Turkish Online Journal of Qualitative Inquiry (TOJQI)
Volume 12, Issue 5, May 2021: 2095-2099

Underwater fish identification And species classification using image processing

Mr.Daniel NareshKumar.M[a], Juturu Jayanth[b], Edupuganti Jignas[c], N.V. Sai Bhuvan[d]

[a] Assistant Professor Department of Electronics and Communication Engineering
R.M.K Engineering College
[b,c,d]Department of Electronics and Communication Engineering, R.M.K Engineering College

Abstract

Identifying fishes has been an important task. Fish identification is not only for the conservation purpose but for many other tasks like for marine scientist mainly for the purpose of researches, for survey about the range of location of the fish and so on. Even there are many medicines which are made from fishes to cure the bacterial diseases in humans. So, in this project we identify the fishes and the different species of fishes using image processing. However here we used four different species of fishes to be identified like the "Common carp, Gold fish, Oscar Fish, European Seabass"

1. Introduction

Recognizing the fishes may be a difficult method and conjointly it needs great amount of your time and expenses. the traditional method of distinctive may be done is by casting nets as fishing instead by the direct human observation underwater. however it can not be practiced as these strategies not solely take time and expenses however conjointly build the things danger and unhealthy. The manual recognition of fish and their species may be done solely by those that area unit smart at the data regarding all the species of fishes. to induce the knowledge from the pictures that don't seem to be clear, the unfinished classification,

assigned as coarse labels is introduced by optimizing the "benefit" of false call created by the classifier. This projected framework results an honest accuracy not solely on public however conjointly on self-possessed underwater fish pictures with high variability and unbalanced category.

So as collecting the underwater images is an easy task it is a common way of approach that can be done to identify the fish species but yet the exact recognition requires a human expert and time. That is why here we are using the technique of image processing to identify the fish species. And as there are 34,300 species of fishes' present in our ecosystem which requires a large database information about the names of species so hereby, we go with four different species of fish.

The most important step is building the computer-based identification system which should be trained in 5 steps which is a challenging task. Those steps include things like firstly identifying the image and checking for its quality. If the image is a low-quality image it will be preprocessed to increase the image quality. Then the image is further processed in order to search for a fish if a fish is searched then the 2-D Convolution network is used to identify the species of the fish.

2.Literature survey:

[1]. Tracking fish abundance by underwater image recognition, Simone Marini, Emanuela Fanelli, Valerio Sbragaglia, Ernesto Azzurro, Joaquin Del Rio Fernandez & Jacopo Aguzzi (2018, September). In this study, the development of a novel methodology in which the content-based image analysis is done on keeping the base as programming in genetics. The main need of this project was to picturize the lay dynamics of

abundance of fish. We have a tendency to methoded quite 20,000 pictures which were nonheritable as in very difficult coastal situation in real-world in the OBSEA- EMSO site of testing. Video-observatories through the marine cable permit the sampling of species at destructiveless frequencies and durations that haven't obtained before. The absence of acceptable strategies to mechanically change/task the video imaging limits this type of technology for purpose of scheme monitoring. Automating could be a necessity to handle the massive amount of video captured by the lenses of cameras, which may then remodel these gadgets into true automatic sensors.

[2]. Fish Detection from Low Visibility Underwater Video, Violetta Shevchenko, Tuomas Eerola, and Arto Kaarna.(August,2018).In this 3

background subtraction technique is that the task being employed largely a post- processing steps and a heuristics is employed to notice the fish and separate them from the opposite moving objects or the other aquatic animals. The results approached by the background subtraction method created potential in achieving a satisfying detection accuracy.

[3].Underwater image matching by incorporating structural constraints. Xu rule , Zhi-Yong Liu, Hong Qiao, Yong-Bo Song , Shu-Nan Ren , Da-Xiong Malaysian Mujahidin Group and Sui-Wu Zheng(2017,November),. The robots Underwater takes a very important role in perception beneath the water and manipulating the tasks as required. Vision IP is vital for the clever perception of robot under the water, during which image matching plays a basic role. Feature-based image matching is appropriate for the underwater ecosystem. However, the present underwater image comparing typically applies those ways with a basic purpose and designed for pictures obtained from the land to underwater images.

[4]. A Feature Learning and seeing Framework for Underwater Fish Images Meng-Che Chuang, Jenq-Neng Hwang, Fellow, IEEE, and Kresimir Williams (February 2016), proposed AN underwater fish recognition framework that has the oversight feature learning technique and an error-resilient classifier. The initialisation of object elements is completed on the basis of prominence and relaxation labeling to match with the thing elements exactly. A model with non-rigid half is then learned supported fitness, separation, and discrimination criteria. For the classifier, AN unattended bunch approach generates a binary category hierarchy, wherever every node may be a classifier. To exploit data from ambiguous images, the thought of unfinished classification is introduced to assign coarse labels by adjusting the profit of wrong call created by the classifier. In these our main contribution is to recognize and disagree the objects with fishes and to trackdown the identification whether or not it's a live fish or not whole unattended while not the help of human eye.

In the proposed method, the CNN and the other algorithms are used based on deep learning as follows:

3. Methodology:

CNN:

Convolutional Neural Network that

Image process is outlined as a technique that enhance raw pictures received from satellites principally just like the satellite pictures, area probes and photos clicked from aircrafts or photos taken in every day life for varied uses.

(A). Pre-processing:

From the given set of images this Pre- processing step is used to perform the operation of improvement of the image data that suppresses unwanted distortion.

Existing method:

In the existing method the underwater image is taken and it is pre processed in order to check only if it is fish using the image processing techniques mostly the live fish is identified.

could be a sub division of machine learning known as deep learning that is most typically applied for analyzing visual imagination. Once this has been enforced in (Parkinson's Disease) metallic element studies. The Kaggle Parkinson Dataset is employed during this project for each testing and coaching purpose.

Image Input Layer:

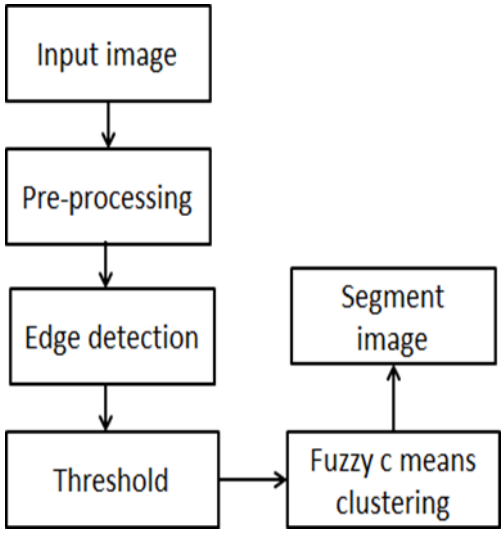
The image input layer is employed to input pictures to a network and so the info social control is processed. The image size is nominal mistreatment the input size argument wherever essentially the image size refers to the peak, dimension and therefore the range of color channels. As associate degree example, a grayscale image

has {the range|the amount|the quantity} of channels as one whereas the colour image has the count of number of channels as three.

Convolutional layer:

In general, a 2-D convolution layer is employed for applying the slippy convolution filters of a picture and also the convolutional layer has filters and slides. it's like that of neurons and connects to sub region of the input pictures or the output of the previous layer. The layer learns the options localized by these regions whereas scanning through a picture. once making a layer exploitation the convolution2dLayer operate, you'll specify concerning size of those regions exploitation the filter Size input argument.

ReLU:



4. Proposed method:

Rectified long measure here is employed as a activation perform that isn't linear. the most perform is in performing arts a operation on threshold to every and each part of the input and checking for the worth, if it's but zero then spherical it up to zero.

Maximum and Average Pooling layers:

In this technique down sampling is completed by parting the input into pooling regions rectangular in shape and shrewd the GHB of every and each region.

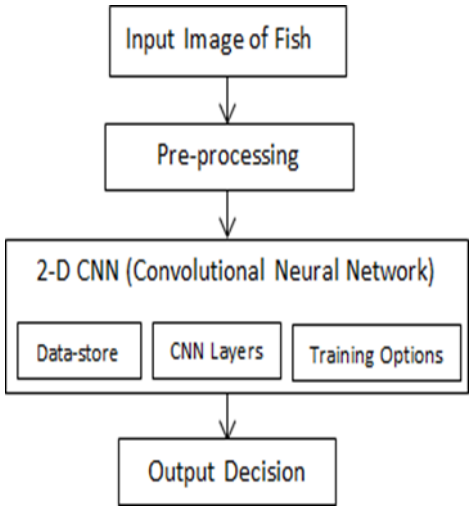
Fully Connected Layer:

In this succeeding step it involves making a totally connected layer. This layer normally multiplies the load matrix with the input then sums up a bias network. because the name suggests all the neurons during this layer connects to any or all the neurons within the previous layer.

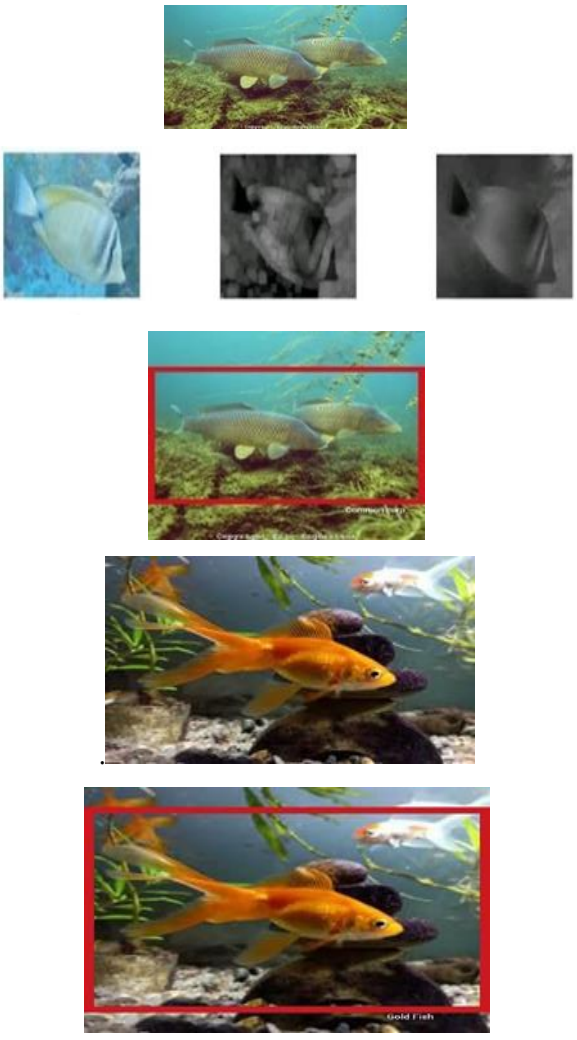
SoftMax and Classification layers:

It applies a software system A classification layer computes for multi-class classification cross-entropy loss issues with reciprocally exclusive categories.

Flow chart for proposed system:



Snapshots of OUTPUT:



5.Conclusion and future work:

From the above methodology it can be made clear that the identification is made easy not only finding the fish but also giving the names of the fish species. The output that has been shown is a software application, but our future work would be developing a hardware application which can be used underwater and transmit all the information spontaneously to the nearby research locations..

References

[1] J. Redmon, S. Divvala, R. Girshick, and A. Farhadi, “You only look once: unified, real- time object detection,” in 2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 779–788, Las Vegas, NV, USA, June 2016. [30] J. Redmon and A. Farhadi, YOLOv3: An Incremental Improvement, 2018.

[2] S. Ren, K. He, R. Girshick, and J. Sun, “Faster R-CNN: towards real-time object detection with region proposal networks,” IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 39, no. 6, pp. 1137– 1149, 2017.

[3] A. Krizhevsky, G. E. Hinton and I. Sutskever,, “ImageNet classification with deep convolutional neural networks,” Communications of the ACM, 2017.

[4] K. He, X. Zhang, S. Ren, and J. Sun, “Deep Residual Learning for Image Recognition,” IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Las Vegas, NV, USA, Jun 2016.

[5] K. He, X. Zhang, S. Ren, and J. Sun, “Spatial pyramid pooling in deep convolutional networks for visual recognition,” EEE Transactions on Pattern Analysis and Machine Intelligence, 2015.

[6] R. Girshick, “Fast R-CNN,”in 2015 IEEE International Conference on Computer Vision (ICCV), pp. 1440–1448, Santiago, Chile, Dec 2015.

[7] R. Girshick, J. Donahue, T. Darrell, and J. Malik, “Rich Feature Hierarchies for Accurate Object Detection and Semantic Segmentation,” IEEE Conference on Computer Vision and Pattern Recognition, Columbus, OH, USA, Jun 2014