**CMSE492 Lab 1. Wang’s method**

20.03.2021

**Task:**

1. Implement Wang’s algorithm [1] in any programming language/operating system
2. Test your implementation using Seminar 23.03.2021 examples: “Embed the following secret binary data, S=’ 1 1 0 1 0 1 0 1 0 1 0 0 0 0 1 0 1 1 0 1 1 1 1 0 1 0 1’, into the cover image, CI=(190, 255, 161, 100, 1, 159) by Wang’s method using T=160, ml=16, mu=32”.
3. Test your implementation on 4 host 512x512 images (Mandrill, Peppers, Jet, and Lena) and 4 secret 256x256 images (Mandrill, Peppers, Jet, and Lena) used in [1]
4. For each of 16 variants of embedding secret into the covers, calculate PSNR and compare your results versus [1, Table 1, p. 112]. In the case of discrepancies, fix your problems, or prove that your results are correct.
5. **Defend the Lab on April 8, Thursday, 18.30-20.20, Teams (upload your report, run your program, and explain your work done).**
6. Report shall have
   1. Cover page (University, Department, Course, Semester, Year, City, Country, Lab subject, Team members, Lecturer, Lab assistant)
   2. Outline
   3. Problem definition (see items 1-4 above)
   4. Wang’s method description
   5. Description of Wang’s method implementation in your programming language/operating system
      1. Description of the host/secret images you use and their sources
      2. Description of preprocessing phase 1 implementation
      3. Description of embedding phase 2 implementation (**ml, mu, and T must be parameters, not literals**)
      4. Description of extraction phase 3 implementation
      5. Description of PSNR and embedding capacity calculation
   6. Description of the tests conducted and their results, **screenshots** of them
   7. Comparison of your results versus [1, Table 1, p. 112].
   8. Conclusion
   9. References
   10. Appendices with the code developed
   11. Archived file (zip, or rar) with all Lab related materials (report, images used, test results, sources, executables). It shall be possible to install your program from the archive, run it on your examples, and view results you got.

**References**

1. S.-J. Wang, Steganography of capacity required using modulo operator for embedding secret image, Applied Mathematics and Computation, 164 (2005), 99-116, doi:10.1016/j.amc.2004.04.059, [paper](https://staff.emu.edu.tr/alexanderchefranov/Documents/CMSE492/LSB%20modulo%20AMC2005.pdf)

**Grading policy: report – 50%, explanations – 50%**