Project Proposal: Simplified Skin Cancer Detection Using Pre-trained CNNs

Will O'Driscoll

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Problem Statement

Early detection of skin cancer is critical for effective treatment. Manual examination by dermatologists can be time-consuming and subjective. A computer vision-based system that classifies skin lesions as benign or malignant can provide fast, consistent, and accessible preliminary screening.

Proposed Computer Vision System

We propose a simplified system that uses a pre-trained Convolutional Neural Network (CNN) to classify skin lesion images. By leveraging transfer learning, the system can achieve accurate predictions without requiring extensive training resources.

This system is significant because it assists healthcare professionals, enables early intervention, and provides a foundation for automated skin cancer screening.

Implementation Plan

The system will be implemented in Python using the following techniques:

- **Data Acquisition:** Use a small subset of the ISIC dataset containing labeled images of benign and malignant lesions.

- **Transfer Learning:** Fine-tune a pre-trained CNN model (e.g., MobileNet or ResNet) on the dataset.

- **Evaluation Metrics:** Assess model performance using accuracy, precision, recall, and F1-score.

- **Demo:** Predict the class of sample images and display results with simple visualizations.

Presentation Plan

The system will be presented through:

- Slides outlining the problem, methodology, and results.

- A demonstration of the model classifying sample images in real time.

- Discussion of potential societal impact and benefits in healthcare.