Name(s)	Project Number
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Project Title

skinCAM: An Effective Solution towards Skin Disease Diagnosis via Novel Deep Learning Algorithm

Abstract

Objectives/Goals
This project resolves a medical issue that many people face regarding dermatology. Skin diseases are common yet typically benign, but for an accurate diagnosis, patients have to visit a dermatologist, a costly endeavor. However, with the building of a convolutional neural network in this novel application of artificial intelligence, patients will be able to self-diagnose diseases that they may have.

Methods/Materials
Our neural network was created to train on a database of over 5000 distinct images. The chosen training sets came from trusted online databases that were validated by professional dermatologists (AAD, dermWeb, webMD). We built the model by creating five convolutional layers: each layer containing the convolutional filter for highlighting the features of the input, the ReLU layer as an activation function, and the pooling layer to minimize computation time. Then, we passed the output of the convolutional layers into a fully connected layer which used backpropagation and gradient descent to move the model towards optimal accuracy by updating the filters. The final output of the program was a probability value between 0 and 1, indicating the disease to the app.

Results
After training the neural network through 1000 iterations with a training step of 0.01, the prediction of the model produced an accuracy of 95.2% from 1000 tests. Each test ran the image through a separate distributable code that utilized the training data to confirm a valid prediction. Based off of the large testing sample size, the program can be statistically accepted since its margin of error is well within the pre-established design criteria.

Conclusions/Discussion
Our study demonstrates that an artificial intelligence approach can be utilized for an initial diagnosis, providing users with useful information about whether or not they should consult a dermatologist for further treatment. The app not only saves time and cuts expenses, but it is also equally as important by providing a unique tool for dermatologists around the world.

Summary Statement

We created a convolutional neural network to accurately diagnose skin diseases while also implementing the algorithm into an app for patients to use.

Help Received

The project was created entirely without outside help. However, we have recently reached out to Dr. Sicun Gao and Dr. Paravar for future studies in improving the accuracy of the model with powerful cloud-computing tools and with dermatologists through testing the app. We have also gotten help from