International Journal of Electronics Engineering (ISSN: 0973-7383)
Volume 11 • Issue 1 pp. 532-539 Jan 2019-June 2019 www.csjournals.com

Under Water Human Body Detection

Karthik C[1], Keerthan HM[2], Preetam Londe[3], Samraj M[4], Ms. Shyma Zaidi (Asst. Prof)
ECE, Vidyavardhak College of Engineering Mysore

Abstract: Underwater human body detection system allows the user to identify the human body or any other object in the water. It involves the technology of image processing, cloud computing and IoT. The proposed system transmits the IR rays. When the IR line is broken or stopped, the camera takes a snap of the object breaking the line. The image is in turn sent to the cloud. Then the image is fetched and processed by using the technology of python. The processing of image will be shown in a desktop application and the object will be identified based on the shapes. The main aim is to develop Object detection and recognition system for Underwater captured images using image processing. The system detects the objects which are under water and captures an image of it.

Keywords: IR Transmitter and Receiver, camera module, gear motor, passive infrared sensor.

Introduction:

Object detection is a computer technology related tocomputer vision and image processing that deals with detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos. Well-researched domains of object detection include face detection and pedestrian detection. Object detection has applications in many areas of computer vision, including image retrieval and video surveillance.

Digital image processing is the use of computeralgorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.

Underwater Images are of paramount importance in underwater scientific mission for applications such as monitoring sea life and assessing geological or biological environment. Underwater Image Processing has received extensive attention in academic and production fields because of its various application potentials. Some of its potential application areas are Navy purpose, Detecting new fish species, Oil pipeline, optic-fibre 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.

2.1. Related articles

1. **IEEE Transactions on Image Processing [By**

Gaurav Sharma, university of Rochester, New York, USA]: The IEE transactions on image processing cover noveltheory, algorithms and architecture for the formation, capture, processing, communication, analysis and display of images, video and multidimensional signals in wide variety of applications.

2. **Digital Image Processing [R. E. Twogood Lawrence Livermore National Laboratory F. Graham Sommer Division of Diagnostic Radiology Stanford University Medical Center Stanford]:** overview of the field of digitalimage processing. Following a brief discussion of some basic concepts in this area, image-processing algorithms are presented with emphasis on fundamental techniques that are broadly applicable to a number of applications. In addition to several real-world examples of such techniques.

3. **Fei-Fei Li: How we Are teaching computers to understand pictures [Fei-Fei, director of Stamford's**

AI lab and vision lab]:| Li describes the state of artincluding the database of 15 million photos her team built to teach a computer to understand pictures.

2. Literature Background:

A literature review is a written document that presents a logically argued case founded on a comprehensive understanding of the current state of knowledge about a topic of study. This literature review discusses about the work on digital image processing.

International Journal of Electronics Engineering (ISSN: 0973-7383)
Volume 11 • Issue 1 pp. 532-539 Jan 2019-June 2019 www.csjournals.com

3. System Description:

3.1. System Analysis

Analysis involves requirement determination and specification. It is basically establishing the requirements for all system elements and then mapping these requirements to software forms It should address issues such as: -

- people who are operating on the system.
- Database on which the software is going to function.
- Hardware on which software is going to function.
- Existing system problems.

Analysis encompasses requirements gathering at the system level with small amount of top level design. The data obtained from the requirement determination phase are documented in Software Requirement Specification (SRS) document. During analysis, a great deal of relatively unstructured data is collected through procedural manuals and through websites. The traditional approach is to organize and convert the data through system flowcharts, which support future developments of the system and simplify communication with users. But the system flowcharts represent the physical system rather than the logical system. Hence, it makes it difficult to distinguish between what happens and how it happens in the system. Because of this drawback it is necessary to have something, which is analogous to the architect's blueprint as a starting point for the design. It is the way of focus on the functions rather than physical implementation.

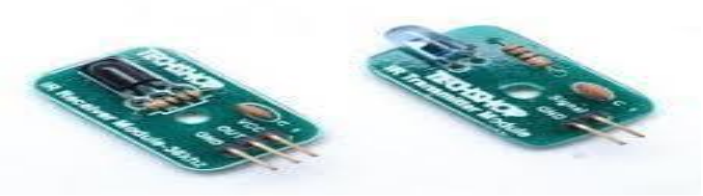
3.1 Components Used:

- IR Transmitter and Receiver

Component Description:

3.2.1 IR Transmitter and Receiver

IR Transmitter is a Arduino breakout for a simple and clear infrared LED on it. These Infrared led operates around 940nm and work well for generic IR systems including remote control and touch-less object sensing. Pair them with any of our IR receivers.



3.2.2 Passive infrared sensor

A **passive infrared sensor** (**PIR sensor**) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on whom or what moved. For that purpose, an active IR sensor is required.

International Journal of Electronics Engineering (ISSN: 0973-7383)
Volume 11 • Issue 1 pp. 532-539 Jan 2019-June 2019 www.csjournals.com

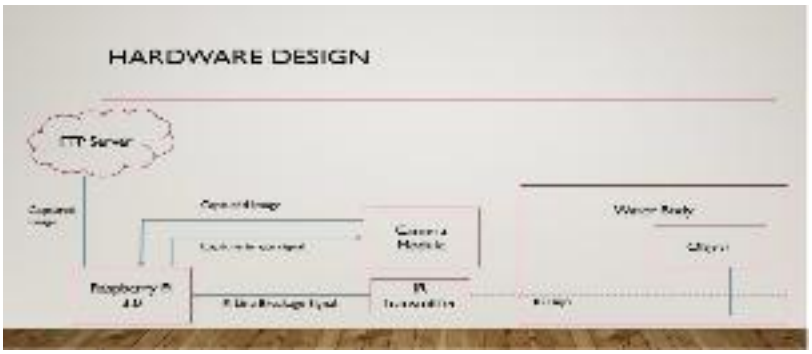
- Passive infrared sensor
- Camera module

3.2.3 Camera Module

A camera module is an image sensor integrated with a lens, control electronics, and an interface like CSI, Ethernet or plain raw low-voltage differential signaling.

- Gear motor

3.2 Block Diagram:



VIDYAVARDHAK COLLEGE OF ENGINEERING MYSORE

The main component is visible as the 10th magnitude variable star at the Centre of NGC 1999, referred to as the primary. Speckle interferometry shows a cool companion separated by 0.15", approximately 62 AU, referred to as the tertiary. Spectroscopy shows a third star at a projected separation less than 0.33 AU, referred to as the secondary. The two closest stars, the primary and tertiary, are surrounded by a circumstellar disk, lying almost edge-on to observers on earth. The fourth star has a projected separation of 4,000 AU and is receding from the other three.

3.2.4 Gear Motor

rgb2gray(X)

RGB2GRAY Convert RGB image or colour map to grayscale. RGB2GRAY converts RGB images to grayscale by eliminating the hue and saturation information while retaining the luminance.

im2bw (I, level)

Im2bw converts the intensity image I to black and white. IM2BW produces binary images from indexed, intensity, or RGB images.

Gear motor" refers to a combination of a motor plus a reduction geartrain. These are often conveniently packaged together in one unit. The gear reduction (gear train) reduces the speed of the motor, with a corresponding increase in torque. Gear ratios range from just a few (e.g. 3) to huge (e.g. 500). A small ratio can be accomplished with a single gear pair, while a large ratio requires a series of gear reduction steps and thus more gears. There are a lot of different kinds of gear reduction.In the case of a small transmission ratio N, the unit may be backdrivable, meaning you can turn the output shaft, perhaps by hand, at angular velocity w and cause the motor to rotate at angular velocity Nw. A larger transmission ratio N may make the unit non-backdrivable. Each has advantages for different circumstances. Backdrivability depends not just on N, but also on many other factors.

Edge (I)

EDGE Find edges in intensity image. EDGE takes an intensity or a binary image I as its input, and returns a binary image BW of the same size as I, with 1's where the function finds edges in
0's elsewhere and I.

Bwlabeln (BW)

BWLABELN returns a label matrix, L, containing labels for the connected components in BW. BW can have any dimension; L is the same size as BW. The elements of L are integer values greater than or equal to zero. The pixels labelled zero are the background. The pixels labelled 1 make up one object; the pixels labelled 2 make up a second object, and so on. The default connectivity is eight for two dimensions, 26 for three dimensions, and CONNDEF (NDIMS (BW),'maximal') for higher dimensions.

4 Implementation

Implementation is the carrying out, execution, or practice of a plan, a method, or any design for doing something. It encompasses all the processes involved in getting new software or hardware operating properly in its environment, including installation, configuration, running testing, and making necessary changes. The word deployment is sometimes used to mean the same thing.

4.1. Methods

Following are the various methods and functions implemented in our project's Android applications —

4.1.1. Common methods

Imresize (Varangian)

Imresize function resizes the image so that it has the specified number of rows and columns. Either NUMROWS or NUMCOLS may be Nan, in which case IMRESIZE computes the number of rows or columns automatically in order to preserve the image aspect ratio.

Imshow (I, [low high])

IMSHOW function displays the grayscale image I, specifying the display range for I in [LOW HIGH]. The value LOW (and any value less than LOW) displays as black, the value HIGH (and any value greater than HIGH) displays as white. Values in between are displayed as intermediate shades of grey, using the default number of grey levels.

DetectSURFFeatures (I)

detectSURFFeatures returns a SURF Points object, points, containing information about SURF features detected in a 2-D grayscale image I. detect SURF Features uses Speeded-Up Robust Features (SURF) algorithm to find blob features.

BagOfFeatures (imds)

BagOfFeatures returns a bag of visual features. Imds is an Image Data store object. By default, SURF features are used to generate the vocabulary features. Vocabulary is quantized using K-means algorithm.

TrainImageCategoryClassifier (imds, bag)

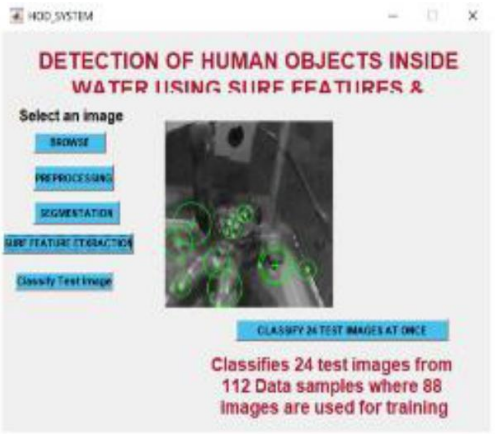
TrainImageCategoryClassifier (imds, bag) creates an image category classifier. Imds must be an Image Data store object and bag is a bagOfFeatures object. A linear SVM. Classifier using error correcting output codes (ECOC) is then trained to classify amongst each of the image categories.

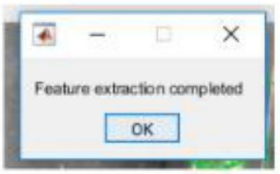
International Journal of Electronics Engineering (ISSN: 0973-7383)
Volume 11 • Issue 1 pp. 532-539 Jan 2019-June 2019 www.csjournals.com

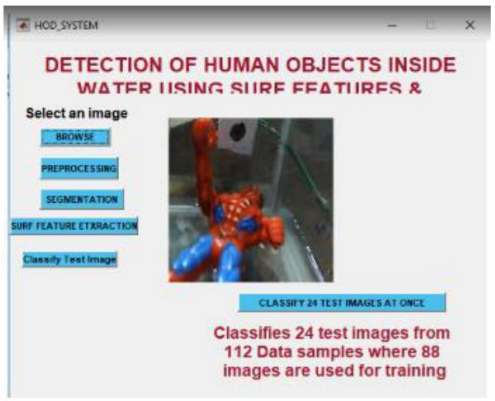
predict (model, data, k)

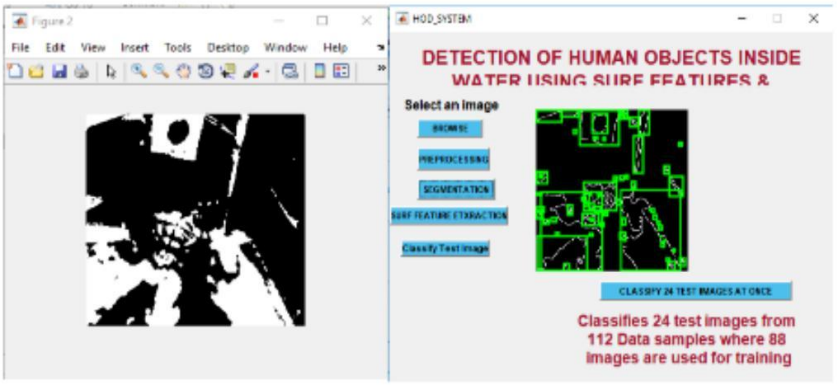
Predict predicts the output of an identified model K time instants ahead using input-output data history from DATA. The predicted response is computed for the time span covered by DATA.

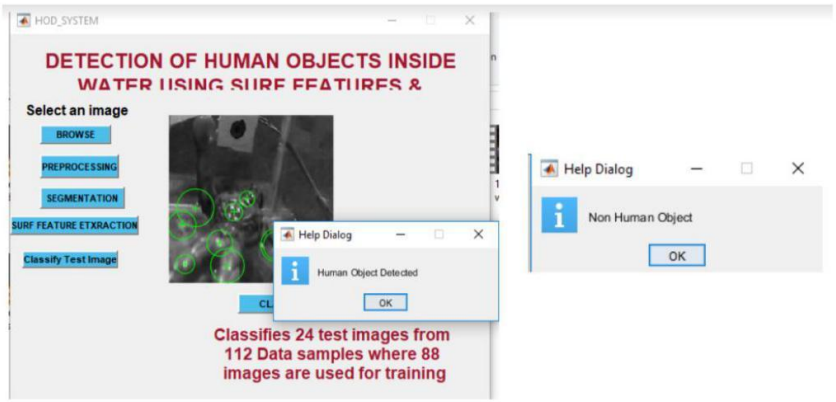
4. Testing











5. Result and Future Work

This project can be considered for future enhancements for providing long-range underwater visions and identifying human bodies underwater. It can be used in the submarines to determine the objects under water instead of using SONAR. This system can also be further enhanced by developing a mobile application to view the objects of underwater from different places and identify the humans within the water.

6. Conclusion

The main advantage of the device is: it is fully automated, reduces manpower, utilizes minimum amount of time, compact in size and requires very little or no maintenance. The signal from the GSM can be tracked easily. The components used in the device is cheap and efficient. Hence, in our paper, we have implemented the idea of under water human body detection using IR Transmitter and passive infrared sensor ,camera module, Gear motor.

References

[1] Ke Liu,Fanshawe College, London, Ontario, Canada John Makaran,Applied Science and Technology at Fanshawe College, London, Ontario, Canada "Design of a solar powered battery charger", IEEE,Oct-2009

[2] How computers learnt to recognize objects.by JOSEPH REDMON(computer scientist) at TED talks.

[3] Fast image matching based on improved SURF algorithm. By Zhang huijuan (school of software engineering, shangai) at IEEE.

[4] How are we teaching computers to understand images. By Fei-fei Lee (associate professor at standfort university)

[5] Kenichi Asakawa, Yuichi Shirasaki, Member, IEEE, and Yoshinao Iwamoto, "Metal Detector for Tracing Submarine Telecommunication Cables", IEEE transactions on instrumentation and measurement,Vol.IM-32, no.4, Dec 1983

[6] H-C.Lee,C-Y.Lin,C-H lin, S-W Hsu,and C-T. King,"A low-cost method for measuring surface currents and modeling drifting objects, "IEEE Trans.Instrum.Meas., vol 60, no.3, pp.980-989,Mar 20ll.

[7] A.Munafo et al., "Enhancing AUV localization using underwater acoustic sensor networks: Results in long baseline navigation from the COLLAB13 sea trial." In proc.IEEE OCEANS conf., St.John's, NL, Canada, Sep.2014,pp 1-7.

[8] D.Heckman and R.Abbott,"An acoustic navigation technique,"in proc.IEEE Int.Conf.Eng.Ocean Environ.(Ocean),Seattle,WA, USA,Sep.1973,pp-591-595.

[9] M.Uliana,F.Andreucci,and B.Papalia,"The navigation system of an autonomous underwater vehicle for Antarctic exploration," in proc.IEEE OCEANS conf.,vol.1 Halifax,NS,Canada,Oct.1997,pp.403-408.

[10] D.A.Janeera, Dr.S.Sheeba et al., Design of Programmable Marine Metal Detector Using UniFi Controller Jour of Adv Research in Dynamical & Control Systems, Vol. 10, 05-Special Issue, 2018