Colored lenses detect

With the development of machine learning,the emergence of pupil recognition can naturally identify whether a person has colored lenses,and this paper discusses how to use machine learning to train to identify whether a person is equipped with a colored lenses.

pupils, lenses, detection, machine learning.

# Objective

To use deep learning to train a model that can determine whether the eye in the photo wears cosmetic contact lens (CCL) or not.

# data

* data format: .bmp photo
* photo size: 640X480
* photo quantity: 2818
* classify the datasets: training data(2085, 972 with CCL, 1113 without CCL),

validating data(636, 330 with CCL, 306 without CCL), testing data(97, 47 with CCL, 50 without CCL) .

# Training model

## Initialize

## We try to use the Image data generator to increase the complexity of the datasets. So, we create two Image data generators for training and validating. We also set variable of rescaling, flipping, zooming photos in the generators.

## Model

## We design a model with 3 layers of CNN and a layer of DNN. We choose relu activation formula for CNN layers, and pooling to accelerate the training process. Finally, we use dropout, dense, and sigmoid activation formula to analyze and determine the result

## Training

## We set the epochs in 200, and the batch\_size in 50. After 200 epochs we get the final training result of accuracy in 0.9710, loss in 0.0866, validation accuracy in 0.8379, and validation loss in 1.1890. And the following plots view all the accuaracies and losses.

# Result

## We create another array for testing photos and labels. And we evaluate the accuracy of the model we trained by determining the testing data. We get the accuracy of 0.97938. Then, we predict the testing data and print the photos, labels and predictions as followings.

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