Journal of Current Science
UGC Approved Journal No.64664
Available Online: https://journal.scienceacad.com
Vol 20, No 01, January 2019 "14th-Conference"(IC-GAEMPSH) ISSN No.- 9726-001X

AN OPTIMAL IMAGE PROCESSING APPROACH FOR GROUND WATER EXPOSURE IN REAL TIME FRAMEWORK

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Abstract:- Water is a standout amongst the most indispensable natural resource for all living things on Earth. In this paper we present a programmed framework for ground water detection from images captured by a drone camera through the image processing techniques. Water detection is beneficial for applications, such as, video search, outdoor surveillance, and frameworks, for example, unmanned ground vehicles and unmanned flying vehicles. In this paper we estimate bit equity features of aqua and utilize some methodology of color detection, texture detection and reflection methodology to detect water subsequent to taking contribution from constant picture information. To detect water based on single cue may be difficult and inappropriate so here we described a method for multi cue water detection.

1. INTRODUCTION

Water is the most indispensible natural resource for all living things on earth. The average of consuming water by a human being is 4 to 5 liters for various purposes of daily routine. As the population is increasing the demand of water is also increasing. About 75% of the earth is covered in water. But there is only limited usable water. According to the studies about 2.5% of the Earth's water is fresh water. Of the fresh water available on earth, only 31% is accessible for use.

There is only a limited resource of usable water on this earth. The demand of public for water is fulfilled by providing water through wells, tube wells, lakes, rivers, ponds etc. Because of Negligence of people some water resources getting contaminated. So it is highly recommended to monitor water resources in regular basis so that people can get clean water for their daily routine work. In this research we only diagnose a framework that can expose water bodies from ground and give the regular updates about water resources.

In the proposed research we used a drone camera for collection of images. Drone camera provides large images in high resolution which leads to computational complexity but we may use the technique of cropping image at different resolution, angles and pose and analyzed them easily. Real time water exposure with the drone provides information that enables effective gathering of information at low cost. The images are captured from various regions while monitoring the region.

All this information is periodically transmitted to the head office and stored in a database. The system may be equipped with decision support algorithms and applied to identify water cues from ground. The advantage of drone camera to use in capturing image over traditional (satellite) remote sensing is that it provides rapid response to environmental changes (multiple samples per day) and more clear images. It provides extremely high resolution data (few cm to 100 m) and less sensitive to cloud. This technique provides effective monitoring of small tributary and neighborhood scale water resources.

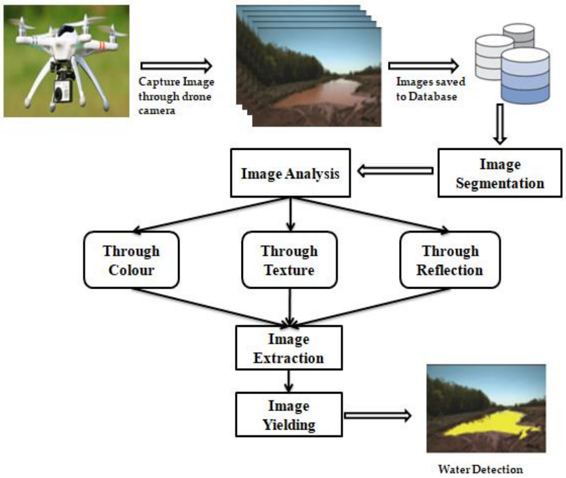

Figure 1: A Programmed Framework for Groundwater Detection through Drone Camera

In the proposed method various images are collected from various regions through the drone camera and saved to database in digitized format. These images processed through software in several methods. First the image is segmented into different regions that are similar or homogeneous through simple grey level thresholding technique.

With the help of thresholding technique pixels are extracted from an image which represent an object. In thresholding the color image or grey scale image is reduced to binary image by converting all pixels to zero and one. The pixels which are below the threshold turned to zero and converted to one which are above the threshold; where the value of threshold is globally defined.

If g(x, y) is a threshold version of f(x, y) at some global threshold Th,

1 if f(x

0 if f(x, g(x,y) =

Detection of water body depends on color of sky, time of the day, province reflection, underwater object visible from the surface and shadows of different objects such as trees, buildings etc. Water detection using a single inkling becomes challenging task because of large number of possible scenarios and appearances. In this approach we use the multi-cue water detector which uses the methodologies which discover the water cues from color, texture, stereo range reflections. Hue, saturation, and brightness levels are thresholded to produce the water signal from shading.

These limits are tuned to recognize sky appearance in water. Nearby picture power change is thresholded to produce the water signal from surface. At the point when zero difference pixels happen in the lower half of the dissimilarity picture, it is likely caused by impressions of items that are far away, (for example, clouds or tree branches). In this way, zero dissimilarity pixels can be a reflection based water signal. Water body may incorporate impressions of the sky and mists, and impressions of trees and other ground cover.

1. Water Detection through Color: In this area, we portray a method utilized for sectioning parts of water bodies for shading investigation. This strategy was connected to distinguish water prompts from ground so as to acquire picture force information on a huge arrangement of water pixels from pictures. Water bodies will in general have a uniform splendor where they are not reflecting articles. Consequently, low surface can be a sign for water. To find locales of low surface, we convert the local RGB pictures to grayscale and pass a 5x5 power difference channel over the grayscale pictures.

The dominant part of this water body was fragmented in the picture by playing out an association of the locale close to the trailing edge emphatically mirroring the sky, low power change districts, and low force angle areas. Amid the daytime water bodies may not be relied upon to amazingly dim. Utilizing a cutoff power restrains the scan space for competitor water bodies.

For this situation, in any case, a part of the water body in the forefront is beneath the cutoff force. We distinguish that locale by extending the low force difference district to incorporate neighboring pixels that have a low power inclination. Stereo range information was utilized to extend water pixels into a computerized landscape delineate.

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Figure 2: Water Detection Based on color variation

2. Water Detection through Reflection: At the point when light touches base at a water surface, it very well may be reflected off the surface, transmitted into the water, consumed by the water, dissipated by the water, consumed by materials suspended in the water, reflected or dispersed by materials suspended in the water, and reflected off the base of the water.

The complete reflection coefficient Rtotal from a water body to a camera will be the aggregate of the reflection coefficients for light reflected off the water surface to the camera, dissipated by water particles to the camera, reflected or dispersed by materials suspended in the water to the camera, and reflected off the base of the water to the camera.

$$R_{total} = R_{reflect} + R_{scatter} + R_{bottom} + R_{particles}$$

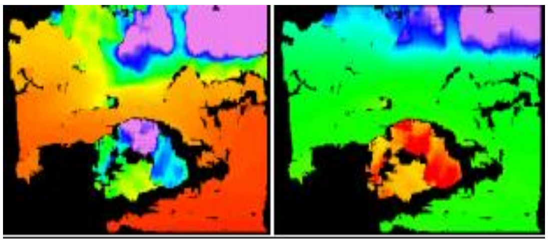

Figure 3: Water Detection based on range reflection

We expect to structure a profound system that catches this reflection impact and endures the twisting and camera turn. The water signal from range reflections is vulnerable to false location on short branches near the ground surface and in vegetation, where some range information pierces the vegetation.

Water Detection through Texture: In pictures, surface evaluates grayscale power contrasts (differentiate), a characterized territory over which contrasts happen, and directionality, or absence of it. For this water prompt, we target water locales having low surface. Here, a 9x9 force fluctuation channel is disregarded an information grayscale power picture. At every pixel, the window change is determined and thresholded.

For the info picture, we have explored different avenues regarding utilizing the green channel of the first RGB pictures and the immersion picture (likewise got from the first RGB pictures). The water prompt from surface is helpless to false location on earth streets having low surface, in the sky, in vegetation, and where the picture is overexposed.

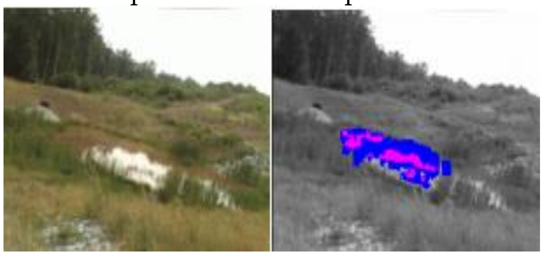

Figure 4: Water Detection based on Texture Feature

CONCLUSION

In the proposed framework we depict a technique for multi-prompt water discovery which utilizes the strategies to find the water signals from shading, surface, stereo range reflections. The multi sign methodology is utilized to distinguish distinctive water classifications.

Water identification method will help unmanned ground vehicle from harm by crossing through water bodies. This strategy is additionally valuable to help us for region observation that is advantageous for territory study. The proposed framework can't analyze the water bodies in the murkiness (night). Water recognition may end up troublesome when the impression of different articles, for example, parts of trees and vegetation happen.

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