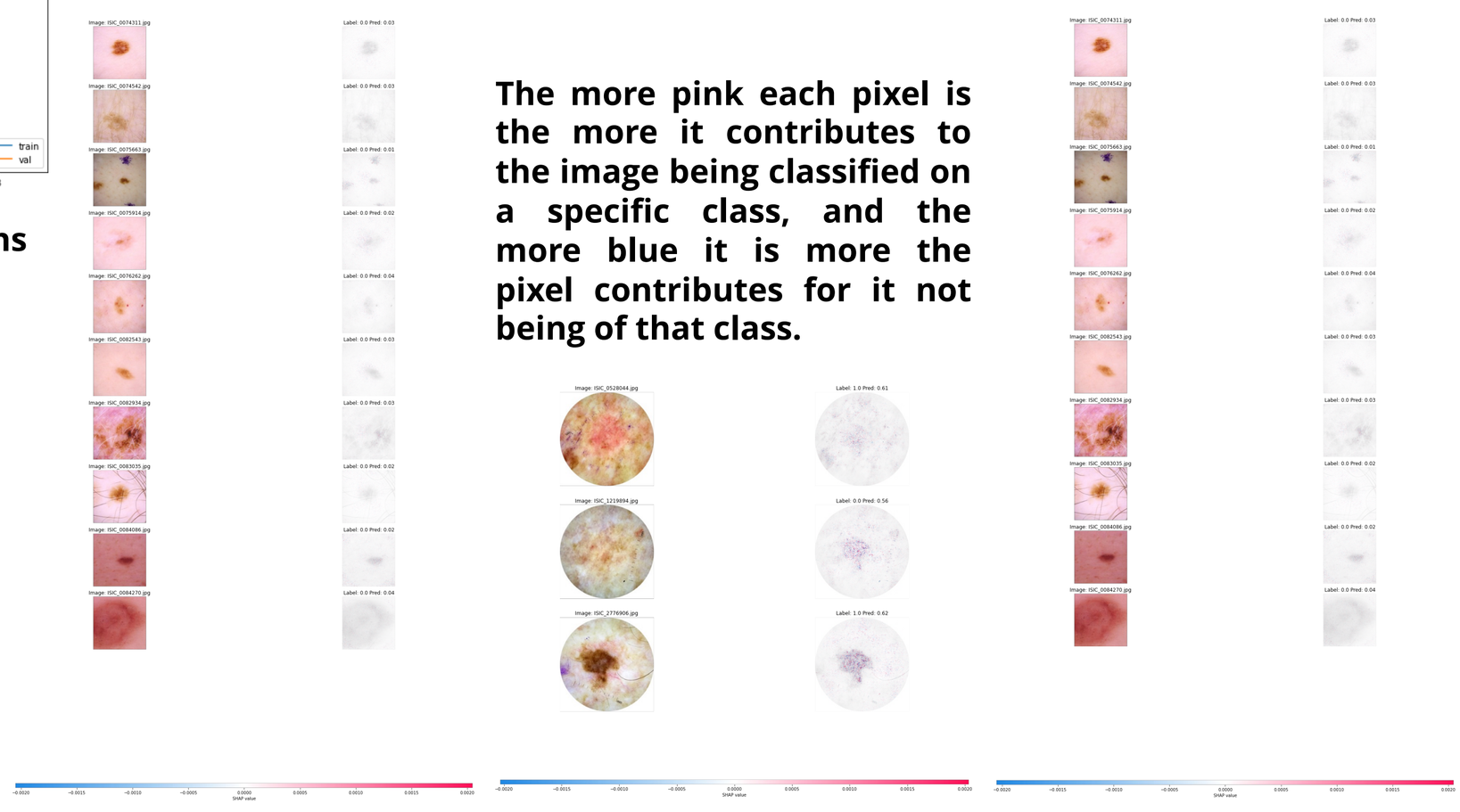

ResNet 50 Performance Measurement Graphs




ResNet 50 Confusion Matrix




ResNet's classification of Images




The more pink each pixel is the more it contributes to the image being classified on a specific class, and the more blue it is more the pixel contributes for it not being of that class.

## Summary

- Enhanced Diagnostic Accuracy: Demonstrates a significant increase in true positives for malignancies, vital for early cancer detection
- Reduction in Misdiagnoses: Shows a decrease in false negatives and false positives, reducing the risk of missed diagnoses and unnecessary interventions
- Explainable AI Integration: Incorporates SHAP, offering clear explanations for predictions, aiding in clinical trust and understanding