Original Work

SCENE COMPLETION USING MILLIONS OF PHOTOGRAPHS

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The Algorithm

Input image → Scene Descriptor → Image Collection

20 completions → Context matching + blending → 200 matches

Hays and Efros, SIGGRAPH 2007
Data

We downloaded **2.3 Million** unique images from Flickr groups and keyword searches.

Hays and Efros, SIGGRAPH 2007
Experiment

SCENE COMPLETION USING THOUSANDS OF IMAGES
Toy Implementation Algorithm

Dataset -> Compute GIST with MatLab -> Dataset w/ GIST

Dataset w/ GIST -> Calculate best fits (nearest GIST) and fill -> Filled in Image(s)

Image -> Create binary mask for image -> Masked Image (Image with omitted part)
Datasets and Experiment

- Two datasets
  - Rural Dataset (~5000 images)
    - SUN Dataset (Pulled rural categories e.g. mountains, hills, forests, etc.)
    - CVCL Dataset (Pulled all available rural categories)
    - Combine to form a single rural dataset
    - Subset is 1500 randomly selected images
  - Urban Dataset (~6000 images)
    - SUN Dataset (Pulled urban categories e.g. highway, city, etc.)
    - CVCL Dataset (Pulled all available urban categories)
    - Combine to form a single urban dataset
    - Subset is 2000 randomly selected images
Datasets and Experiment...

- **Experiment**
  - Pull out 2 images from database with respect to the categories identified by the CVCL database
    - **Beach**, Open Country, Forest, Mountain, Highway, Street, City Center, **Tall Building**
    - 1 of each from the CVCL subset; delete the originals in the compound dataset (s.t. we don't find an exact match and replace with same image))
  - **Variable: Dataset size**
    - How to control?
    - Randomly select n (roughly 1/3) amount of images for each dataset and re-calculate the GIST descriptors for the subsets
Rural Datasets
Rural Dataset Results

Initial Image

Query Image

Matched Result

Filled Result
Rural **Subset** Results

Initial Image  Query Image  Matched Result  Filled Result
Urban Datasets
Urban Dataset Results

Initial Image

Query Image

Matched Result

Filled Result
Urban **Subset** Results

Initial Image

Query Image

Matched Result

Filled Result
Problems/Difficulties with Experiment and Discussion

- Selecting what to omit from the image
- Finding good data
- Working with a lot of data
- Difficult/Questionable Scenes
  - Highway?
- Resolution
  - Query Images: 256x256
  - Database Images: Large variety (3752x5000 to 87x65)
- Box vs. Freeform
- Replacement size
References

- [http://cvcl.mit.edu/database.htm](http://cvcl.mit.edu/database.htm)
- [http://groups.csail.mit.edu/vision/SUN/hierarchy.html](http://groups.csail.mit.edu/vision/SUN/hierarchy.html)