

# User Guide

## Directories

In this directory you will find five directories:

- **Localization\_algorithms:** It contains the code of the AJPEG, NAJPEG and CFA localization algorithms.
- **Framework:** It contains the .m files for the Framework fusion and segmentation, the edison matlab interface and the tamper\_images folder.
- **Dataset\_creation:** It contains the .m files for the generation of all the data necessary for the Basic Belief Assignment for all the algorithms and a zip file that contains the images used to create these data.
- **DST\_theory:** It contains the code to build up the fusion model using the Dempster-Shafer theory.
- **Utils:** It contains some .m files shared by the code in Framework and Dataset\_creation, the fusion model of the framework and the data necessary for the BBA modules (the three matrices of the data and the best parameters found by the grid search).

## Dataset\_creation

In this folder you will find all the codes necessary to build up the three matrices and the parameters for all the BBA modules. The main script is the **generate\_dataset** that from a specified directory:

- Creates the tampering for AJPEG, NAJPEG and CFA.
- Generates the localization map for each tampering by applying the algorithm that localizes that kind of manipulation.
- Divides the data into five folds.
- Executes the script **create\_best\_BBA\_parameters** that creates the .mat files:
  - **tables.mat** that contains the three matrices that are necessary for the KNN search.
  - **best\_fusion\_parameter.mat** that contains the best parameters found by a grid search using the previously created fold.

The other .m files are the functions used by the script **generate\_dataset** for its purpose. The two generated files **tables.mat** and **best\_fusion\_parameter.mat** have to be moved to the directory **Utils** if you want to use them in the Fusion Framework.

## ***Make your own dataset***

You can make your own dataset. Just pay attention to some rules:

1. The matrices must have a number of 5/6 columns in this order: Q1 (first compression factor), Q2 (second compression factor), mean value, std deviation, localization map value, label (for more information read the pdf file in the directory **TESI**).
2. The mean value and the std deviation are calculated from the Y channel of the YCbCr image.
3. The label is a binary number that has to be 1 in the case of the double compression block or in the presence of CFA in the block. Otherwise it is 0.

## Framework

This fold contains the .m files for the Framework fusion and segmentation, the edison matlab interface and the tamper\_images folder. In the tamper\_images you can find the realistic dataset used to test the framework. In the edison\_matlab\_interface you can find the code that implements the Synergetic Image Segmentation.

If you want to test the Framework on the realistic dataset, you just have to start the script **Framework.m**. This script executes two functions: **fusion\_framework.m** and **segmentation\_module.m**.

1. **fusion\_framework.m** executes the three localization algorithms, filters the localization map, generates the BBA map and starts the fusion module. The fusion maps are saved in the same folder of the images.
2. **segmentation\_module.m** executes the segmentation for all the images and generate the binary map of each image from the calculated fusion map.

The other functions in the folder are subroutines necessary for them.

## DST\_Theory

In this folder you can find the code to generate the fusion model in a symbolic form. You have to:

1. Build the model for a single variable.
2. Extend it to 5 variables.
3. Generate two formulae (tampered and original).
4. Simplify them.
5. Transform them into a char variable and replace the Matlab operator / with ./ and \* with .\*

The tampered and original formulae used by the Fusion Framework are in the directory **utils** saved in the model.mat file.

An example of the generation of these variables is contained in the **DS\_spatial\_model.m**.

**ATTENTION** this code works only on MATLAB 2009a. Any other version of MATLAB returns an error code if you execute it.