Detection Of Areas in Satellite Imagery Using Point Feature Matching

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Research Article

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Abstract

Recognizing items in cluttered scenes is a fundamental test that has recently been generally accepted by computer vision frameworks. In this paper, we use the intelligent pattern recognition algorithm in a jumbled image in MATLAB for computer vision of area detection in satellite imagery. In the examples used, we used two completely different regional images, both in terms of resolution and pixels, with two different climates with a larger overall image, to show the detection power of this algorithm, which in this case can also view the region in the picture. Distinguish well from a larger satellite image that shows more areas and recognizes us. The algorithm is also able to detect the regional image with high accuracy if the angle of the satellite image changes. This algorithm for detecting a specific object is based on finding point correspondences between the reference and the target image. It can detect objects despite a scale change or in-plane rotation. It is also robust to a small amount of out-of-plane rotation and occlusion.

1. Introduction

Diagnosis with the help of computer algorithms in different fields of medicine (diagnosis of brain tumor with algorithm and diagnosis of the benign nucleus of angiolipoma tumor, etc.) [1–3], in physics (diagnosis of climate, etc.) [4] and computer vision (recognition of text in the image and, etc.) [5] has many uses. Recognizing items in cluttered scenes is a fundamental test that has recently been generally accepted by computer vision frameworks [6]. Image matching is an essential feature that involves recognizing a scene or object. Detection using the dot feature method is a very effective technique for detecting a specific target instead of other objects or in a cluttered scene in an image. This is done by comparing matching points and analyzing a cluttered scene image and a target object in the image [7]. SURF can detect the position of the object in the original image using geometric conversion. This method of recording objects works best for objects that have jumbled texture patterns. When part of an object is blocked by other objects in the scene, we use this algorithm to find the reference image [8].

2. Materials And Methods

We have first entered two aerial images from two areas into MATLAB software. The aerial images are the first image of the Caspian Sea and some of its land areas, and the second image is a part of the Persian Gulf Sea and some of its land areas.

The geometric conversion estimation algorithm calculates the conversion of the deviate points while subtracting the throw points. This conversion allows us to localize the area on a large map.

In the last step, we want to identify the aerial image of the Persian Gulf in the image in which the Caspian Sea is identified. To do this, we do the same identification process that we described for the previous

image for this map. The aerial image of the Persian Gulf, like the image of the Caspian Sea, differs from the large map image in terms of climate, time, pixels, and quality.

3. Conclusions

In this paper, the point matching algorithm is used to identify the object in MATLAB software for two aerial target maps of the Caspian Sea and the Persian Gulf and several surrounding areas because of the great aerial reference to Iran. The two aerial images are completely different from the reference aerial map of Iran in terms of pixel quality and size, geographical location, and time. The algorithm was able to distinguish the image of these two areas from the reference image well and with high sensitivity and show us. The algorithm can also detect the area image of targets that have an angle of rotation in the reference image.

Declarations

ACKNOWLEDGEMENT

Simulations and algorithms were implemented in MATLAB software.

Competing interests

There is NO Competing Interest.

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Figures

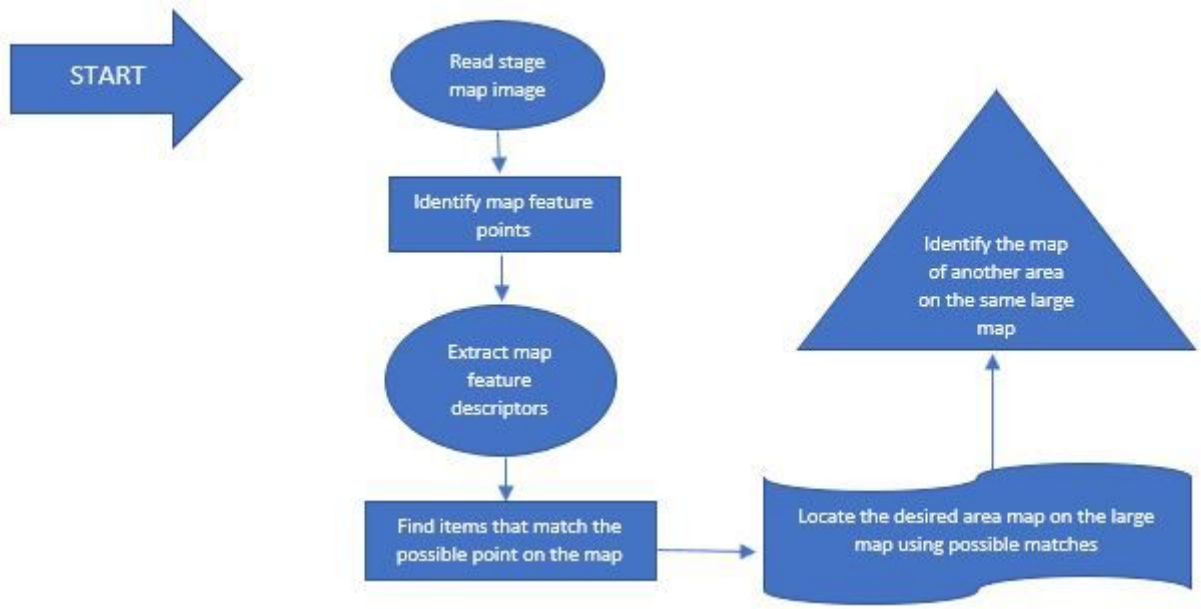

Figure 1

Steps of detection of areas in satellite imagery using point feature matching

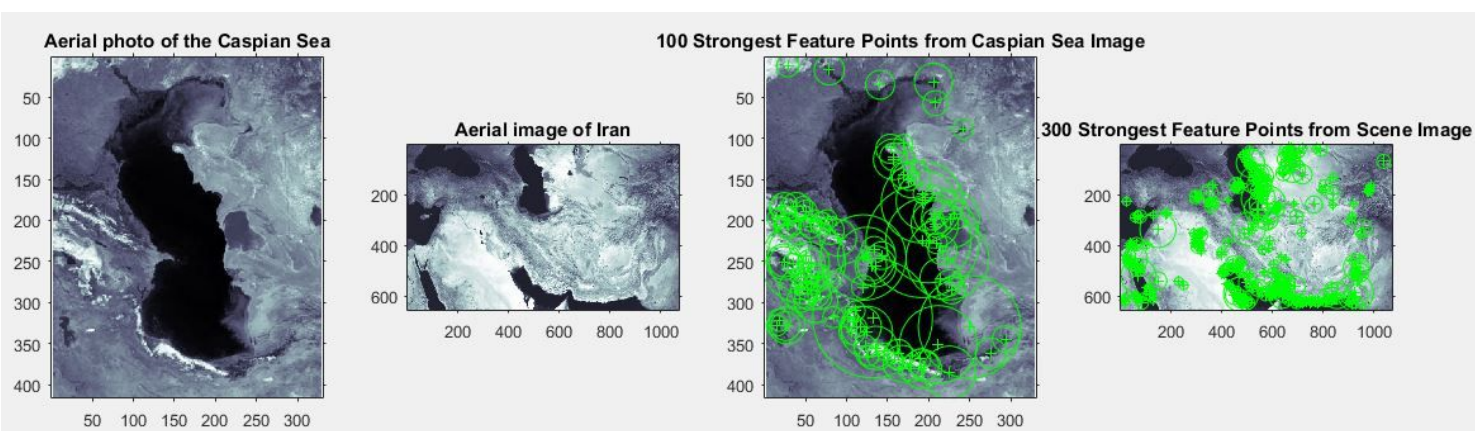

Figure 2

A) Reference image of the aerial map of the Caspian Sea, **B)** The target image contains an aerial image of Iran and a small part of the countries, **C, D)** Identify the characteristic points in both images and visualize the strongest characteristic points in the image.

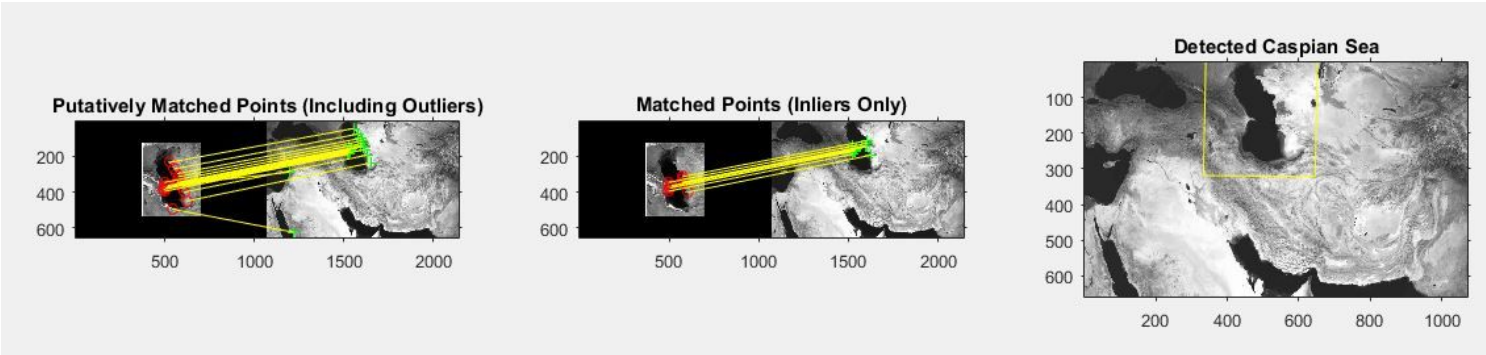

Figure 3

A) We extracted attribute descriptors at points of interest in both images. **B)** Match descriptor features two images. **C)** Using possible adaptations, we have determined the position of the region (Caspian Sea) in the scene.

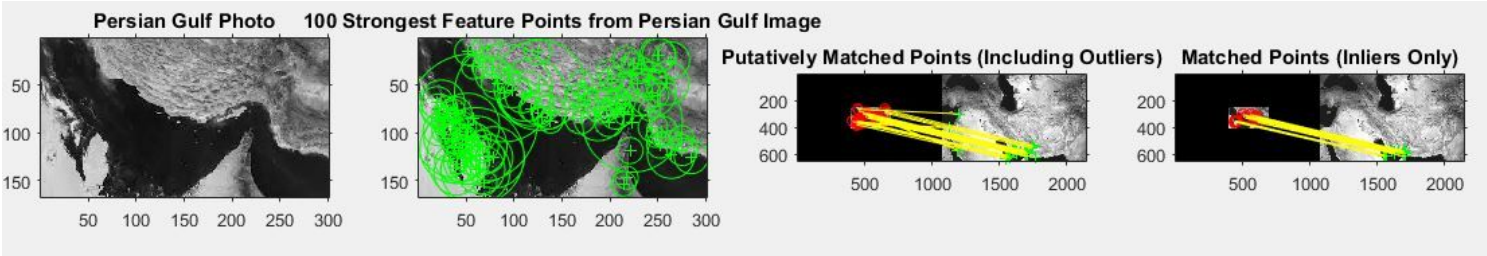

Figure 4

A) Reference image of the aerial map of the Persian Gulf**, B)** Identify the characteristic points in Persian Gulf images, **C)** We extracted attribute descriptors at points of interest in image, **D)** we have determined the position of the region (Persian Gulf) in the scene.

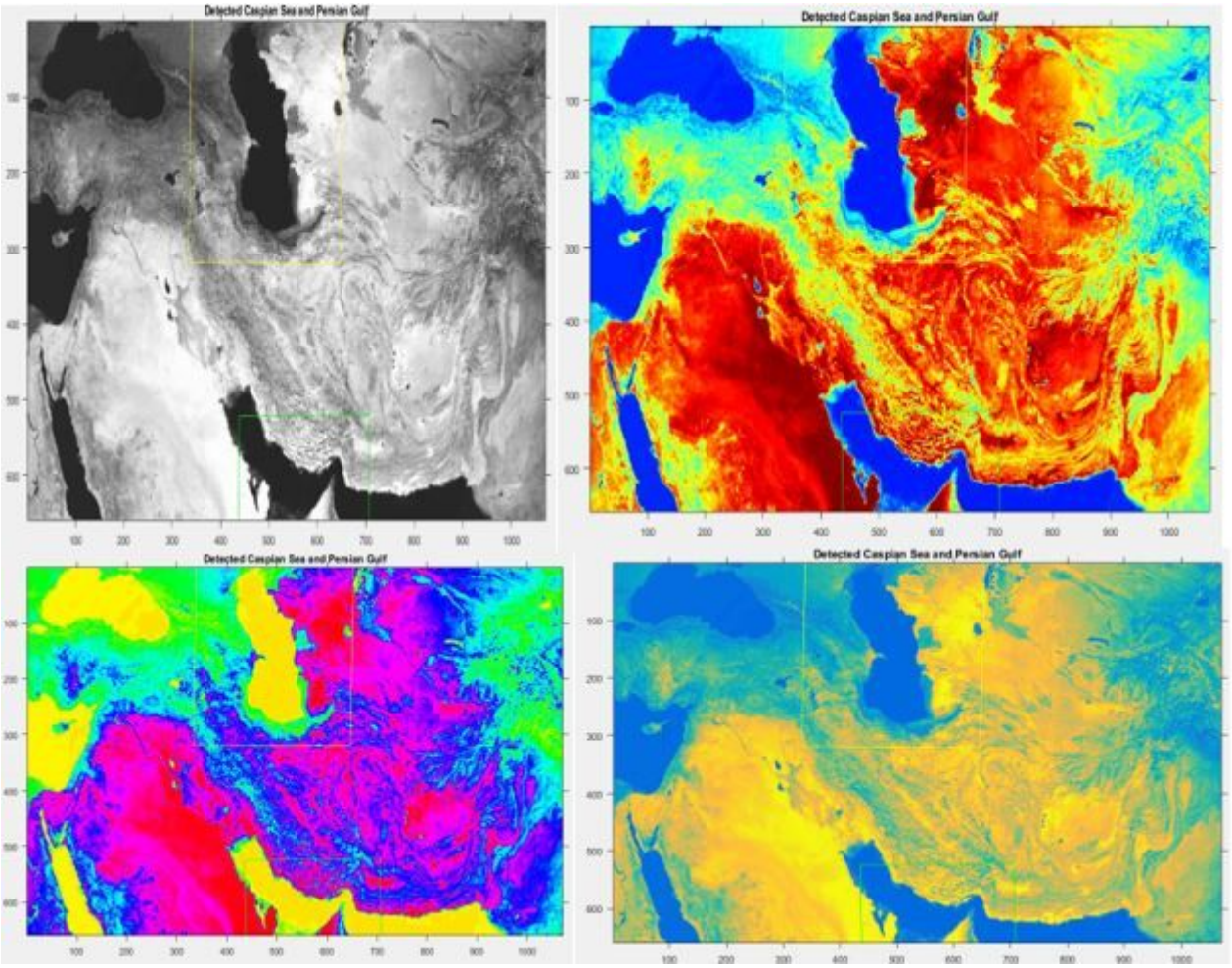

Figure 5

Two identified areas of the reference map with different colors