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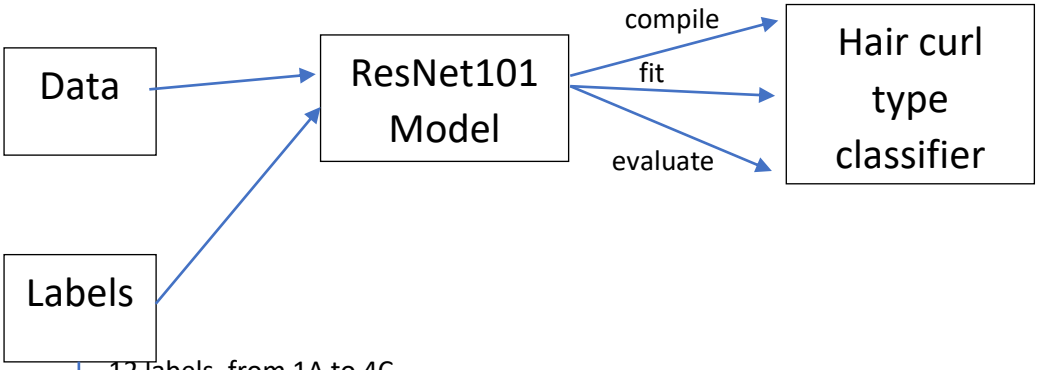
# Hair Curl Type Classifier




12 labels, from 1A to 4C

| | A | B | C |
|---|---|---|---|
| 1 (straight) | Fine, straight hair | Thicker straight hair | Coarse straight hair |
| 2 (wavy) | Fine, S-shaped curls | Looser curl, still S-shaped | Loose curl |
| 3 (curly) | Shiny, defined curls | Combination of curls and coils | Combination of defined coils |
| 4 (coily) | Soft, well-defined coils | Shiny, less defined coils | Sensitive, undefined coils |

The aim of this part of the project is to find the most accurate method of classifying hair curl types according to the 12 labels detailed in the table above, from 1A to 4C.

1. A CNN is the first experiment used for this classifying problem, with the aid of the Tensorflow Keras model.
    a. The first configuration has 10 layers, including 5 Conv2D layers, 2 Add layers, one Global Average Pooling 2D layer and a Dense layer. As an optimizer, Adam is used, and since it is a classification problem, we use SparseCategoricalCrossentropy as the loss function. The noticed results using 32 batches is unsatisfactory, with an accuracy of 0.12 after 20 epochs.
    b. Another tried configuration is MaxPooling2D and Dense layers as well, and it produces slightly better results faster, respectively an accuracy of 0.1425 after the 2nd epoch, after which it drops again.
2. In [3], the most efficient approach for hairstyle classification was using a ResNet101. Indeed, using a pre-trained model has been observed to perform well on smaller datasets. This is reflected in the current case as well, since in a dataset with 12 classes and approximately 50 input pictures/class, ResNet101 achieves an accuracy of 0.84 after only 10 epochs, an actually good accuracy, especially compared to the above-mentioned approach.