



The fifth project of the Data Science Bootcamp T5  
Deep Learning and Convolutional Neural Network (CNN)

## Handwritten Signature Forgery Detection

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### Abstract:

Handwritten signatures are very important in our social and legal life for verification and authentication. A signature can be accepted only if it is from the intended person. The probability of two signatures made by the same person being the same is very less. Many properties of the signature may vary even when two signatures are made by the same person. So, detecting a forgery becomes a challenging task. The goal of this project is to detect the forgery signature. Banking, Insurance, Healthcare, Copyright, and Intellectual Property Rights, Regulatory and Government Compliance will benefit from this project.

### Design:

In our project, a solution based on Convolutional Neural Network (CNN) is presented where the model is trained with a dataset of signatures, and predictions are made as to whether a provided signature is genuine or forged.

## Data:

The dataset contains the signature of user both genuine and forged. In the dataset the directory number says the name of the user and it's classified into two: Genuine and forged.

Found the dataset on the Kaggle website: [Here](#).

## Algorithms:

Using the sequential model from Keras framework has been 1649 for training and 500 for testing in a dataset. By Adaptive Moment Optimizer (ADAM) and Root Mean Square Propagation (RMS) models.

## Tools:

- Technologies:

Python -Jupyter Notebook.

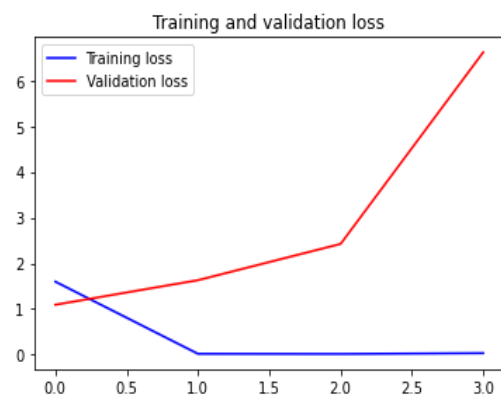
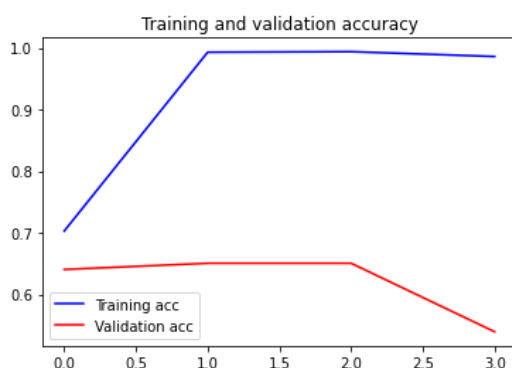
- Libraries:

Pandas -NumPy -Matplotlib - Keras - sklearn - Tensorflow - cv2 - os - glob - Skimage - gc.

## Communication:

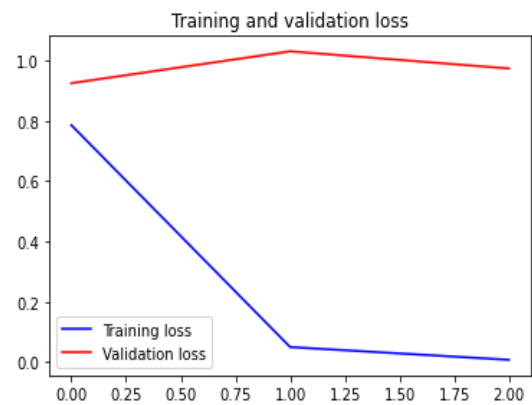
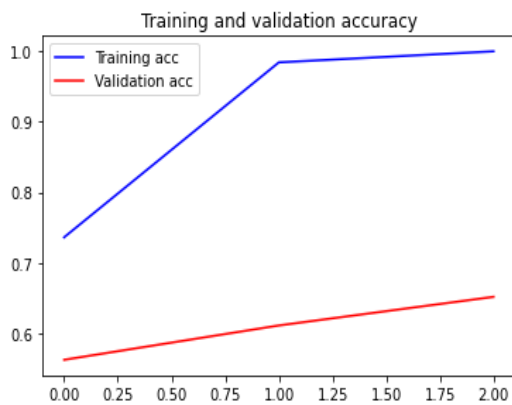
- InceptionV3\_RMSprop model

Training Accuracy	Validation Accuracy	Test Accuracy
98%	54%	60%

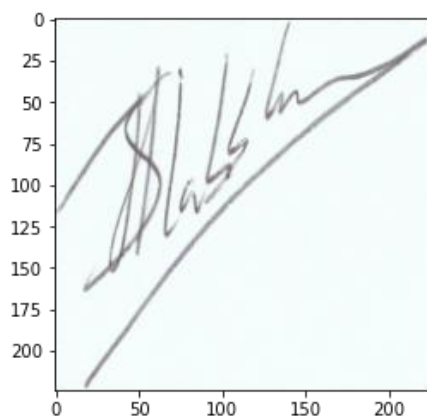


- Inception-v3 – Adam model

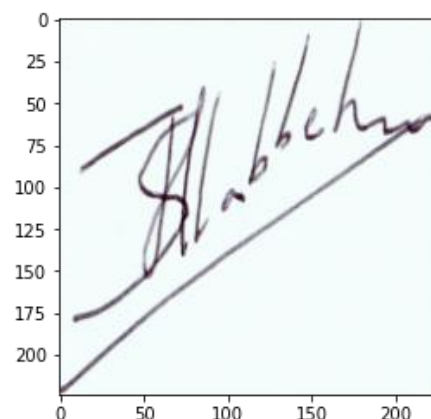
Training Accuracy	Validation Accuracy	Test Accuracy
99%	65.2%	68%



- Testing out with your own images



Probability Genuine: **61%**  
 Probability Forged: **39%**



Probability Genuine: **3%**  
 Probability Forged: **97%**

## **Conclusion:**

In this project, using Convolutional Neural Network (CNN) has been trained and tested in a dataset and reached an accuracy of 99% and 68% for testing.

## **Future Work:**

- ❖ Increase the obtained results by using different DL approaches which are supported by extra feature extraction methods.