CS588-HW1

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README

Note

- Please see the dependencies in the `pyproject.toml` file. The extract version of the dependencies can be installed with Poetry with `poetry.lock`.
- To the result can be replicated by running the `run.sh` script.
- The program is written as a command line tool. The usage can be found by running `python main.py --help`.
  - The entry point is `python run.py`.
  - For the gaussian filtere funcionality:
    - Entry point: python run.py gaussian-filter

```
Usage: run.py gaussian-filter [OPTIONS]

Gaussian filter with stride 1

Options
--input    -i        TEXT     Input image path [default: data/kangaroo.pgm]
--output   -o        TEXT     Output folder path [default: result]
--sigma    -sig      FLOAT    Sigma (variance in gaussian filer) [default: 1.0]
--size     -s        INTEGER  Size of the filter, should be at least less than image size, if it is not specified, it
                              will be set to floor(6 * sigma + 1))
                              [default: None]
--help                        Show this message and exit.
```

Figure 1: Gaussian filter

  - For the sobel operator funcionality:
    - Entry point: python run.py sobel-operator-gradient-magnitude

```
Usage: run.py sobel-operator-gradient-magnitude [OPTIONS]

Sobel operator

Options
--input          -i       TEXT     Input image path [default: result/kangaroo_gaussian_1.0_7.pgm]
--output         -o       TEXT     Output folder path [default: result]
--sigma          -sig     FLOAT    Sigma (variance in gaussian filer) [default: 6.0]
--gaussian-size  -gs      INTEGER  Size of the filter, should be at least less than image size, if it is not specified, it will be set to floor(6 * sigma + 1))
                                   [default: None]
--threshold      -t       FLOAT    Threshold [default: 75.0]
--help                             Show this message and exit.
```

Figure 2: Sobel Operator

  - For the non-maximum supression edge detection(combined the gaussian filter and sobel operator):
    - Entry point: python run.py non-maximum-suppression-edge-detection

```
Usage: run.py non-maximum-suppression-edge-detection [OPTIONS]

Non maximum suppression edge detection

Options
--input          -i       TEXT     Input image path [default: data/plane.pgm]
--output         -o       TEXT     Output folder path [default: result]
--sigma          -sig     FLOAT    Sigma (variance in gaussian filer) [default: 6.0]
--gaussian-size  -gs      INTEGER  Size of the filter, should be at least less than image size, if it is not specified, it will be set to floor(6 * sigma + 1))
                                   [default: None]
--threshold      -t       FLOAT    Threshold [default: 22.0]
--help                             Show this message and exit.
```

Figure 3: Non Maximum Supression