Skin Cancer Detection using Convolution Neural Network, ResNet50, XGBoost

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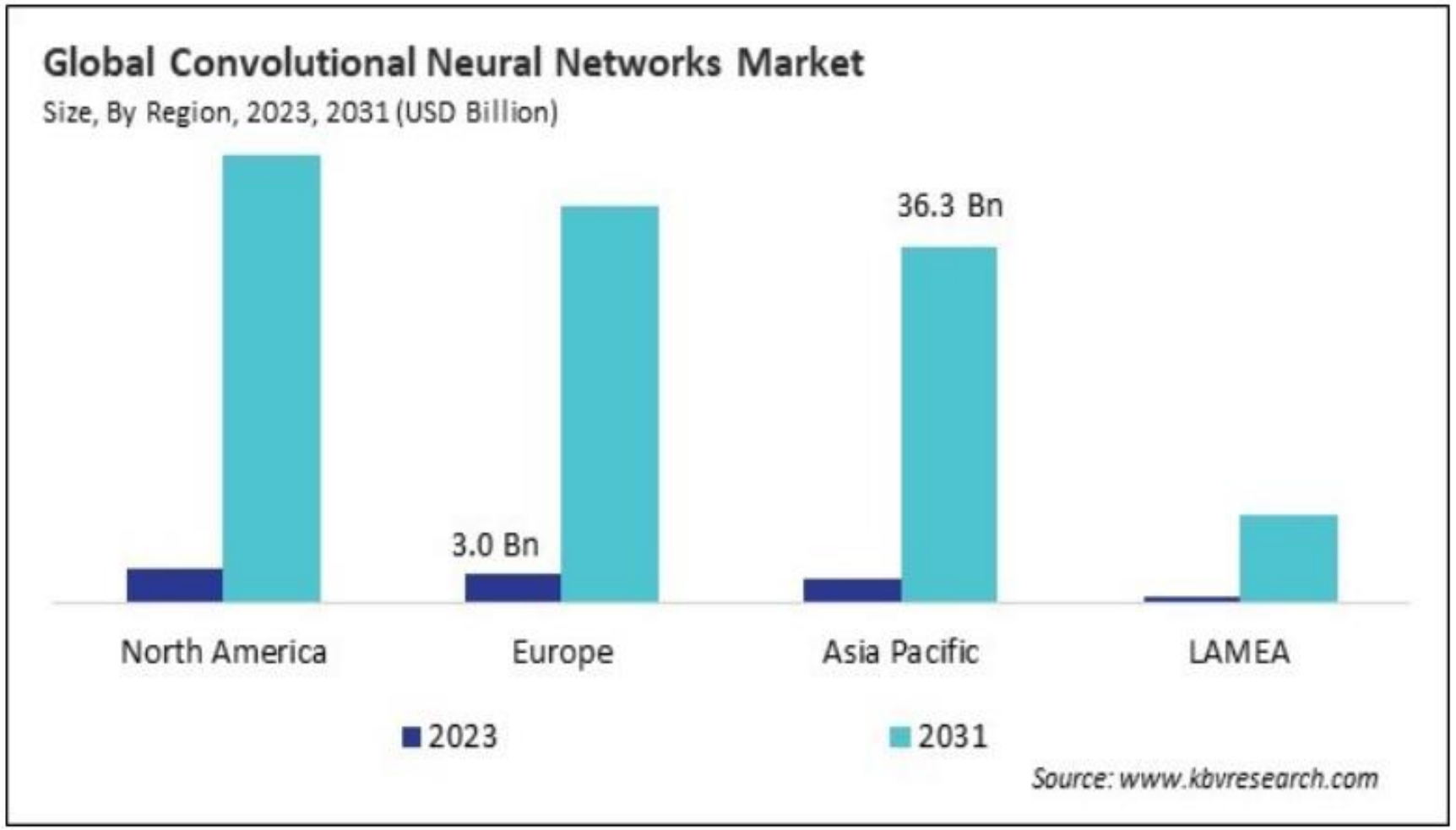
CONVOLUTION NEURAL NETWORK OVERVIEW



The global CNN market is projected to grow at a compound annual growth rate (CAGR) of 40.2%, reaching approximately $131.7 billion by 2031.

PROJECT OBJECTIVES

01. Develop a robust Convolutional Neural Network (CNN) capable of classifying skin lesions

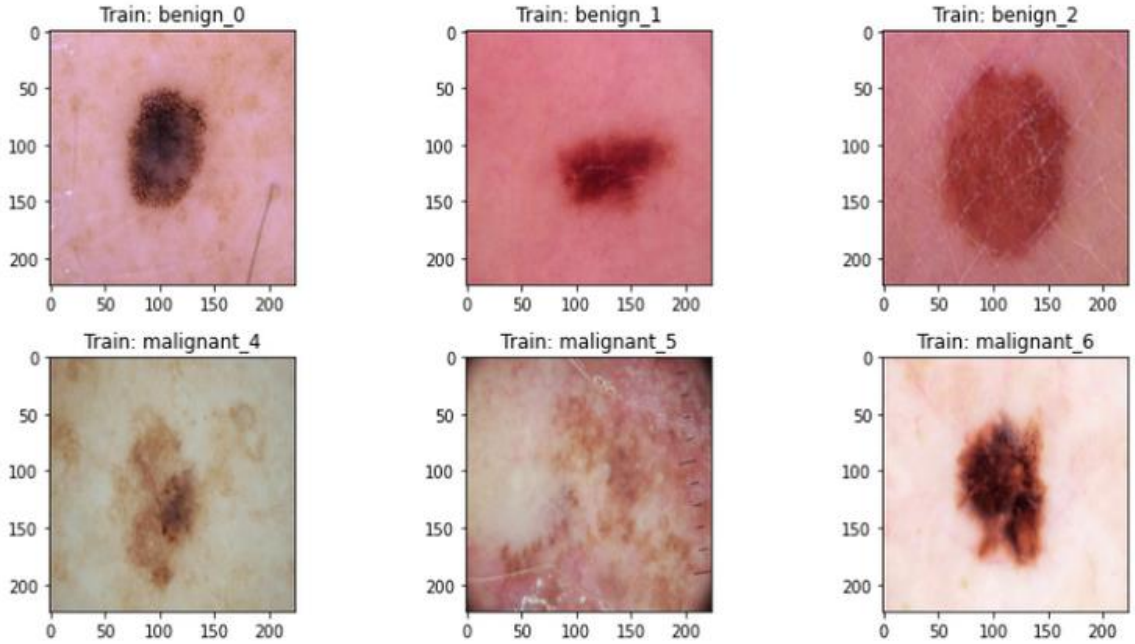
02. Maximizing model's recall rate

DATA OVERVIEW

- Sourced from Kaggle's Skin Cancer: Malignant vs. Benign
- Two folders: train and test with images (224x244) of the two types of moles

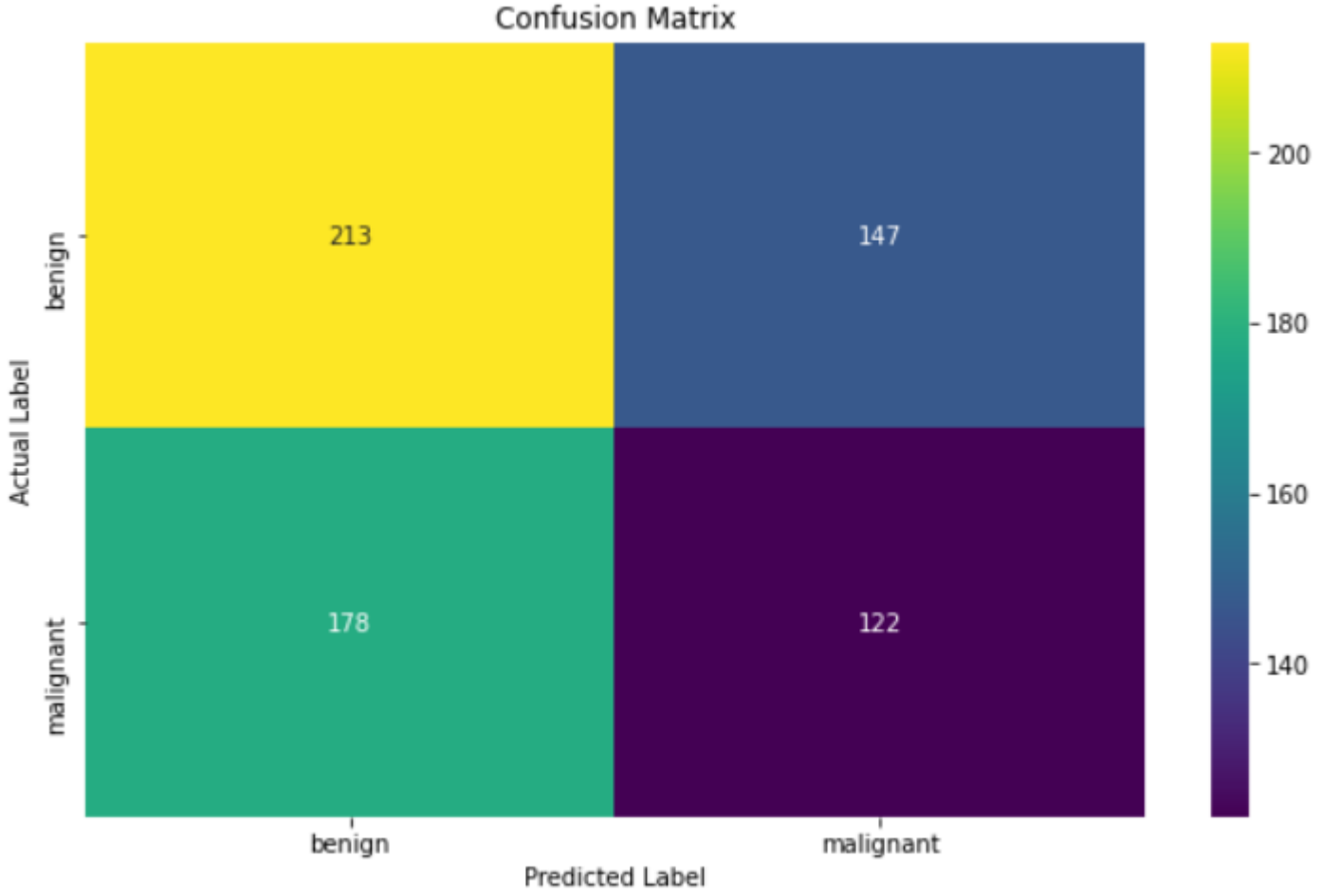
PRE-PROCESSING

- Train set (80%) vs Validation Set (20%)
- The labels are categorical, indicating benign (label 0) or malignant (label 1)
- Image augmentation such as normalization and transformation



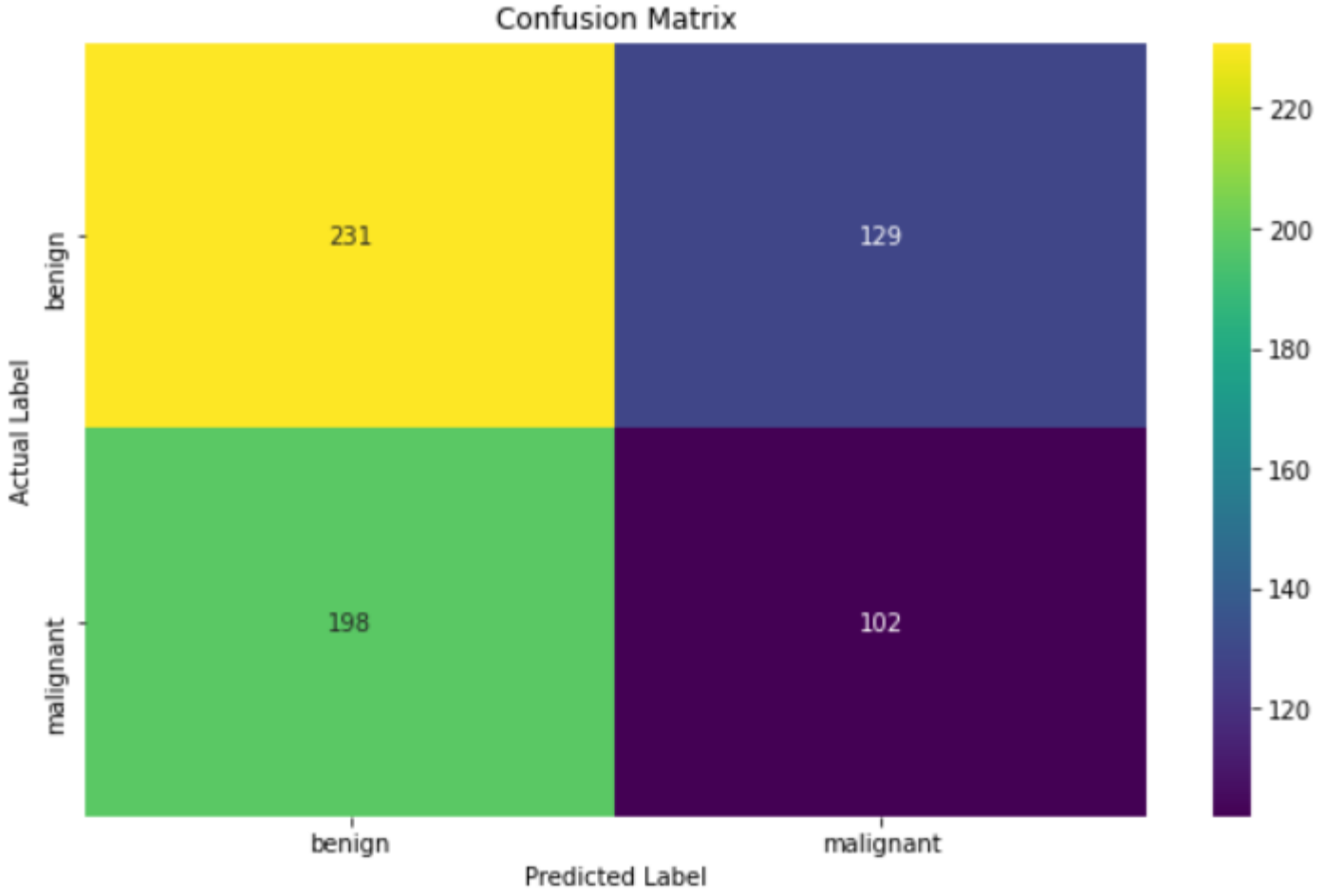
BASE MODEL – SHALLOW CNN

- simple, 3 convolution layers with increasing nodes
- 66% recall rate and 79% accuracy rate



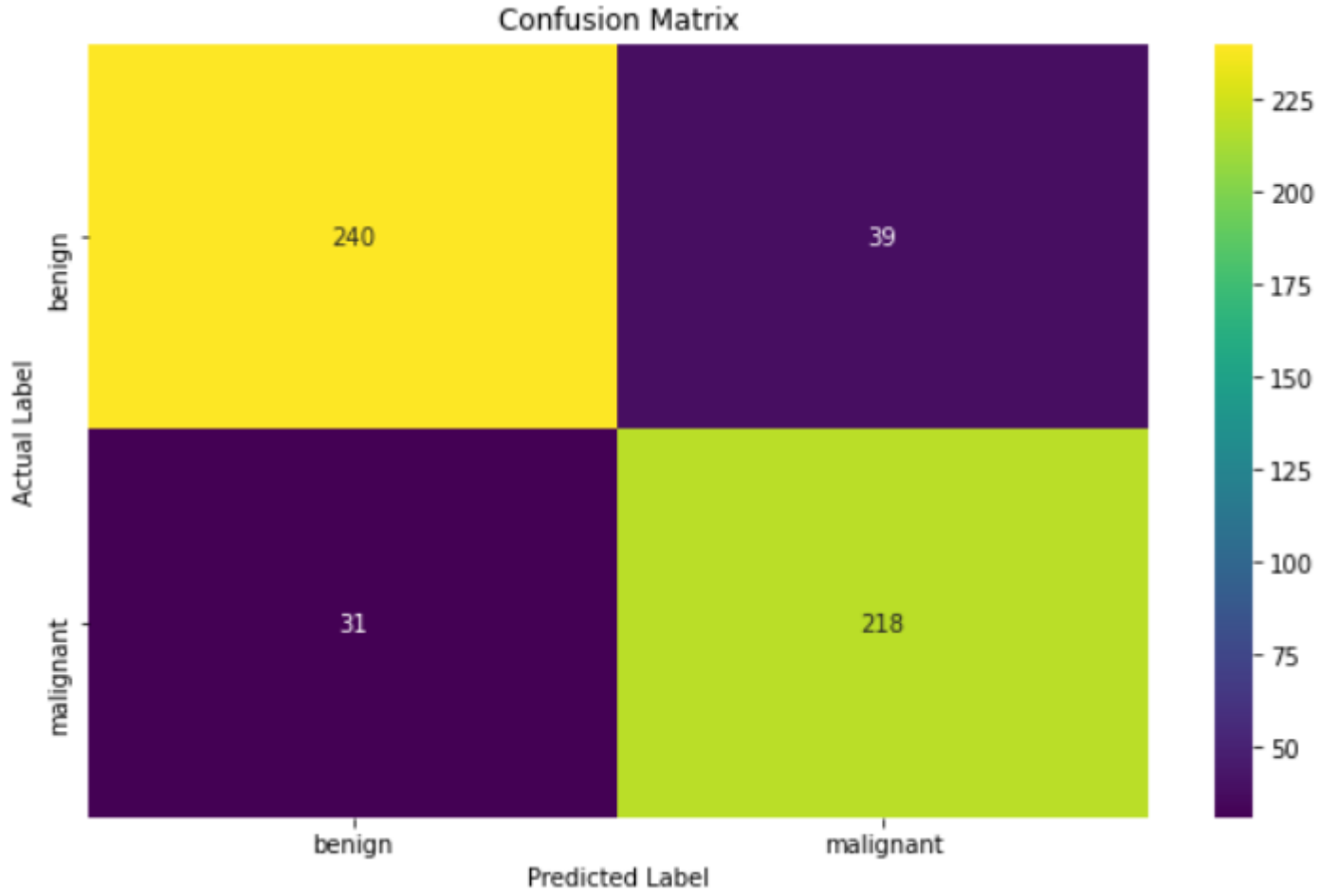
RESNET50

- proven success in various image classification tasks
- 34% recall rate and 72.27% accuracy rate
- cause of such low recall rate may result from model complexity



HYBRID (RESNET50 + XGBOOST)

- ResNet50's feature extraction + XGBoost's ensemble of decision trees
- 88% recall rate and 87.5% accuracy rate



CONCLUSION

- recommend a hybrid model combining ResNet50's feature extraction process with the XGBoost model for this cancer detection problem
- For future works, extend this project by investigate other popular models used in medical detection field such as VGG16, InceptionV3 or MobileNetV3.

Thank you

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