Alarming system for the detection of abandoned luggage

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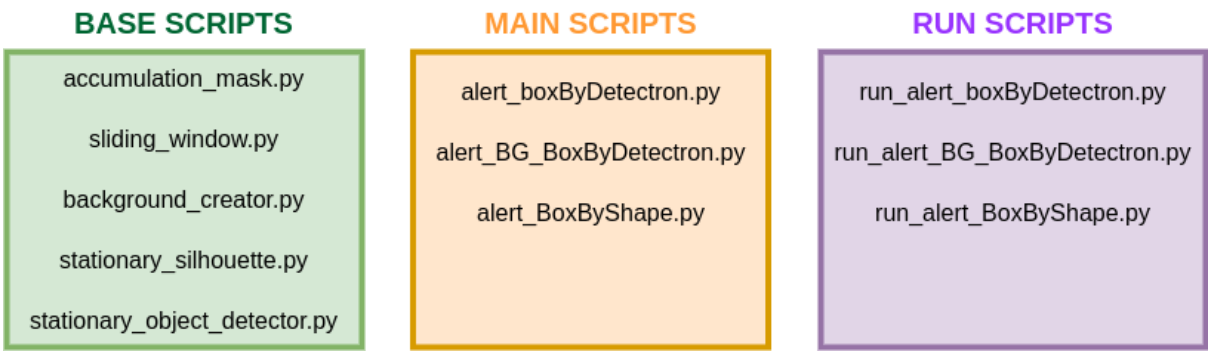
REQUIREMENTS

- OpenCV
- PyTorch
- Detectron2
- sklearn
- argparse

PROJECT ORGANIZATION

The project directory contains several python scripts that can be conceptually separated in the following way:



In the base scripts group there are all the scripts that contain the base classes used by the scripts in the main scripts group. The run scripts group contains a script for each script in the main scripts group, and through this group it is possible to launch the effective alarming system.

INTRO

It is possible to run the program through the python scripts that start with “run”.

- run_alert_BoxByDetectron.py [“Version 1” in the report]
- run_alert_BG_BoxByDetectron.py [“Version 2” in the report]
- run_alert_BoxByShape.py [“Version 3” in the report]

SYSTEM SETUP

All the “run scripts” use the script alert_configuration.py to set up the internal parameters. To change these parameters open alert_configuration.py and change the parameter you want. Below the list of all the parameters that can be changed, the meaning of each parameter is explained in the report.

```
# file: alert_configuration.py
...
        self.STATIONARY_SECONDS = 30
        self.PEOPLE_STATIONARY_SECONDS = 10
        self.SLIDING_WINDOW_SECONDS = 10
        self.BACK_STEP = 1
        self.THRESHOLD_ACCUMULATION_MASK = 0.5
        self.PEOPLE_ID = 0
        self.CATEGORIES_ID = [24, 26, 28]   # backpack, handbag, suitcase
        self.COLORS = {24: (65, 14, 240), 26: (33, 196, 65), 28: (236, 67, 239)}
        self.NOISE_SCALE_FACTOR_BAGGAGE_SILHOUETTE = 5e-4
        self.NOISE_SCALE_FACTOR_PEOPLE_SILHOUETTE = 1e-3
        self.NOISE_SCALE_FACTOR_PEOPLE_SILHOUETTE_REDUCED = 7e-4

        self.BACKGROUND_METHOD = 'MOG2'
        self.BACKGROUND_LEARNING_RATE = -1
```

HOW TO RUN

In order to better manipulate input and output video is possible to pass some arguments to the “run scripts”. To show all the possible argument type:

```
$ python3 run_run_alert_BoxByDetectron.py --help
usage: run_alert_BoxByDetectron.py [-h] [--input_file INPUT_FILE]
                                   [--output_dir OUTPUT_DIR]
                                   [--skipped_frames SKIPPED_FRAMES]

optional arguments:
  -h, --help            show this help message and exit
  --input_file INPUT_FILE, -i INPUT_FILE
                        Path to the input video file, (default:
                        ./data/video1.mp4)
  --output_dir OUTPUT_DIR, -o OUTPUT_DIR
                        Path to the output folder (default: ./output)
  --skipped_frames SKIPPED_FRAMES, -s SKIPPED_FRAMES
                        Number of frame to skip during exectuion (default: 2)
```

It is possible to specify the input file, the output directory and the number of frames that have to be skipped by the processing.

Below are written the command to type to run all the three “run script” where input file is *./data/video1.mp4*, output directory is *./output* and number of skipped frames is 2.

```
$ python3 run_alert_BoxByDetectron.py -i ./data/video1.mp4 -o ./output/ -s 2
$ python3 run_alert_BG_BoxByDetectron.py -i ./data/video1.mp4 -o ./output/ -s 2
$ python3 run_alert_BoxByShape.py -i ./data/video1.mp4 -o ./output/ -s 2
```