Retrieval of GIF Images
(Track: Research)

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Overview of My Project

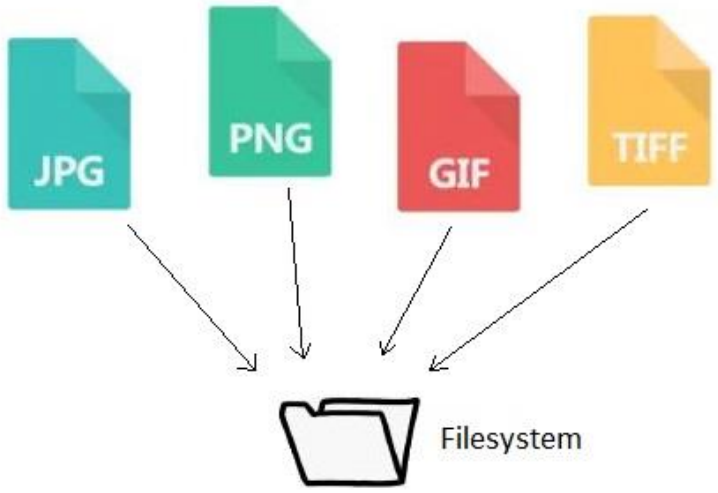
- Problem definition
- Goals and performance measures
- Methods and techniques proposed
- Project timeline
- Current state of the project
- Projected plan
- Discussion
- References

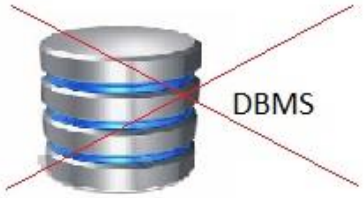
Problem Definition

- GIF image is comprised by a set of images.
- Main problem: How to retrieve similar GIF formatted image when one GIF image is given.

https://giphy.com/gifs/natsaero-RdoGOGPKceidK719rZ

Goals and Performance Measures





- Storing GIF images
  - No difference from other formats
  - JPEG, PNG, GIF, TIFF, etc. are stored by using the same method.
  - They are stored in filesystem, NOT in databases.
  - Video formats are different.

Goals and Performance Measures

- Retrieving GIF images
  - No special method for GIF image.
  - The most commonly used method to calculate difference between two simple image is Euclidean distance.

$$d(\mathbf{p}, \mathbf{q}) = \sqrt{\sum_{i=1}^{n} (p_i - q_i)^2}$$

Euclidean distance formula

Goals and Performance Measures

- Accuracy Results
  - Google's reverse image search function does not work perfectly.
  - There are too many features that changes the image such as resolution and toning.
  - My proposed method will give result as True or False.
  - It will look for the exact match.
- Performance
  - No special performance metric for images.
  - Loop through all GIF images in the folder.

Methods and Techniques Proposed

- Storage methods
  - I will use filesystem to store GIF images.
  - Storing images in the filesystem shows nearly same performance comparing to the databases.
  - Filesystem is easy to maintain and rearrangeable.
  - A source control system might be used to prevent disk corruption or accidental deletion.
  - Filesystem and databases can have the same security level if they are configured well enough.

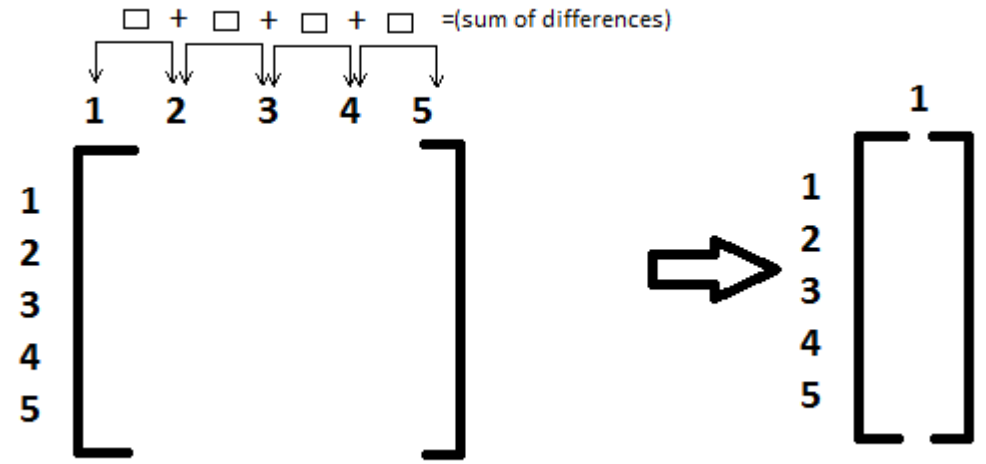
Methods and Techniques Proposed

- Retrieving techniques
  - Question: Is there any GIF image in the filesystem similar to the given GIF image?
  - Similarity calculations are being done with the steps that I propose on the right.
  - Finally, I will have two 1D arrays representing GIF images. I will check those arrays' equality and return the result.

- C : number of images
  m : mode
  S_R, S_G, S_B: standard deviations

$$S = \sqrt{\frac{1}{C-1}\sum_{k=1}^{C}(x - m_k)^2}$$

- $S_R + S_G + S_B$



Project Timeline

- The deadline is June 10, 2020.
- I will submit my paper and source codes until deadline.

Current State of the Project

- I created GIF folder.
- My algorithm is almost done.
- I am planning to use Java.

Projected Plan

1. Introduction
2. Related Research
3. Methodology
4. Experiments and Results
5. Discussion and Conclusion

Discussion

- Technical difficulty
  - Matlab and Python is more useful for reading images.
  - I will use Java because I am familiar with it.
- Possible directions for improvement
  - My proposed algorithm on other image formats
  - Storing GIF images as compressed files

References

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2. Jing Li, Bao-Liang Lu. (2009). An adaptive image Euclidean distance. Pattern Recognition, Volume 42, Issue 3, Pages 349-357, ISSN 0031-3203.
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