



Age detection from images using neural networks and machine learning

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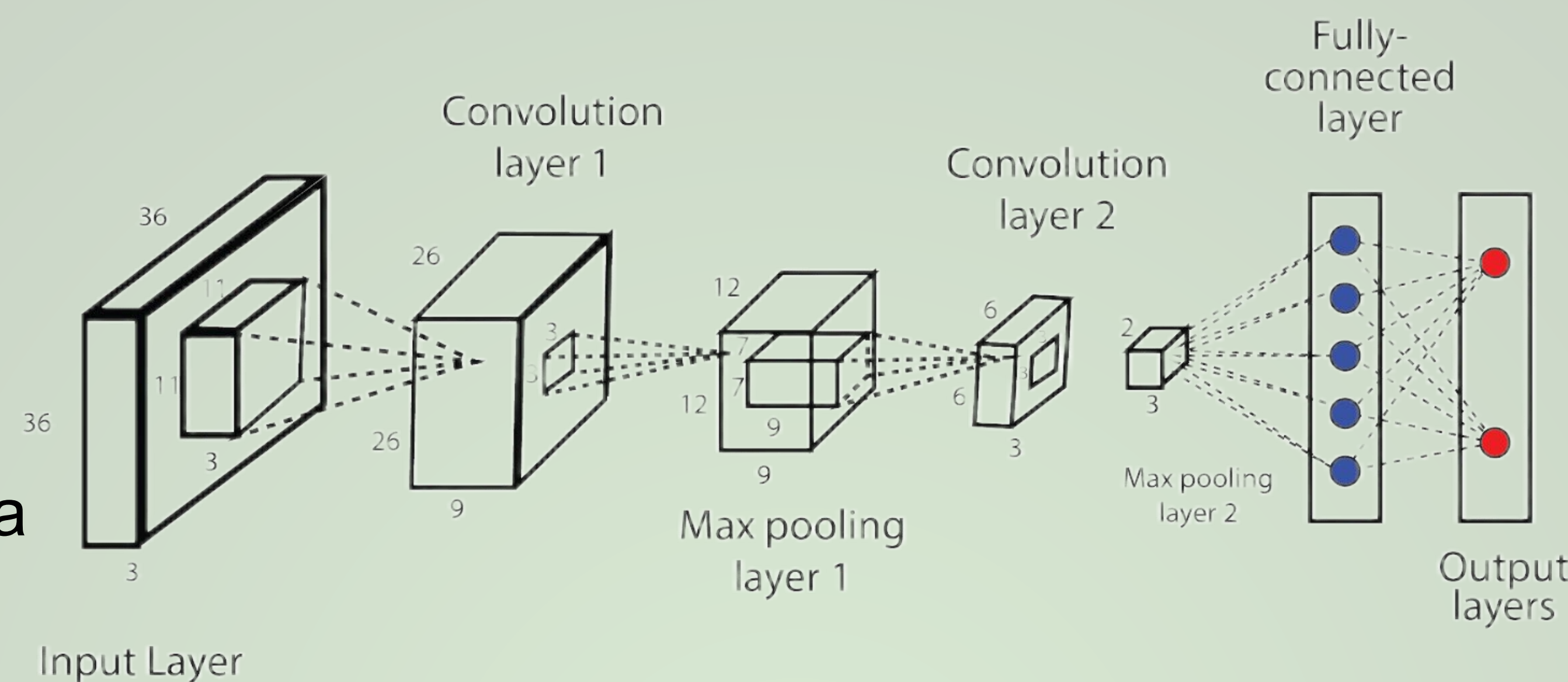
Introduction

This project uses Convolution Neural Networks (CNN) to predict a human subject's age from a photo. Neural networks are computing systems inspired by how the neurons of living beings operate. Machine learning is a technique, including neural networks, that involves training machines to learn from provided data to the program. Through the use of neural networks and machine learning, photos of people are analyzed, and the system trains the model. In the analysis process, the face of human subjects is the area of a photo that the program works with and based on the selected area of a photo by max pooling method and CNN analysis layers the program predicts age. In this work, the program is trained with a dataset that contains 20,000 images of people from ages 0 to 116.

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CNN Architecture

The following diagram is a demonstration of how the CNN algorithm analyzes a person's age from a photo. The final result is only one output which is the predicted age of a person.



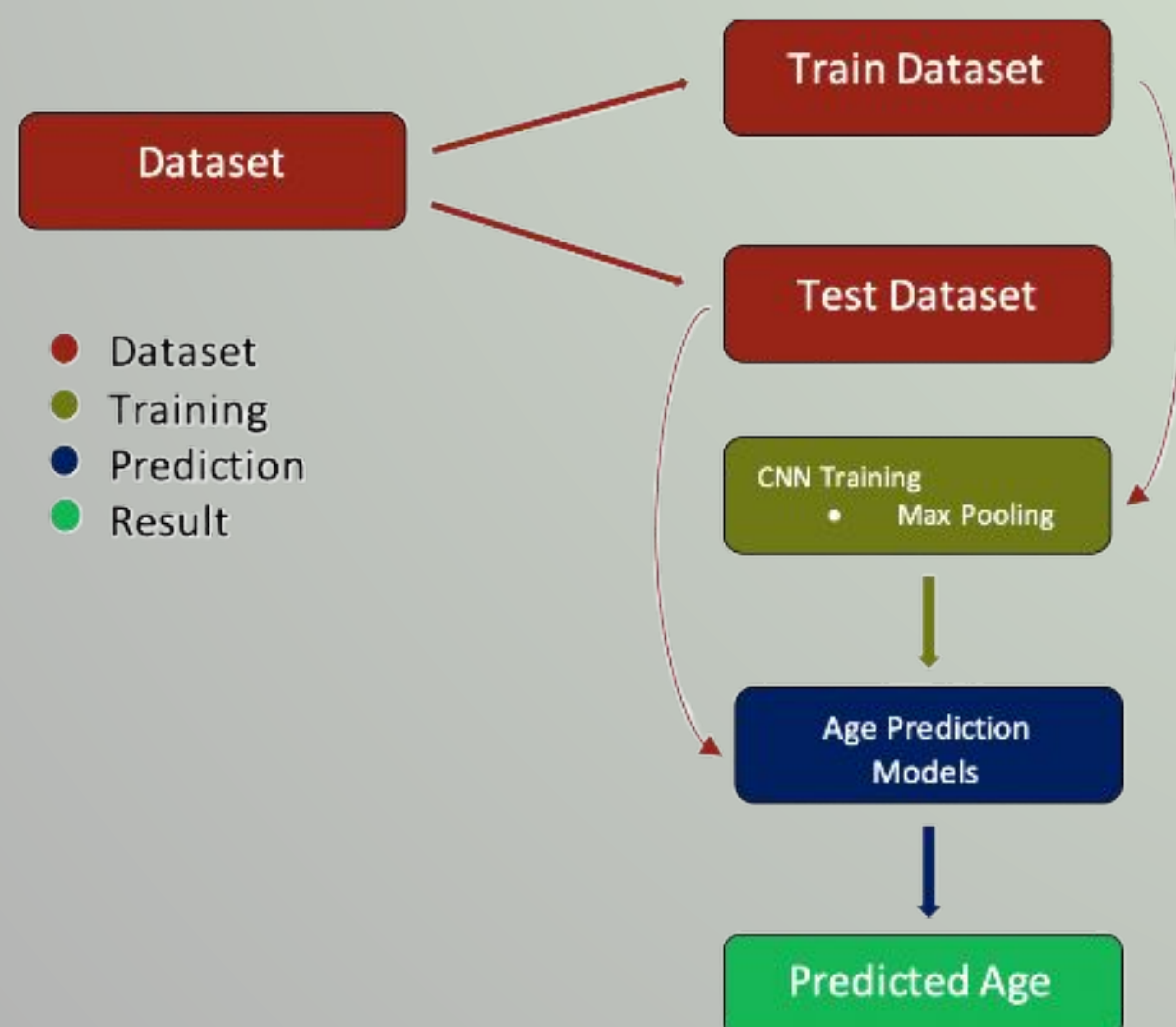
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Implementation

- This project has used UTK Face Cropped as the primary database for analysis and predicting age. Each photo's name contains information such as age, gender, and ethnicity in order
- There are three layers of deep learning in the photo analysis where the first layer will be reading photos from the dataset in the program, the second layer is the analysis, and the third layer is the output layer
- The third layer of analysis is a hidden machine learning and analysis layer that is an essential step. Thousands of neural networks learn from photos and constantly make predictions until the best decision is made
- After completing the second step of deep learning in the final step, the program will output an age prediction based on the result processed in step two of the deep learning

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Data Architecture



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Convolution Neural Networks

- A four layer CNN network architecture is used to find patterns in the dataset
- Each convolution layer is an analysis layer that uses photos for analysis
- The output of one CNN is given to Max Pooling and the same process is repeated for all the layers of CNN
- Prominent features of images are selected by Max Pooling method
- In this project CNN detects important features of images without human supervision
- Towards the end of project, the output of CNN layers and max pooling layers is converted to one dimensional array for predicting age

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Future Work

Using this program, one will be able to detect their age based on their photo. A few months ago, I watched a video of a vlogger for YouTube who had traveled to Yemen, and he was asking questions from the local people. One of the questions he asked people was how old they were and many of them didn't know because they didn't have birth certificates. In many third-world countries, similar to Yemen, the older generations don't have birth certificates, and they are unsure of their age. This project will be able to detect the age of people based on their photos. Among many other methods and possible use of this program, the Age Detection project can be transformed into a mobile app or a website to predict the age of people who don't know their age.