



Advanced Programming  
Project Proposal

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**Skin Cancer Detection**

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Astana, 2024

## **Idea Proposal: Skin Cancer Detection**

### **Group Members:**

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### **Problem or Idea Description:**

In this project, our goal is to develop a Tensorflow model for detecting Skin Cancer. The model will be trained on a dataset comprising images categorized as either malignant or benign. To enhance efficiency and yield superior outcomes with minimal training, we'll employ the transfer learning technique.

### **Background Information:**

Skin cancer, a global health concern, necessitates timely detection for improved outcomes. Traditionally, visual inspection by healthcare professionals has been the primary diagnostic method. However, the increasing prevalence of skin cancer underscores the need for more efficient and accurate diagnostic tools.

### **Available Solutions with Links:**

DermSpectra: A Dermatologist-AI Collaboration Platform

DermSpectra integrates AI-based skin cancer detection with dermatologists' expertise. The platform utilizes deep learning algorithms for image analysis, enhancing diagnostic accuracy.

Link:

<https://www.prnewswire.com/news-releases/dermspectra-to-conduct-collaborative-research-with-mayo-clinic-on-automated-total-body-digital-skin-imaging-300010018.html>

AI-Derm: A Comprehensive Review on Skin Cancer Detection

AI-Derm provides a comprehensive review of various deep learning techniques employed in skin cancer detection. It discusses advancements, challenges, and future prospects.

Link:

<https://www.mdpi.com/2075-4418/13/11/1911>

DermaTech: AI-Powered Skin Cancer Detection Device

DermaTech, an FDA-cleared device, combines AI algorithms with near-perfect accuracy for identifying skin cancer. This solution showcases the successful integration of deep learning in clinical practice.

Link:

[https://www.mdpi.com/2075-](https://www.mdpi.com/2075-4418/13/11/1911#:~:text=Skin%20cancer%20is%20mostly%20diagnosed,classification%20using%20deep%20learning%20methods.)

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### **How to Get the Data:**

Image dataset from:

<https://drive.google.com/drive/folders/1BAC4wJNksepPk3fquLF-DiWdS4nnIE1G>

In our dataset we have 2637 images with .jpg extension.

### **Brief Description of Your Solution:**

We plan to create a model using Keras' Functional API that comprises several components:

The foundational model is derived from EfficientNet.

The Flatten layer is utilized to flatten the output from the base model.

Following the flattened layer, two fully connected layers are incorporated.

BatchNormalization layers are included to facilitate stable and efficient training, and a Dropout layer is positioned before the last layer to prevent potential overfitting.

The ultimate layer functions as the output layer, generating soft probabilities for the three classes.

### **Tech Stack:**

Python libraries make it very easy for us to handle the data and perform typical and complex tasks with a single line of code.

Pandas – This library helps to load the data frame in a 2D array format and has multiple functions to perform analysis tasks in one go.

Numpy – Numpy arrays are very fast and can perform large computations in a very short time.

Matplotlib – This library is used to draw visualizations.

Sklearn – This module contains multiple libraries having pre-implemented functions to perform tasks from data preprocessing to model development and evaluation.

Tensorflow – This is an open-source library that is used for Machine Learning and Artificial intelligence and provides a range of functions to achieve complex functionalities with single lines of code.

### **Conclusion:**

In conclusion, our proposed skin cancer detection project aims to leverage TensorFlow and Keras' Functional API, incorporating transfer learning with an EfficientNet base. The model's architecture, which includes Flatten, fully connected layers, BatchNormalization, and Dropout layers, is designed for efficient training and prevention of overfitting. Inspired by existing solutions like DermSpectra and DermaTech, our project seeks to contribute to the field of AI-driven healthcare by addressing the critical need for accurate and timely skin cancer diagnosis.