Contents

1 Subject

The project's aim is to implement and compare 2 methods of the digital watermarking. Technologies chosen by us are: LSB and Patchwork. Analysis will be focused on main areas of watermarking which are: transformation, distortion, compression.. //todo: dopisac jakie jeszcze.

2 State of art

Digital watermarking in general is a kind of marker embedded in a noise-tolerant signal. The most popular kinds of the signals which allow watermarking are images, videos, audio. Typically used for identifying ownership and mark copyrights. A digital watermark does not change the size of the carrier signal. Exam-

ple of watermark.

. . .

1. Spatial domain techniques - directly add the watermark to pixel values - exploit Human Visual System for hiding the data
2. Transformed domain techniques - add the watermark to the coefficients of a full-frame transform (DFT, DCT, Mellin, Radon, Fresnell)
3. Hybrid techniques

3 Project scope

In the following subchapters,

3.1 Goal

The main goal of the project is to prepare simple application with both of the algorithms implemented. Our tasks were focused on proper algorithm implementation rather than on user interface. We were trying...

3.2 Communication

Communication of team members took place remotely using Trello (an internet application for project management) and Facebook Messenger (messenger on a social networking site). After the division of tasks through Trello, each member could take on a specific task and present the progress of the work and the final effects of the project stages on an ongoing basis. Important point of communication were team meetings, where we could discuss problems related to the project implementation and solve difficult tasks more efficient. The source code of the application has been managed remotely using the GitHub repository.

3.3 Features

3.4 Requirements

4 Techniques and Technologies

- Python 3.7
- NumPy
- scikit-image
- algorithms:
    1. LSB – Least Significant Bit
    2. Patchwork techniqe

5 Milestone and project plan

5.1 Team members

- Bartosz Gardziejewski
- Rafał Gradkowski
- Łukasz Obrebski
- Paweł Zaborowski

5.2 Project plan

Out team have splitted into topic groups:

1. LSB implementation
2. Patchwork implementation
3. Documentation work

5.3 Gantt Chart

- 11.10.19 – Setup of Trello & GitHub
- 17.10.19 – Project Kick OFF (first presentation)
- 14.11.19 – Literature analysis, working Python environment, beginnings of a documentation
- 28.11.19 – Implementation of embedding digital watermark in images using both algorithms
- 12.12.19 – Implementation of decoding digital watermark in images using both algorithms
- 09.01.20 – Juxtaposition and comparison of results
- 16.01.20 – Project closure (Final presentation, project demo, documentation)

5.4

6 Results

Example:

When we look at background of the black area with "python" word we are able to se generated watermark.

6.1 1

LSB pros and cons:

- Resistance to geometric transformations, like cropping, stretching or rotating
- High capacity of watermark
- Can be easily destroyed by distortions or gamma changes

6.2 2

Patchwork pros and cons

- Resistance to cropping and to gamma and tone scale corrections
- The detector doesn't require the original cover image to determine whether the image has been watermarked.
- Can be destroyed by any affine transformation, like translation, rotation or scaling

7 Conclusions