

# Homework #12

## Clustering and optimisation

Anastasiia Konoplina

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7. *Provide feedback for the course and homework topics so far*

- *which topics were most useful?*
  - *what needs to be covered better in the course?*
  - *are there some topics that would need more practical implementation assignments?*
  - *are there some topics that got too much attention (e.g. too boring or otherwise already well known)*
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- 1) I cannot say that some topic was “useful”. There were several topics like “interesting to know” – trees, heaps, sorting. But in any case I don’t think I will use any of them in life.
  - 2) For me the most complicated topics were from hw 7 and 8. Maybe for others as well, if so – maybe it would make sense to cover these topics more
  - 3) I think for graphs assignments could be “more interesting” – some things from real life.
  - 4) no
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4. *Propose a possible project idea for the course project. Outline the challenge, question, and brief description of the steps needed to solve this project. You do not need to perform this research. The goal is rather to work through some idea from the course that someone might or should perform based on current course knowledge.*

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I liked the idea of article I used for essay. There is hub-based labeling algorithm for shortest paths in road networks, where continent-scale road networks was used. This algorithm theoretically was very fast (the fastest from all known algorithms), but nobody used it in practice. I think it would be nice to try to implement this, but I don’t know where to take the data from.

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5. Attempt to reconstruct the image. By "sorting" the rows - perhaps using some clustering tool or algorithm, and providing the row id's in respective order to the image shuffling web tool - you *may* get some hint of a reconstruction of this image. What is depicted on the original image?

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The picture I got after clustering rows by sum of all values:



Implementation is [here](#).

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1. Describe two (or more) objective functions for a "best fit" of  $N$  data points on 2D plane.

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- 1) Functions which determines "nearest" data point
- 2) Orthographic projection