



## RECOGNITION AND TRACKING OF MOVING OBJECT IN UNDERWATER SONAR IMAGES

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**Abstract--**This paper presents an resourceful technique which can be used for underwater object recognition system computerization. The mainly vital thing in underwater image processing is collection of processing domain (like RGB, Gray- scale, R, G, B etc) and filter. The tracking was carried out by the application of Wiener filter that enables the tracking of objects. Underwater image processing for object recognition is a system which loads a image, pre- processes the image, filters and scales the image to find the object.

**Keywords:** RGB, Underwater, Object recognition, System, computerization, Database, Internet

### 1. Introduction

Underwater Images are of dominant significance in underwater scientific mission for applications such as monitoring sea life and assessing geological or biological surroundings. Underwater Image Processing has received wide-ranging attention in academic and production fields because of its various application potentials. Some of its possible application areas are Navy purpose, Detecting new fish species, Oil pipeline, optic-fiber cable etc.

The detection system should have underwater camera. Nowadays sonar is used to detect underwater submarines. The main objective of Underwater Image Processing Object Detection system is to recognize objects, which are in the form of images, without any human interference. This is done by extracting boundary information and reducing noise.

## 2. System Development

The main aspire is to expand a Object recognition and tracking system for Underwater captured imagery using image processing. The things are affected by light reflection near water surface. When deep inside water boundary of object are not detected due to dark color of object and also due to poor lighting. Following are project specification for this method essential Software items are PC with MATLAB r2012a and hardware systems is Waterproof Camera

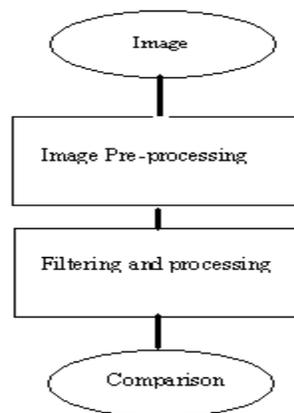


Fig. 1. System Block Diagram

## 3. Proposed Method

The preliminary point of the scheme was the formation of a database images that would be used for processing. Data compilation for the current work has been done from internet. Composed images are of submarines and fish in water. Images in database of submarine are in darkness or near surface. All images are must be in JPEG format.

### A.Pre-Processing

Pre-processing includes the steps that are necessary to bring the input data into an acceptable form for filtering and processing. The corresponding objectives of Pre-processing methods are as follows: -

#### 1.RGB to Blue conversion

The RGB plane has three mechanisms red, green and blue. To deal with all three mechanisms and process them together is tedious so we take out only Blue part which will give simplicity in processing. We do not work in grayscale as output obtained from Blue factor is better than R, G, B & grayscale. The red marks show edge not detected.

The output for R, G, B & Grayscale when observed after application of edge detection is as follows:

## **2. Adjusting Image**

The intensity values in images are adjusted using the 'imadjust' function. It increases contrast of image.

## **4. Filtering And Processing**

For filtering, the LOG filter is proposed on which proper noise removal filter is applied.

### **A.Marr-Hildreth filters for edge detection**

Laplacian of gaussian is a isotropic filter i.e. rotation invariant. Directly Laplacian filter not able to used as it gives strong response to stray noise pixels. therefore some amount of some amount of noise cleaning is to be done prior application of Laplacian operator. Noise cleaning (Gaussian smoothening) is complete. following to edge detection main work is to remove noise which is done by wiener filter.

### **B.Wiener filter**

The wiener2 is an inbuilt task that applies a Wiener filter (a type of linear filter) to an image adaptively, tailoring itself to the local image variance. Where the variance is large (high frequency component), wiener2 performs small smoothing. Where the variance is small, wiener2 performs more smoothing. It preserves edges and other high-frequency parts of an image. Wiener2 estimates the local mean and variance around each pixel. Wiener2 then creates a pixel-wise Wiener filter using these estimates. If the noise variance is not given, wiener2 uses the average of all the local estimated variances . 3. Image Scaling:

The picture obtained is scaled i.e. intensity over 255 are scaled down to 255 while those below 0 are scaled down to 0.Scaled image has some missing edges which are detected using 'imtool' then those pixels values are scaled to 255.



**Fig 2. Captured Images**

### **C.Comparison**

The image obtained is compare into three categories:

1. Inbuilt Canny edge-detected Image
2. Inbuilt Log edge-detected Image
3. Object-Recognised Image by Wiener Filter

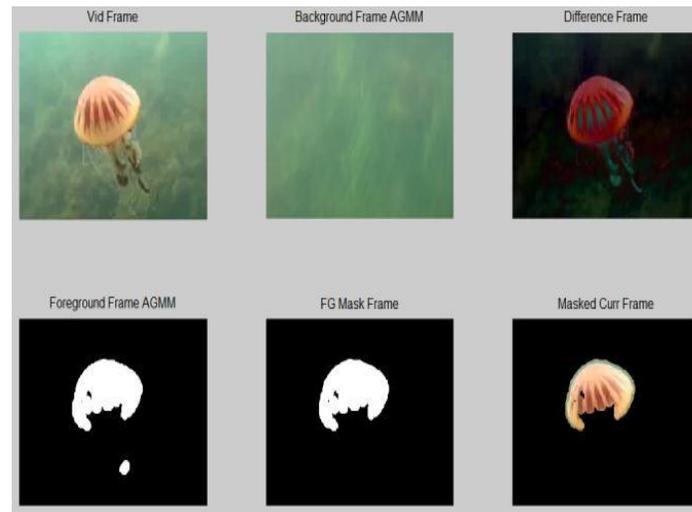
### **5. Result**

The images were processed and observed and also compared in following Figure .In that figure we can recognize object under sea level and we can track the position of the object in under water.

### **6. System Implementation**

#### **A.Image Pre-processing Method Begins**

First we give Input the image from the database which is stored in JPEG format then Convert the RGB image into Blue image.



**Fig 3.Movment of Jelly fish Images**

## B.Filtering and Processing

In the filtering section first we need to calculate size of image obtained in previous step. Then we apply the LoG mask throughout the image. Finally system will Display above filtered image. In further step apply weiner filter for reducing noise . Here Scale image intensity above 255 scale down to 255 and below 0 are scaled up to 0. Scaled image has some missing edges which are detected using 'imtool' then those pixels values are scaled to 255.

## C.Comparison

Image comparison is essential in image processing. Display the edge detected image by using inbuilt 'canny' operator. After that Display the edge detected image by using inbuilt 'log' operator. Finally image is the edge recognized image by using our method.

## 7. Conclusion

This manuscript proposes about Under Image Processing for Object recognition. It has found that recognition of underwater object is difficult mission. From this method the achieved things are If we extract only B module from RGB image and process it then result obtained would be better than Grayscale or any other domain. Then the code written as proposed by paper produce better result than inbuilt 'canny' and 'log' edge detection function which are inbuilt in MATLAB R2012a. In the majority cases output given by code proposed in paper is comparable to inbuilt 'log' function abut in some cases superior to inbuilt 'log' purpose and is always superior to inbuilt 'canny' function.

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