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FFEATURE EXTRACTION AND MATCHING FROM IMAGES

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FEATURE EXTRACTION AND MATCHING FROM IMAGES

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Feature Extraction and Matching are crucial in computer vision and graphics. This is a fundamental task for many applications such as 3D point cloud reconstruction and pattern recognition. In this task, feature extraction is used to detect the unique feature point from the images. The unique features depend on the type of images captured from different types of acquisition apparatus such as jpeg, png and dicom. Then, the feature matching algorithm is used to find the corresponding feature point between two or more images. Figure 1 shows the various feature extraction and matching methods. Meanwhile, Figure 2 shows the illustration of feature extraction and matching from 2D images using the jpeg file types. In this example, the features from images were extracted using Good Feature to Track. Next, the feature points from two images are matched using Optical Flow Lucas Kanade. The corresponding feature points are used to find the 3D point cloud for computer graphic application. The 3D point cloud used to represent the real object.

Feature Extraction
SIFT (Scale-Invariant Feature Transform)
SuRF (Speeded-Up Robust Features)
Good Feature to Track
Harris Corner Detaction
CNN-based Features

Feature Matching
F-Matrix (Fundamental Matrix)
Zero-Mean Normalized Cross Relation (ZNCC)
Optical Flow Lucas Kanade (LK)
FLANN (Fast Library for Approximate Nearest Neighbors) Matching
RANSAC (Random Sample Consensus)
Deep Learning -Based Matching

Figure 1: Feature Extraction and Matching Method

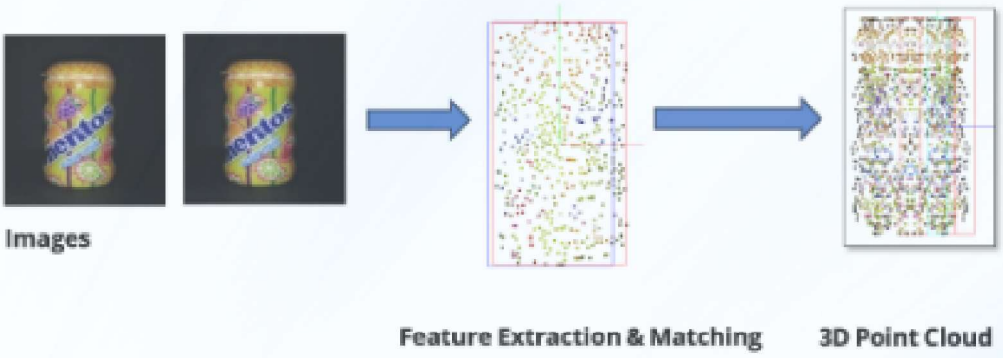

Figure 2: 3D Point Cloud Reconstruction from 2D Feature Point

As for the conclusion, the advantages and disadvantages of each feature extraction and matching method depend on the speed, accuracy, complexity and the types of images used in the process. These feature extraction and matching methods are very useful to detect the characteristics, pattern and the relation between images. It also can provide specific information from captured images which can be applied in various fields of research.

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