

Assignment-5 Report

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Abstract

A quick summary of HOG and SIFT key points detection using the VLFeat toolbox.

1 Introduction

The HOG features are widely use for object detection. HOG decomposes an image into small squared cells, computes an histogram of oriented gradients in each cell, normalizes the result using a block-wise pattern, and return a descriptor for each cell. Stacking the cells into a squared image region can be used as an image window descriptor for object detection, for example by means of an SVM.

SIFT is a technique for detecting salient, stable feature points in an image. To determine correspondences correctly, we need some features characterizing a salient point.

2 HOG

2.1 Motivation

The motivating idea behind the Hough technique for line detection is that each input measurement (e.g. coordinate point) indicates its contribution to a globally consistent solution (e.g.the physical line which gave rise to that image point).

2.2 Guidelines for Use

HOG is computed by calling the vl-hog function

HOG is an array of cells, with the third dimension spanning feature components

2.3 Result Examples

refer to figure-1 to see the result of HOG of an image.

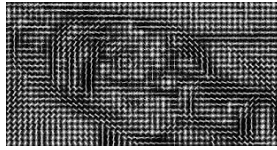


Figure 1: HOG

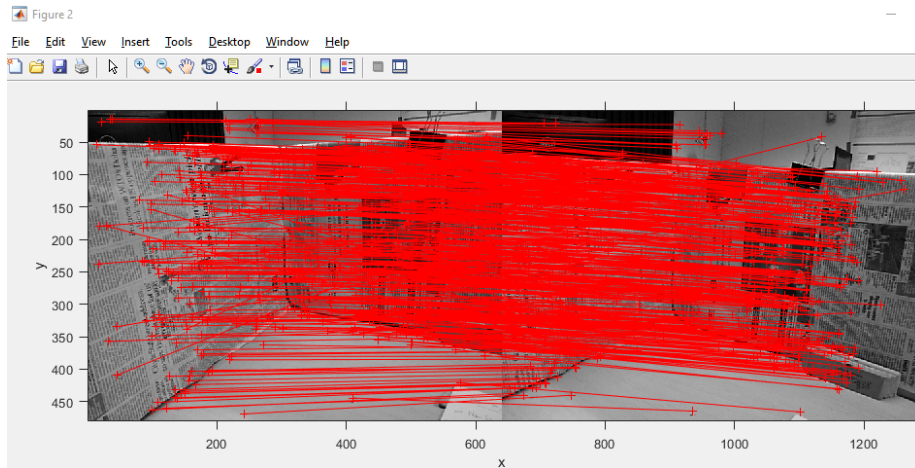


Figure 2: SIFT.

3 SIFT

3.1 Motivation

One could try matching patches around the salient feature points but these patches will themselves change if there is change in object pose or illumination.

So these patches will lead to several false matches/correspondences.

3.2 SIFT overview

Step-1 Find Scale-Space Extrema.

Step-2 Key point Localization and Filtering.

Step-3 Orientation Assignment.

Step-4 Create descriptor.

4 Results

Refer to Figure-2 to see Points matched using SIFT