

Report-5

Data PreProcessing:

- Data Preprocessing is that step in which the data gets transformed, or Encoded, to bring it to such a state that now the machine can easily parse it.
- Data objects are described by a number of features, that capture the basic characteristics of an object.
- Real-world data is often incomplete, inconsistent, and lacks in certain behaviors or trends, and is likely to contain many errors.
- Numpy,Pandas,Matplotlib Provide the methods to pre process the Data.

Stages Of Data Pre-Processing:

- **Data Quality Assessment:** Should Check for data types,dimensions mismatch,missing values handling, Outliners in the dataset. We have make sure that the database is accurate, boosts consistency and smooth the data.
- **Data Cleaning:** goal of data cleaning is to provide simple, complete, and clear sets of examples for machine learning. Fill/ remove Missing Data, Noisy Data(duplicates,unnecessary information).
- **Data Transformation:** Is the method of turning the data into an appropriate format for the computer to learn from. Some common techniques of data transformation are : Aggregation(data is pooled together and presented in a unified format for data analysis) ,Normalization(scaling of data within a range to avoid building incorrect ML models while training),Discretization.
- **Data Reduction:** Process of reducing the amount of data and decrease the cost of analysis. Dimensionality Reduction is an example.

Panaroma Stitching:

Image stitching or photo stitching is the process of combining multiple photographic images with overlapping fields of view to produce a segmented panorama or high-resolution image.

Our panorama stitching algorithm consists of four steps:

Step 1: Detect keypoints (DoG, Harris, etc.) and extract local invariant descriptors (SIFT, SURF, etc.) from the two input images.

Step 2: Match the descriptors between the two images.

Step 3: Use the RANSAC algorithm to estimate a homography matrix using our matched feature vectors.

Step 4: Apply a warping transformation using the homography matrix obtained from Step 3.

References:

https://www.researchgate.net/publication/302412200_Image_pre-processing_for_optimizing_automated_photogrammetry_performances/fulltext/5730669208ae3736095ce446/Image-pre-processing-for-optimizing-automated-photogrammetry-performances.pdf

<https://towardsdatascience.com/data-preprocessing-concepts-fa946d11c825>

Drone Images : <https://www.cfreds.nist.gov/drone-images.html>