PROJECT-I

PRESENTATION

Automated Skin Lesion Analysis with CNNs in TensorFlow and Keras

SUBMITTED BY

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OBJECTIVE

- Develop a deep learning model using convolutional neural networks (CNNs) in TensorFlow and Keras for automated skin lesion detection.
- Precisely classify and identify various types of skin lesions, such as benign or malignant, based on visual characteristics.
- Employ advanced image analysis techniques to enhance diagnostic support for medical professionals.
- Improve efficiency and accuracy in diagnosing skin conditions, leading to better patient outcomes and quicker medical assessments.

PROBLEM STATEMENT

Manual skin lesion diagnosis is time-consuming and prone to error.

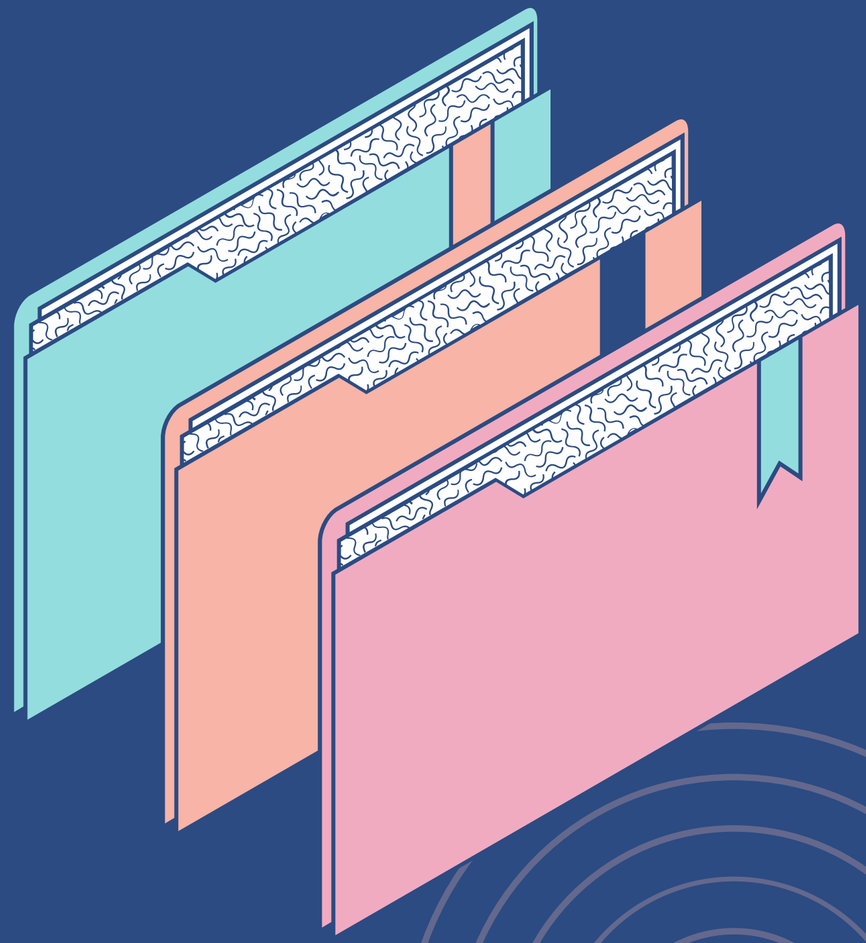
Aim to accurately detect and classify various types of skin lesions.

Need for automated, reliable analysis of dermatological images.

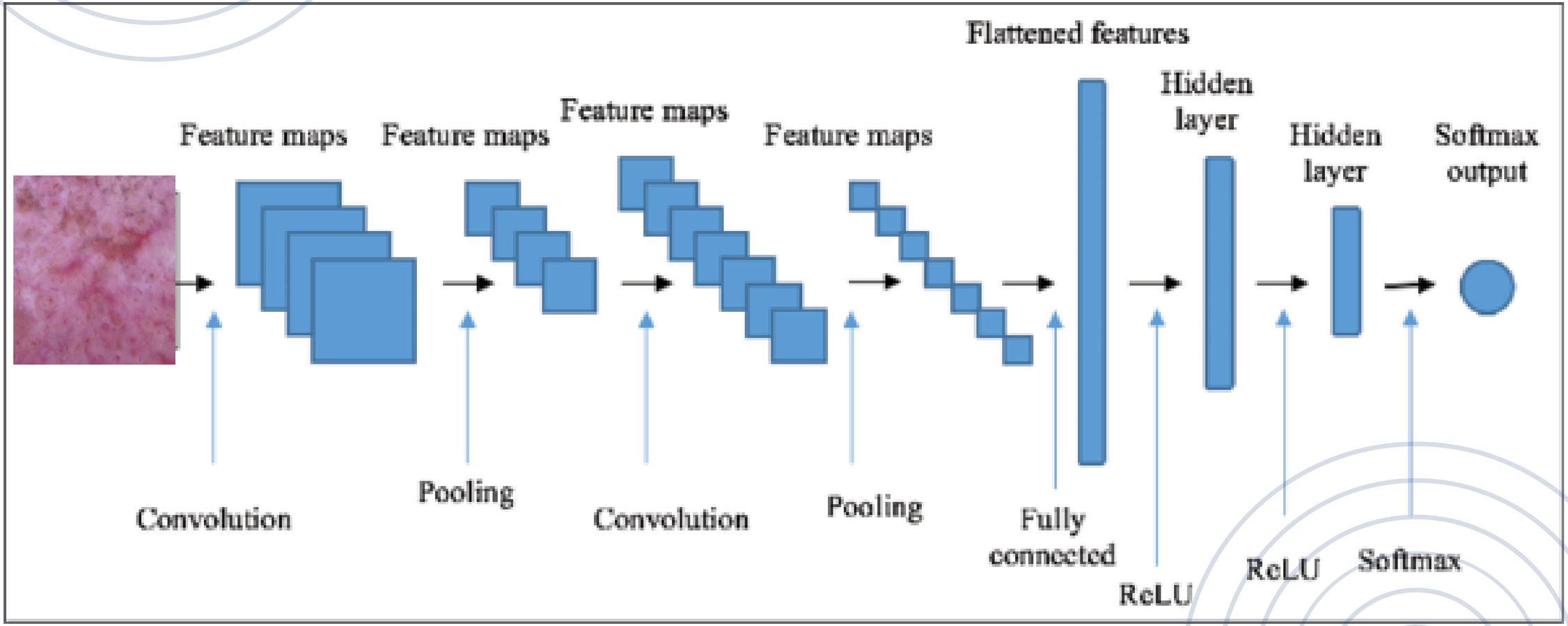
Support medical professionals with efficient and precise skin lesion assessment.

Convolutional Neural Network

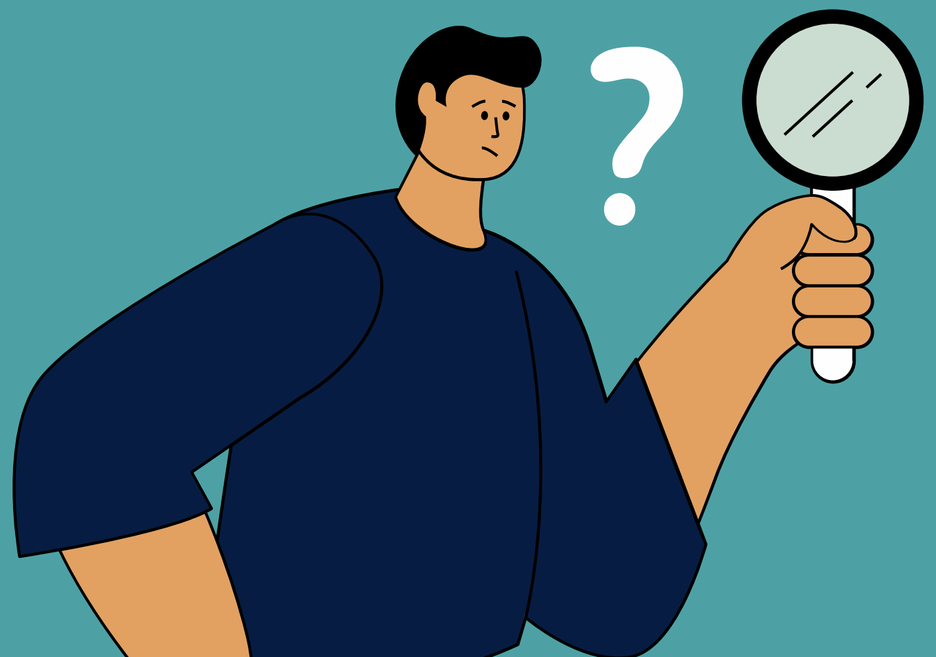
- **Feature Extraction:** Extracts visual features using convolutional layers.
- **Convolutional Layers**: Applies filters (kernels) to input images for feature maps.
- **Pooling Layers:** Reduces spatial dimensions for efficiency and generalization.
- **Activation Functions:** Introduces non-linearity for complex pattern recognition.
- **Fully Connected Layers**: Performs classification tasks after feature extraction.
- **Dropout:** Prevents overfitting by randomly dropping neurons during training.
- **End-to-End Learning:** Trains from raw image input to final classification output.



CNN ARCHITECTURE

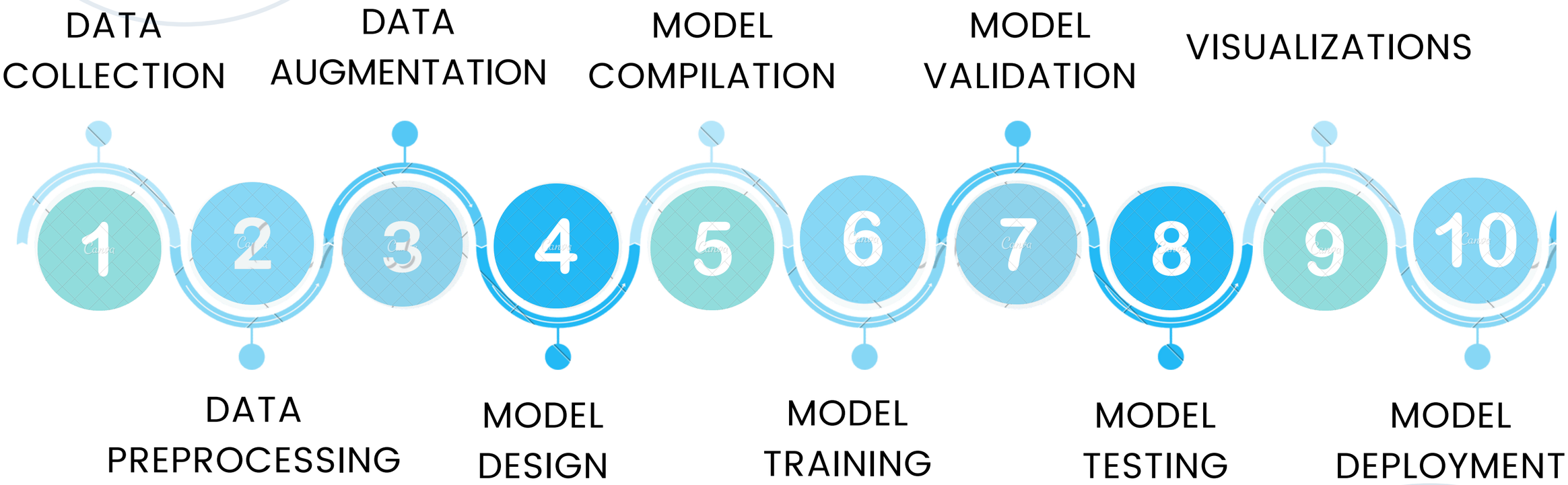


ABCDE RULE FOR DETECTION OF SKIN CANCER



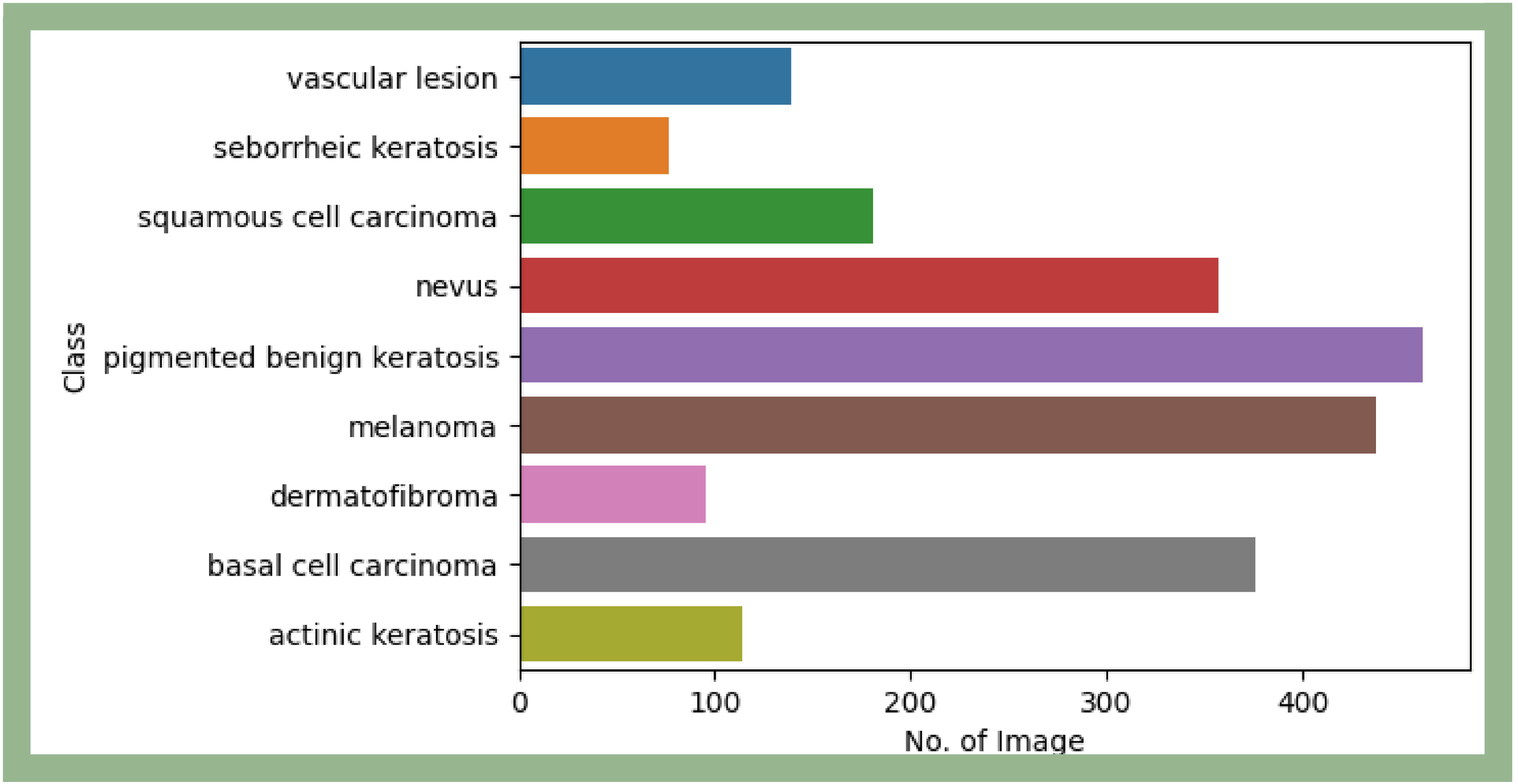
- **A** Asymmetry
- **B** Border
- **C** Colour
- **D** Diameter
- **E** Evolving

TIMELINE

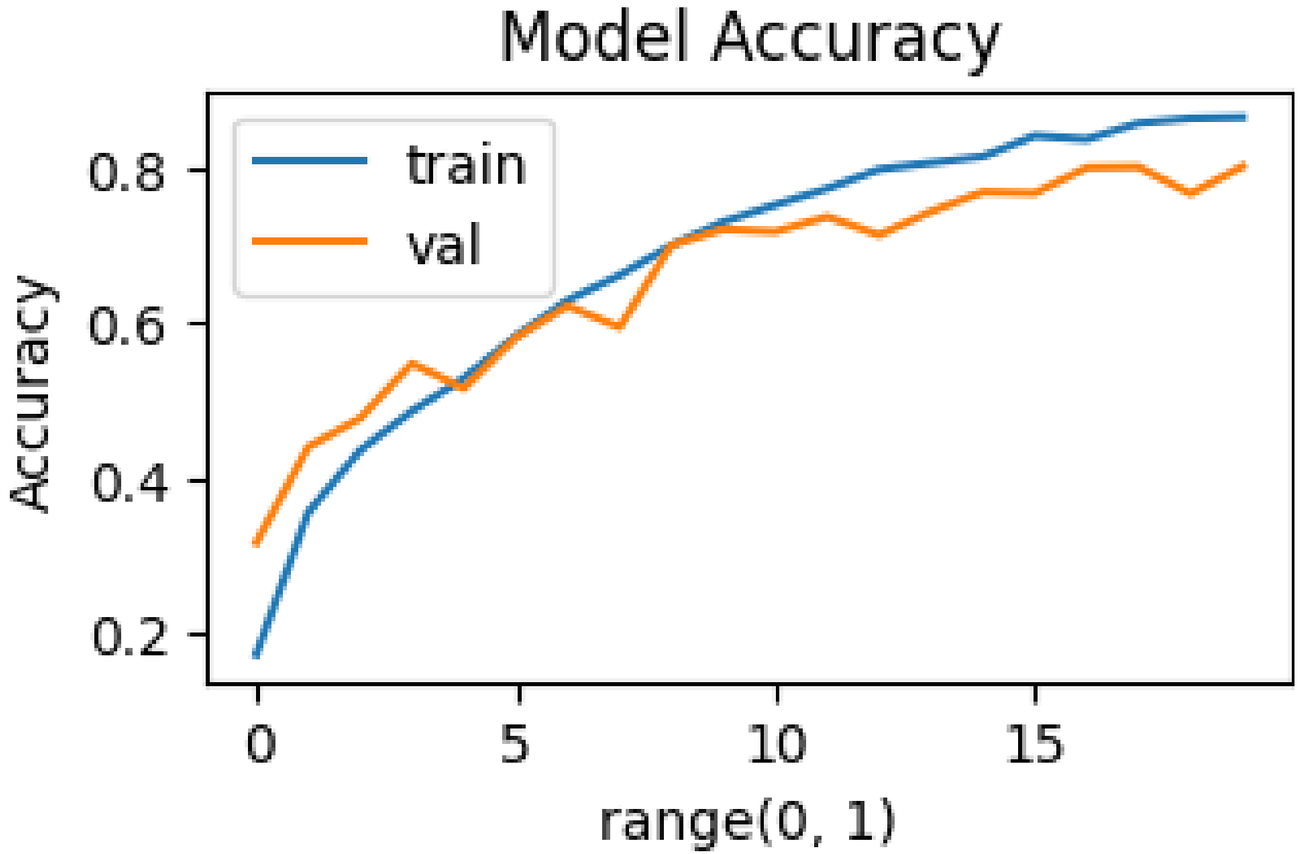

DATA COLLECTION
DATA AUGMENTATION
MODEL COMPILATION
MODEL VALIDATION
VISUALIZATIONS
1
2
3
4
5
6
7
8
9
10
DATA PREPROCESSING
MODEL DESIGN
MODEL TRAINING
MODEL TESTING
MODEL DEPLOYMENT

DATASET

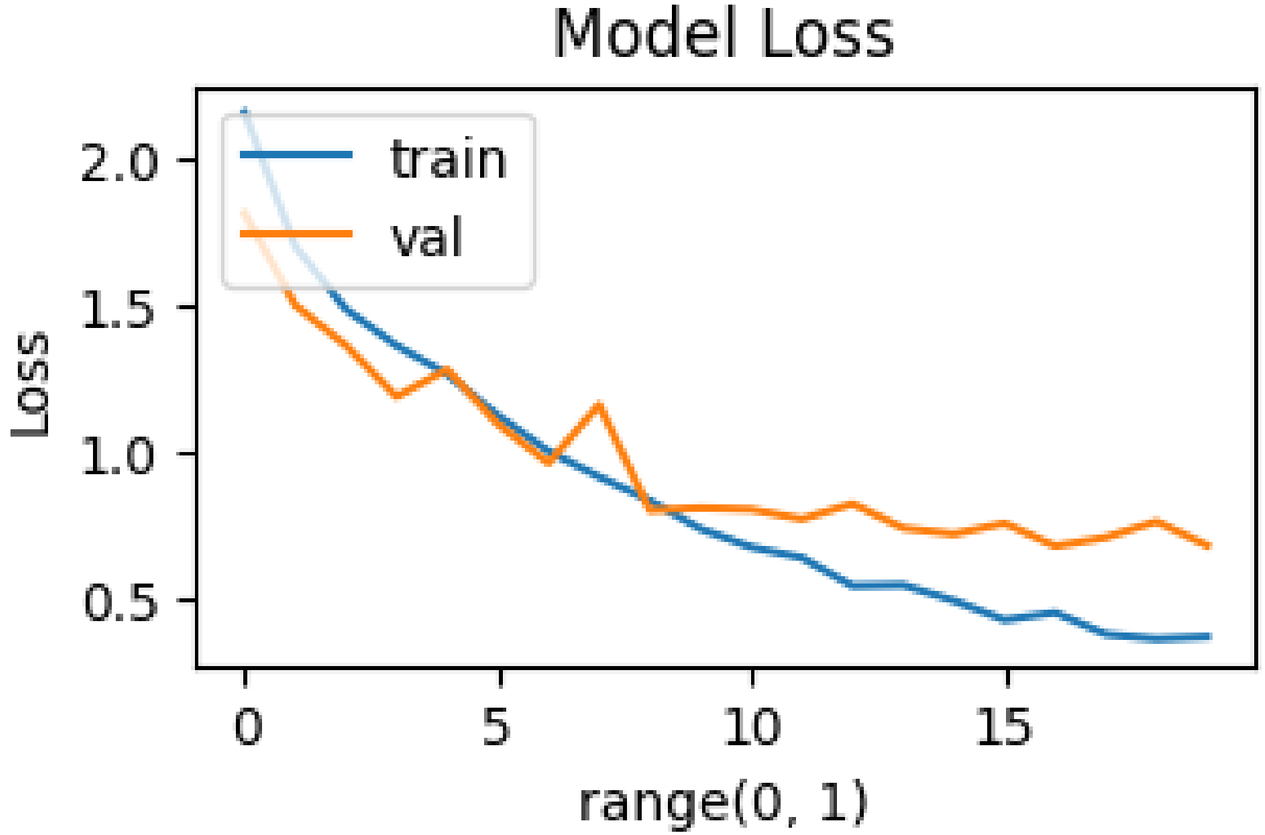
- Sourced from Kaggle for skin cancer detection.
- Consists of 2,357 images of malignant and benign oncological diseases.
- Training data includes 2,239 images, testing data has 118 images.


vascular lesion
seborrheic keratosis
squamous cell carcinoma
nevus
pigmented benign keratosis
melanoma
dermatofibroma
basal cell carcinoma
actinic keratosis
Class
0
100
200
300
400
No. of Image

MODEL EVALUATION



MODEL EVALUATION



CONCLUSION

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- Automated Detection: The model enables automated detection of skin lesions using CNNs.
- Skin Lesion Classification: Classifies various skin lesions, including benign and malignant types.
- Medical Support: Assists medical professionals in efficient and accurate diagnosis.
- Improved Outcomes: Leads to better patient outcomes and faster medical assessments.

BIBLIOGRAPHY

- Melanoma Skin Cancer from https://www.cancer.org/cancer/melanoma-skin-cancer/about/what-is-melanoma.html
- Introduction to CNN from https://www.analyticsvidhya.com/blog/2021/05/convolutional-neural-networks-cnn/
- Image classification using CNN from https://www.analyticsvidhya.com/blog/2020/02/learn-image-classification-cnn-convolutional-neural-networks-3-datasets/
- Efficient way to build CNN architecture from https://towardsdatascience.com/a-guide-to-an-efficient-way-to-build-neural-network-architectures-part-ii-hyper-parameter-42efca01e5d7