

# Cinnamon AI Bootcamp

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## 1 Introduction

This challenge is a forensic problem that means you have to point out whether the image is fake or detect the tampered regions in an image by using edge features (Wavelet, Fourier, ...) . Your task is to implement such system which has the pipeline in the Figure 1.

- Data Generation, data pre-processing
- Feature extraction
- Classification (SVM, Neural Net, ...)
- Post-processing
- Evaluation

## 2 Data Generation

We will give you a public dataset CASIA v2 that contains tampered images with ground truth and original images without tampering. Depend on your models, you have some approaches to normalize and generate data. We also propose some works to generate and pre-processing data.

- convert image to Y-Cr-Cb channel
- Normalize the image size
- Divide the image into blocks

## 3 Feature Extraction and Classification

If you using a Deep Learning model to extract features, you have to consider to augment data because of lack of tampered images. Whereas conventional features are not good enough to preserve the information of fake.

After that, you need a classifier to point out the tampered images. You have some approaches:

- Neural Network + Activation function
- Support Vector Machine
- Softmax Regression

Particularly, if you using SVM or Softmax Regressor as a classifier, you have to implement it with numpy.

## 4 Post-processing and Evaluation

After training a classifier, you need some post-processing steps to finalize the result. For example, if you divide an image into blocks and classify these blocks is authentic or tampered, you have to post-process to finalize the class of the image.

This is a binary classification problem, there are some metrics to evaluate a model, such as, *Precision*, *Recall*, *F1 – score*

## 5 Interface

## References

- [1] Thuong Le-Tien, Hanh Phan-Xuan, Thuy Nguyen-Chinh, and Thien Do-Tieu. *Image Forgery Detection: A Low Computational-Cost and Effective Data-Driven Model*. <http://www.ijmlc.org/vol19/784-ML0016.pdf>, 1993.



Figure 1: Pipeline of system for forensic. This image is taken from (1)