BLENDIFY

SEAMLESS IMAGE STICHING

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CONTENT

INTRODUCTION

The Blendify app in Python is a convenient tool that transforms ordinary photos into captivating panoramic views with ease.

The primary objective is to achieve precise alignment, or homography, between consecutive images and extend this capability to create coherent panoramas from larger sets.

OBJECTIVES

- To develop an efficient algorithm using SIFT, RANSAC, and Levenberg-Marquardt(LM) optimization to create captivating panoramas with a wide field of view.

- To design intuitive features for seamless image uploads and automatic panorama generation, eliminating manual effort or complex tools.

- To implement techniques to address exposure variations and vignetting for smooth transitions, ensuring visually appealing and natural panoramas.

HOW IT WORKS

Scale-Invariant Feature Transform(SIFT)

For identifying and matching features between images

Random Sample Consensus(RANSAC)

To find patterns in data that contains many outliers

Levenberg-Marquardt(LM) Algorithmn

To find the best fit for a set of data points

SCALE-INVARIANT FEATURE TRANSFORM(SIFT)

- **Feature Detection**: SIFT identifies unique points, like corners and edges, in an image that are likely to be the same even if the image is scaled, rotated, or viewed from a different angle.

- **Feature Description**: It creates a "descriptor" for each feature point—basically, a unique fingerprint that describes the texture and orientation around the feature.

- **Feature Matching**: When comparing two images, SIFT looks for matching descriptors between them, which helps determine whether the images have similar content or overlapping areas.

RANDOM SAMPLE CONSENSUS(RANSAC)

- **Random Sampling**: RANSAC randomly picks a small number of data points to estimate a model. For example, if it's trying to fit a line, it might randomly select two points and draw a line between them.
- **Consensus Building**: It checks how many other points in the data fit (or are "close to") this estimated model. Points that fit are called "inliers," and those that don’t are "outliers."

- **Best Fit Model Selection**: RANSAC repeats this process many times, each time choosing a different random sample and model. The model that has the most inliers (fits the most points) is chosen as the best model.

LEVENBERG-MARQUARDT(LM) ALGORITHMN

- **Adjusting Parameters**: LM tweaks the model's parameters (like the slope or shape of a curve) to make it line up with the data points as closely as possible.
- **Switching Between Steps**: LM decides automatically when to make big steps or small steps to find the best fit efficiently.

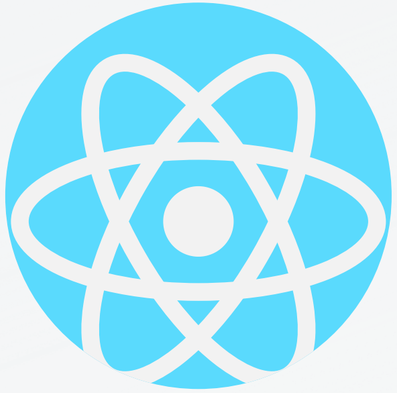
Combination of Two Methods:

- **Big Adjustments (Gradient Descent)**: If the model is far from the data, it makes larger steps to quickly get closer.
- **Fine Adjustments (Gauss-Newton)**: When it’s closer to a good fit, it makes smaller, precise steps to match the data even better.

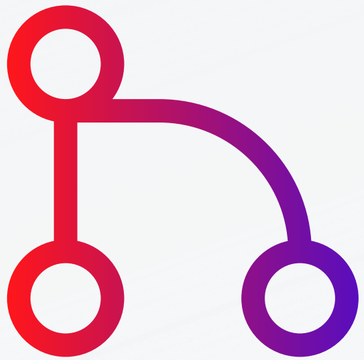
HTML

CSS

REACT



PYTHON



GIT

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THANK YOU!