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Image Feature Matching and Object Detection using ORB algorithm

Abstract

In the realm of computer vision and image processing, the utilization of advanced algorithms has gained significant prominence. This study explores the domain of image feature matching and object detection, utilizing the ORB (Oriented FAST and Rotated BRIEF) algorithm as the central tool. The ORB algorithm's has ability to detect and match key features in images forms the cornerstone of this project. The ORB algorithm stands for Oriented FAST and Rotated BRIEF Detector. 'FAST' denotes an algorithm for feature detection, while 'BRIEF' refers to an algorithm for generating and describing vectors. The ORB algorithm generates feature vectors consisting solely of binary values, thus they are referred to as binary feature vectors. In addition to its speed, ORB is robust against noise, illumination variations, and image transformations such as rotation. The ORB algorithm will be used to quickly extract feature vectors for subsequent object recognition in images. Image matching using the ORB algorithm holds great importance in image processing, with applications in navigation, target recognition and classification, image stitching, and remote sensing recording. This work introduces the ORB algorithm for swiftly obtaining feature vectors of interest within an image, which are subsequently used for image matching.