

Skin Cancer Prediction System

This project implements a skin cancer prediction system that utilizes state-of-the-art deep learning models including Xception, DenseNet, and ResNet. These models are compared in terms of performance and integrated into an interactive frontend website for user-friendly access.

Overview

Skin cancer is a prevalent form of cancer, and early detection is crucial for effective treatment. This system leverages deep learning models trained on dermoscopic images to predict whether a skin lesion is malignant or benign.

Models Used

1. Xception

- **Description:** Xception is a deep convolutional neural network architecture known for its depthwise separable convolutions, offering improved computational efficiency and parameter reduction while maintaining performance.
- **Usage:** Xception model is employed for skin cancer prediction due to its high accuracy and efficiency in image classification tasks.

2. DenseNet

- **Description:** DenseNet is a densely connected convolutional neural network architecture characterized by dense connections between layers, facilitating feature reuse, enhancing gradient flow, and improving learning efficiency.
- **Usage:** DenseNet model is utilized for skin cancer prediction to exploit its ability to capture fine-grained features and alleviate the vanishing-gradient problem.

3. ResNet

- **Description:** ResNet (Residual Network) is a deep neural network architecture featuring skip connections, enabling the training of very deep networks by mitigating the vanishing-gradient problem.
- **Usage:** ResNet model is included in the comparison to evaluate its performance in skin cancer prediction tasks against more recent architectures like Xception and DenseNet.

Frontend Website

The skin cancer prediction system is integrated into an interactive frontend website to provide a user-friendly interface for users to upload skin lesion images and receive predictions. The website allows users to compare predictions from different models and explore additional information about skin cancer.

Usage

1. **Upload Image:** Users can upload a dermatoscopic image of a skin lesion via the frontend website.
2. **Prediction:** The uploaded image is processed by the selected deep learning model (Xception, DenseNet, or ResNet) to predict whether the skin lesion is malignant or benign.
3. **Comparison:** Users can compare predictions from different models to assess their performance and reliability.
4. **Additional Information:** The website provides additional information about skin cancer, risk factors, and preventive measures to educate users about the importance of early detection and prevention.

Dependencies

- Python 3.x
- TensorFlow
- Keras
- Flask
- HTML/CSS/JavaScript (for the frontend)