POP - Project conception
Photo Slideshow Optimization

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Project goal

The goal of our project is to find a way to arrange the slides so that the slideshow score is as high as possible. Each photo is assigned a tag, and points are awarded based on how well the slides fit together—not too similar, but not completely different either. Therefore, we want to arrange the photos in a way that maximizes the total score for the entire slideshow.

How do we want to approach this?

We don't plan to write the final algorithm right away. We want to experiment with different ideas, see what works and what doesn't, and gradually arrive at something sensible. Our goal is to show the entire thinking process—trial, error, testing, and conclusions.

General action plan

1. Explore the data – see what photos look like, how many tags they have, how often they repeat, etc.

2. Make the simplest solution.

3. Gradually improve – explore different ways of pairing vertical photos and arranging the entire show.

4. Compare results – how many points, how long it takes, is the result stable.

5. Make conclusions.

With horizontal photos, each photo constitutes a separate slide, while vertical photos must be combined in pairs to create slides. This means that the entire slideshow consists of both single horizontal photos and pairs of vertical photos. If the number of vertical photos is odd, one will be left unused, as two vertical photos are always required to create a slide.

First ideas to test

We want to test a few simple ideas that will help us understand what influences the result the most and which strategies are worth developing later.

Combining vertical photos

We need to combine vertical photos into pairs to create a single slide. We want to test several different ways of doing this:

1. **Random Stitching** – stitch vertical photos together randomly to provide a point of reference.

2. **Similar photos** – combining photos that have a lot of common tags.

3. **Different photos** – combining photos that have few common tags, so that there are more unique tags in one pair.

Arranging the order of slides

We plan to test several approaches:

1. **Random arrangement** – the simplest possible solution that will give us a starting point for comparisons.

2. **Nearest neighbor (greedy)** – we start with one slide and choose the next one that gives the greatest increase in points compared to the previous one.

3. **Grouping by tags** – we divide the slides into groups with similar topics and try to arrange the presentation so that the transitions between groups are smooth.

4. **Mixing topics** – we intentionally mix different groups to make the slideshow more diverse and interesting.

Local corrections

After creating the initial order, we want to add a small adjustment step that can slightly increase the score:

1. swap two adjacent slides if this improves the result.

2. move one slide to a different location if it gives better transitions.

3. randomly shuffle a section of the show and see if the score improves.

How will we test

We want to test and compare every idea we come up with. We plan to record all test results in a table or simple graph so we can easily see what really works best.
   What we are going to record:

1. method of combining vertical photos (random, similar, different),

2. slide ordering method (random, greedy, grouping by tags),

3. score (total points from the entire show),

4. operation time (if method is fast or slow),

5. short observations and conclusions.

What we plan to observe and analyze

We will pay attention to features such as:

1. average number of tags per photo and per slide,

2. the most frequently occurring tags and their repetition,

3. how arranging similar or different tags affects your points,

4. how the result changes with different parameters (e.g. the number of candidates considered in the greedy method),

5. how much does the result differ between several random runs of the same method.

The results we expect

Based on our ideas and previous observations from similar projects, we assume that:

1. the random solution will have the lowest score, but will serve as a reference point,

2. method *greedy* will give a noticeably better result with little effort,

3. minor local corrections will allow you to gain a few more points,

4. combining vertical photos with different tags may produce better results than combining similar ones.

   These are only our assumptions — we want to verify them in practice and draw conclusions based on them.

The final effect

We don't think we'll create a perfect algorithm, but we'll strive to present a sensible and logical process for reaching a solution.

The final result will include:

1. set of results from different approaches (in tables or graphs),

2. quick summary of what works and what doesn't,

3. description of the process of our experiments,

4. conclusions and ideas on what could be improved further.