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# Application Research of Machine Learning in Automatic Identification of Fish Parasitic Viscera Species

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**ABSTRACT:** Fish diseases in cultivation represent a major hazard to alimentation security. Whereas intake the infected fish, humans can develop a risk for cancer and alternative health problems. Identification of infected fishes in cultivation may be a difficult method thanks to the shortage of infrastructure. Therefore, it becomes a vital step to diagnose this illness at AN early stage to forestall additional spreading. The motive of this project is to get the epidemic lesion syndrome illness that is caused by a fungus infective agent. Initially, segmentation is applied to boost the image, numerous edge detection techniques and Morphological operations are applied on the EUS affected fish image. HOG and quick are the 2 totally different feature descriptors that are accustomed extract options from the EUS infected fish image. The classification of EUS infected and non-EUS infected fish image are done by Machine Learning Algorithms and classifier is employed to work out the accuracy of the classification.

**KEYWORDS:** HOG · FAST · DL · ANN · Epizootic Ulcerative syndrome

## I.INTRODUCTION

Aquaculture includes breeding, raising, gathering fishes, aquatic plants, crustaceans, Mollusca, and aquatic organisms. It involves the cultivation of each fresh and water creatures below a controlled condition. Crucial the explanation for infection in a very fish is very important for maintaining the health of alternative fish within the same surroundings. Most of the diseases in fish are caused by bacterium and protozoa. These diseases are tough to spot as a result of their biological signs are similar. The variations arise solely throughout the acute or chronicle section and in several cases, transmission patterns are unknown. Epidemic lesion syndrome is taken into account to be associate infection with the oomycete referred to as Aphanomyces invaders that may be a plant infectious agent. it's a red spot unwellness and appears like lesion therefore it's usually misidentified by the folks. EUS causes ugly lesions within the affected fish which will vary from little pin purpose red spots to localized swelling and skin erosion. To notice this unwellness, we tend to use Artificial Neural Network that may be a procedure intelligence technique. ANN is predicated on a group of connected units or nodes referred to as artificial neurons that loosely model the neurons in a very biological brain. Artificial neurons ar wide utilized in part, defence and health care applications.

## II.OBJECTIVE

To detect the disease called Epizootic Ulcerative Syndrome and to screen a large numbers of infected fish images for appropriate diagnosis.To classify EUS infected and Non-EUS infected fish image, Artificial Neural Network is employed which is a machine learning model.ANN is a significant application in various medical

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branches because of enabling detection of valuable artefacts as well as providing decision support that effectively reduces the workload for clinicians.

The classification of EUS infected and Non-EUS infected fish image are done by Machine Learning Algorithms and classifier is used to determine the accuracy of the classification.

### **III. RELATED WORK**

The concept of detecting the disease using deep artificial neural networks was introduced by Q. K. Ai-Shayea, Artificial Neural Networks in Medical Diagnosis: within the medical field, ANNs square measure went to assist the specialist within the analysis, identification and treatment of diseases. Most medical applications of artificial neural networks square measure classification issues, in different words, the task is predicated on the classification of measured parameters, to assign the patient to a tiny low set of categories, that square measure the diseases. The back-propagation model with 2 layers (hidden and output), with the sigmoid and linear activation functions, has been used for the answer of a number of these issues.

This paper discussed the effectiveness of several popular gradient based edge detection techniques when applied on binary images was introduced by Valentin Lyubchenko, Rami Matarneh, Oleg Kobylin, Vyacheslav Lyashenko, Digital Image process Techniques for Detection associate degreed identification of Fish: planned a way that mechanically acknowledges the act from input video stream with bar chart of homeward-bound Gradient options (HOG) and Probabilistic Neural network (PNN) classifier and within which options square measure extracted from input video frames by HOG options detector and square measure concatenated to create an action pattern. Experiments square measure conducted on KTH info and provides higher performance in terms of 100 percent recognition rate for coaching set and eighty nine.8% accuracy for take a look at set.

The Proposed method which automatically recognizes the human activity from input video stream with Histogram of Oriented Gradient features (HOG) was classified by Daoliang Lia, Zetian Fua, and Yanqing Duanb: projected a system within which the image of the pathologic fish acknowledges by mistreatment PCA methodology and pathologic space segmentation of fish image supported colour options with K-means cluster. HSV pictures and Morphological operation open for higher accuracy to pathologic space detection and mensuration. It's taken solely four epidemic lesion Syndrome (EUS) pathologic fish pictures as a case study to judge the projected approach and within the experimental results clear indication of the effectiveness of projected approach to boost the pathologic identification with larger preciseness in addition as properly cipher pathologic space. Within which options area unit extracted and processed by PCA to create the feature vector at the moment classify them in line with the Euclidean distance.

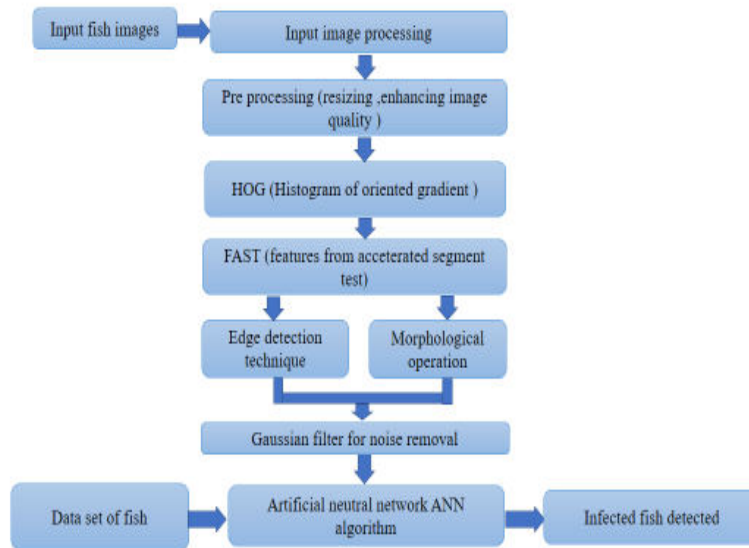
### **IV. METHODOLOGY**

This paper has nice potential to be applied in assessing and quantifying the infected regions, observance the longitudinal sickness changes, and mass screening process. Machine-driven recognition of patterns in knowledge by computers supported information already obtained is named pattern recognition. It is applications in image analysis, info retrieval, signal process, knowledge compression, applied mathematics knowledge analysis, and machine learning. In machine learning approaches and applications, the artificial neural network (ANN) structures demonstrate a high capability to extract and classify some key options and bridging the gap between the capabilities of machines and humans.

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## V. IMAGE SEGMENTATION

Image Segmentation is the process of partitioning a digital image into multiple segments (sets of pixels known as image objects).The goal of segmentation is to simplify and change the representation of an image into an efficient one which is more meaningful and easier to analyze.Image segmentation is typically used to locate objects and boundaries (lines, curves, etc) in images. More precisely, it is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.The result of this process is a set of segments that collectively cover the entire image, or a set of contours extracted from the image.Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, and texture.

## VI. HISTOGRAM OF ORIENTED GRADIENT (HOG)

Histogram of Oriented Gradients, also known as HOG, is a feature descriptor like the Canny Edge Detector, SIFT (Scale Invariant and Feature Transform). It is used in computer vision and image processing for the purpose of object detection.

The technique counts occurrences of gradient orientation in the localized portion of an image. This method is quite similar to Edge Orientation Histograms and Scale Invariant a Feature Transformation (SIFT).The HOG descriptor focuses on the structure or the shape of an object. It is better than any edge descriptor as it uses magnitude as well as angle of the gradient to compute the features. For the regions of the image, it generates histograms using the magnitude and orientations of the gradient.

## VII. FEATURES FROM ACCELERATED SEGMENT TEST (FAST)

Features from accelerated segment test (FAST) is a corner detection method, which could be used to extract feature points and later used to track and map objects in many computers vision tasks. The FAST corner detector was originally developed by Edward Rosten and Tom Drummond and was published in 2006.The most promising advantage of the FAST corner detector is its computational efficiency. Referring to its name, it is

indeed faster than many other well-known feature extraction methods, such as difference of Gaussians (DoG) used by the SIFT, SUSAN and Harris detectors.

Moreover, when machine learning techniques are applied, superior performance in terms of computation time and resources can be realized. The FAST corner detector is very suitable for real-time video processing application because of this high-speed performance.

### VIII. EDGE DETECTION

Edge detection is one of the fundamental steps in image processing, image analysis, image pattern recognition, and computer vision techniques. It includes a variety of mathematical methods that aim at identifying edges, curves in a digital image at which the image brightness changes sharply and formally. It works by detecting discontinuities in brightness. The purpose of detecting changes in the brightness of an image is to capture important events and changes in properties of the world. It can be shown that, under the general assumptions for an image formation model, discontinuities in image brightness are likely to correspond to discontinuities in depth, surface orientation, and changes in material properties and variations in scene illumination. The result of applying an edge detector to an image may lead to a set of connected curves that indicate the boundaries of objects, surface markings.

### IX. ANN ALGORITHM

Artificial neural networks (ANNs), usually simply called neural networks (NNs), are computing systems inspired by the biological neural networks that constitute animal brains. An ANN is based on a collection of connected units or nodes called artificial neurons, which loosely model the neurons in a biological brain. Each connection, like the synapses in a biological brain, can transmit a signal to other neurons. An artificial neuron receives a signal then processes it and can signal neurons connected to it. The "signal" at a connection is a real number, and the output of each neuron is computed by some non-linear function of the sum of its inputs. The connections are called edges. Neurons and edges typically have a *weight* that adjusts as learning proceeds. The weight increases or decreases the strength of the signal at a connection. A neural network may contain the following 3 layers:

**Input layer:** The activity of the input units represents the raw information that can feed into the network.

**Hidden layer:** To determine the activity of each hidden unit. The activities of the input units and the weights on the connections between the input and the hidden units. There may be one or more hidden layers.

**Output layer:** The behaviour of the output units depends on the activity of the hidden units and the weights between the hidden and output units.

### X. EXPERIMENTAL RESULTS

The results of the proposed model can be analysed as follows.



(a)

(b)

(c)

Fig 1 Fish Images (a) Dilate Image (b) Erode Image (c) Gaussian Image

(d) Grey Level Image (e) Edge Detection Image (f) Output Image

Figure 1 (a) Shows the expanded pixel range of input image. (b) Erosion removes the pixels on object boundaries of the input image. (c) In Gaussian image unwanted image noises such as blurriness and brightness of the image is removed.

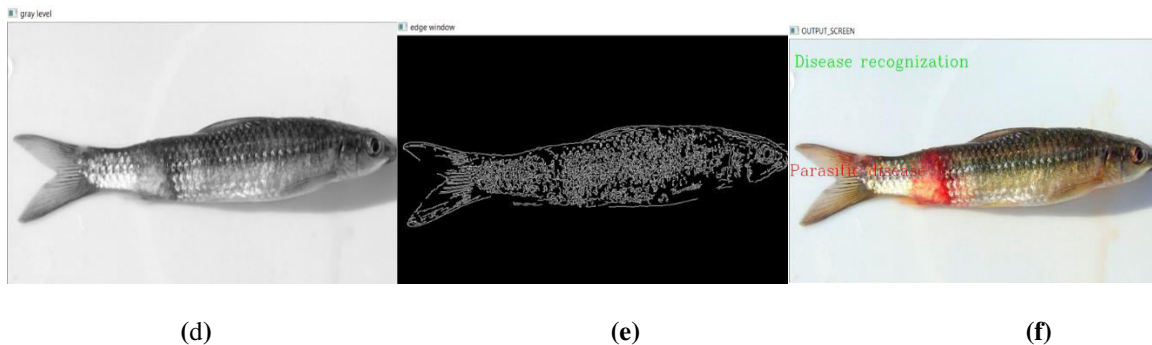


Figure 1 (d) In Grey level image the edges and boundaries of the object is marked. (e) Using edge detection technique the infected area is marked in white in colour and uninfected area is marked in black colour. (f) Finally the output screen is displayed with the name of infected disease.

## XI. CONCLUSION

The paper concludes that the proposed combination gave better accuracy after applied the artificial neural network algorithm. Artificial Neural Networks (ANN) architecture for identifying fish disease more precisely and meticulously. This neural network helped in increase the accuracy. The Experimentation has been applied on the real images of the EUS infected fish images dataset. The implementation has been done in thorny software. It automatically detects the Fish EUS disease. This work contributes to bringing out a superior automated fish detection system than the existed systems have lower accuracy.

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