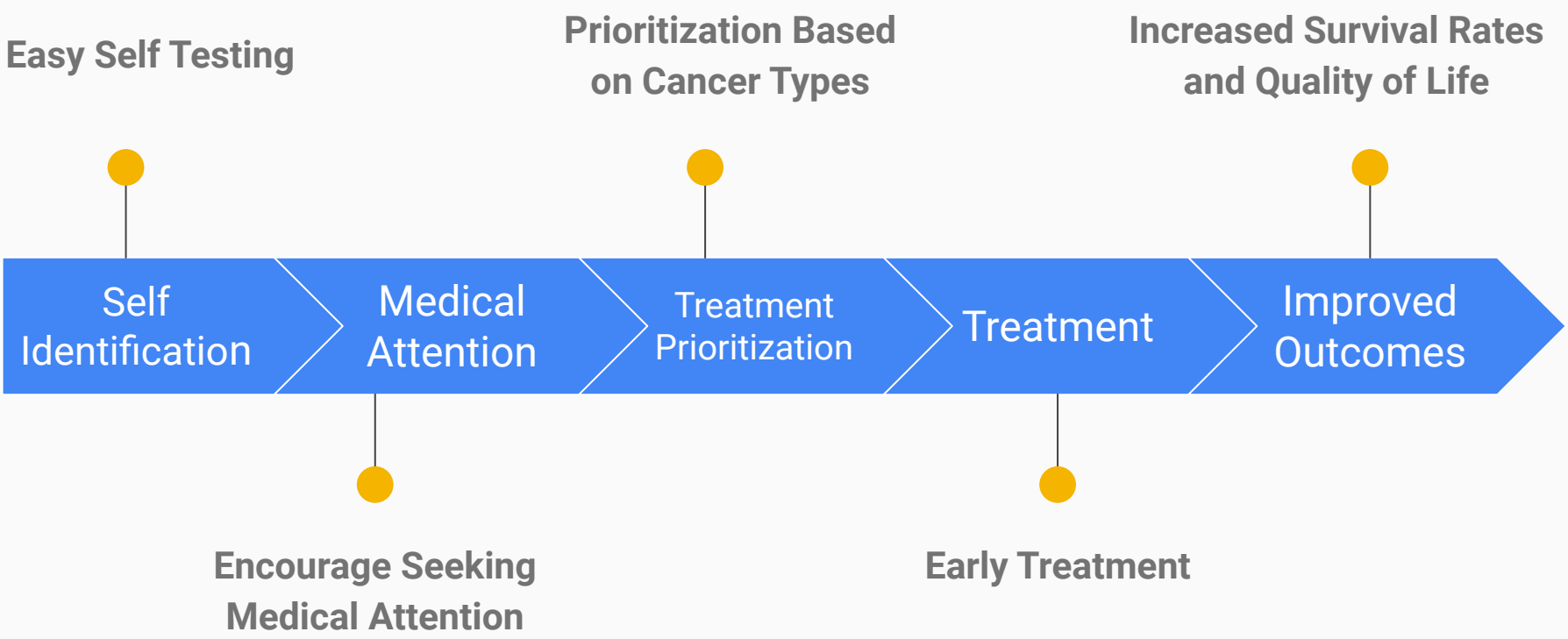
Skin Cancer Image Classification

Machine Learning And Optimization For Identification of Skin Cancer From Images

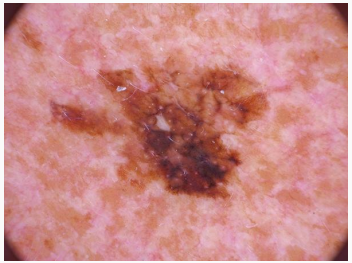
Skin Cancer Facts

- Skin cancer is the most common cancer type worldwide
- 1 in 5 people in North America will get skin cancer in their lives
- On average, 2 people die from skin cancer every hour
- Early detection dramatically improves survivability and quality of life for those affected

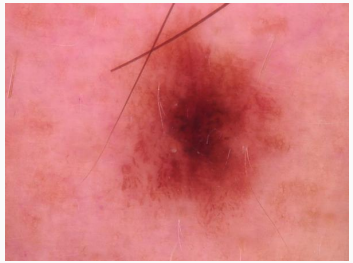

Easy Self Testing
Prioritization Based on Cancer Types
Increased Survival Rates and Quality of Life
Self Identification
Medical Attention
Treatment Prioritization
Treatment
Improved Outcomes
Encourage Seeking Medical Attention
Early Treatment

HAMM10000 Dataset

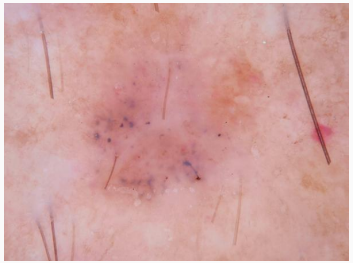
10,000+ Images, Well documented, Labelled by CSV file



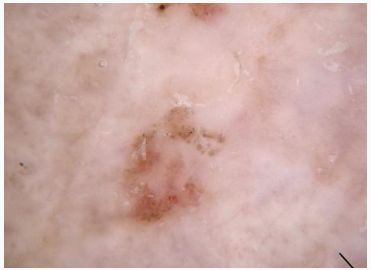
melanoma (MEL)



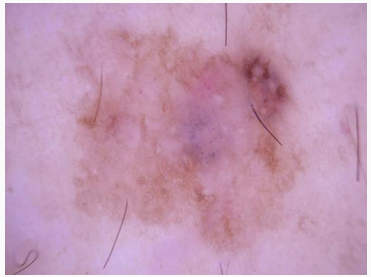
melanocytic nevi (NV)



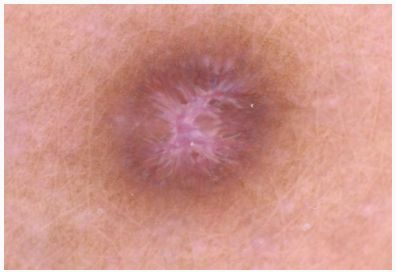
basal cell carcinoma (BCC)



Actinic keratoses)



benign keratosis-like lesions (BKL)



dermatofibroma (DF)

vascular lesions (VASC)

ML Model for Skin Cancer Identification

1. Obtain dataset (HAMM10000)
2. Clean Data
3. Create, Fit, and Optimize a Convolution Neural Network (CNN) for Skin Cancer Image Classification
4. Use and fit pre-trained models (VGG, ResNet, ShuffleNet V2, MobileNetV2)
5. Implementation of best model

Important Steps

- Standardizing Image Size
- Image Data Manipulation
  - rotation, shear, zoom, flip, shift
- Optimization of CNN
  - number of layers, load rate
- Using Pre-trained Models
  - VGG, ResNet, ShuffleNet V2, MobileNetV2
- Implementation of Best Model

Data Processing

Image Processing

(From Keras, ImageDataGenerator)

1. Image Size Standardization
2. Rotation Range
3. Shear Range
4. Zoom Range
5. Horizontal Flip
6. Width Shift
7. Height Shift

Convolution Neural Network Creation

1. Sequential
2. Network Layers
   a. Convolution
   b. Normalization
   c. Max Pooling
3. Flatten
4. Dense
5. Dropout

Pre-trained Models: VGG, ResNet, ShuffleNet V2, MobileNetV2