Image quilting for texture synthesis and transfer

Project Id : 44

Github Link : https://github.com/anveshc05/DIP_Image_Quilting

Team Members:

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Goal

Synthesizing a new image by stitching together small patches of existing images. We will achieve our goal by splitting our project into two main parts:

- **Texture Synthesis -** Given a finite sample of some texture, the goal is to synthesize other samples from that same texture
- **Texture Transfer -** Take the texture from one object and "paint" it onto another object.

Problem Definition

Texture synthesis has been tried using multiple methods. Some of them which are mentioned in paper:

- ***Efros & Leung: Markov property, compute P(p|N(p))***
- ***Chaos Mosaic: Place random blocks in random location.***

The method we will be using in achieving our goal will be **Minimum Error Boundary Cut.**

Minimum Error Boundary Cut.

We want to make the cut between two overlapping blocks on the pixels where the two textures match best (that is, where the overlap error is low).

$$E(i, j) = e(i, j) + \min(E(i-1, j-1), E(i-1, j), E(i-1, j+1))$$

Results

The synthesis process will be followed on wide range of images. Despite its simplicity, this method is expected to work remarkably well when applied to texture synthesis, producing results that are equal or better than the Efros & Leung family of algorithms but with improved stability (less chance of “growing garbage”) and at a fraction of the computational cost. We will also extend our method to texture transfer in a general setting with some very promising results.

For texture transfer, image being synthesized must respect two independent constraints:

(a) The output should be synthesized examples of the source texture

(b) The correspondence image mapping should be respected.

Team members and tasks for each member

Since there are just two members in our team so every task from reading, learning till implementation will be equally shared between both of the team members.

Distribution of task would be decided with the progress of the project.

Timeline

Dates	Work to be done
Week - 1 Oct 1 - Oct 7	1. Proper understanding of the problem statement and ***thorough reading of multiple related research papers***. 2. Finding interesting texture images for ***performing texture synthesis.***
Week - 2 Oct 8 - Oct 12	1. Work towards ***understanding texture synthesis***, and various techniques which have already been explored. 2. Try out naive implementations of other methods like the ***chaos mosaic***. 3. Work towards implementing and achieving considerable success in ***Minimum Error Boundary Cut*** for texture synthesis.(continued further ….)
Week - 3 Oct 12 - Oct 17	1. Work towards implementing and achieving considerable success in ***Minimum Error Boundary Cut*** for texture synthesis. 2. **MID - EXAMS**
Milestone - 1	
Week - 4 Oct 18 - Oct 25	1. Studying about various texture transfer methods and working towards ***choosing the***

	appropriate strategy. 2. Each patch from the synthesis algorithm should be made to satisfy a desired ***correspondence map.***
Week - 5 Oct 26 - Nov 1	1. ***Refining the texture mapping*** procedure to obtain better results. 2. Finalizing the pipeline for the work which has been done until now, which include ***image quilting and stitching together multiple images*** to give the desired results.
Week - 6 Nov 2 - Nov 10	1. ***Preparing the presentation and demo*** of the final submission. 2. Final Evaluation of the code and code submission. 3. Prepare a ***final project report***.
Milestone - 2	