

Review Article

Automatic Fish Detection and Species Classification Using Optimal Archimedes Shooty Term Deep Network

Bhubneshwar Sharma*

Department of Electronics and Communication Engineering, Sardar Beant Singh State University, Punjab, India

Abstract

The Optimal Archimedes Shooty-Term Deep Network algorithm employs image resizing and normalisation as a pre-processing step to enhance the quality of images. Image recording of fish is very difficult, time-consuming, and costly during manual analysis of the data. Due to this reason, we attract more spontaneous ordering, calculating, and size of catch fish data. Here we are going to discuss automated fish detection and thus species classification, as well as various fish-related facts, its impacts, the evolution of fish, and the details of various challenges that fish are facing while getting food in the sea. Populations of various species of fish is progressively squeezed by ecological gravities like worldwide roasting, naval reports to weather alteration and smog, and general densities such as tolerant and overfishing and supportable misuse of naval ordinary possessions. The implications of these bring further interest to produce a reliable, lucrative, and persistent system to show fish across environments. Labor-intensive methods to organize fish can be inspiring and they can be wasteful and they may dictate large choice applications.

Keywords: Automated fish; Ecological gravities; Overfishing

Introduction

As we read about all articles related to our research and we decided to explore more on research gaps which is a great aspects or areas of concern and also that will help us to formulate problem of our research work. Our concern is to fill these research gaps and formulate problem which will be our scope of study of research in this

*Corresponding author: Bhubneshwar Sharma, Department of Electronics and Communication Engineering, Sardar Beant Singh State University, Punjab, India, E-mail: bhubnesh86@gmail.com

Citation: Sharma B (2023) Automatic Fish Detection and Species Classification Using Optimal Archimedes Shooty Term Deep Network. J Aquac Fisheries 7: 071.

Received: September 24, 2023; **Accepted:** October 09, 2023; **Published:** October 15, 2023

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proposed framework. During study of our research gaps in already existing methods like in case of Support Vector Machine (SVMs) approach, YOLO Fish Classification method and Convolution Neural Networks approach, we found that in every fish classification method or approach there are so many limitations and with the help of our proposed model we will eliminate all research gaps by our proposed approach or framework by enhancing fish species recognition with better performance. I decided to plan proposed model so that I can eliminate gaps of research and we got one hint for our research work that we have planned one research proposal of proposed framework which will be very helpful in solving all kinds of limitations of already existing technologies. Our proposed algorithm is Optimal Archimedes Shooty Term Deep Network (OASTDN) and I assure you we will get best results by using this technique with the help of using various metrics to demonstrate its superiority in fish species recognition. Our proposed model can easily work under different environmental conditions and our proposed model ensures its reliability and applicability in real-world scenarios and aquatic environments. Trawl selection acknowledgment is a not simple task for explore. Huge challenge for grab fish acknowledgment approach into sight unexpected outcomes of marine tapes and metaphors. Objective categorization difficulty slurs at the centre of the work of approximation the incidence of each trawl type. Many likely variables may be use in image classification such as figure and touch and it can be completed by the characteristic removal process. The reason of quality removal is to make a decision the most appropriate and the smallest amount quantity of data picture of the representation kind in order to decrease the within-class example unpredictability, even as, attractive class draw round unpredictability. Close by are two class of sort: value kind and structural type. Attribute removal beginning a depiction is a main procedure in image assessment. So this is the main crisis and great face faced in case of trawl acknowledgment and in our future made we are disappearing to comprehensible. It is also found that this is the best way the image is segmented using multistate morphology methods to prepare for cell feature analysis with the proposed or planned framework. There has been an increasing concentration in misusing automated intensive care, electrical broadcasting, and reproduction intellect for fish documentation drives and to recover present approaches. Using these pictures of fish transportable can offer high excellence pictures at a reasonable price. Mechanism educations practices deliver resources to systematize image handling and can be personalized to behaviour [1]. Present computerization contain many knowledge procedures and topographies such as hue, figure and curve, precise milestones and surface. Exact sample of education procedures that have been recycled include major module investigation for vision vector mechanism and artificial neural networks. Manufacture business uses it to pattern and improve the excellence from large amounts of harvests [2]. All blocks used in the fish recognition have special significance for better understanding of overall diagram for understanding characteristics of different kinds of fishes and their manipulation of data for getting better results and it is believed that selection of data attribute is must to understand whole outline of diagram so that even layman can also understand better its physical importance and their behavior in simplify manner to adapt its natural phenomenon in their identification process

of fishes. Image processing techniques are found to be very efficient during the processing and analysis of data obtained from various fish species inside the sea. Due to this reason, we attract more spontaneous ordering, calculating, and size of catch fish data. Fish class credentials are conventionally morphological geographies, comprising physique contour, shape of standards, measure scope. In addition to this; we also study various steps and phases while processing data, like early processing and subdivision. In order to perform high-accuracy fish classification, we require great understanding and in-depth knowledge of fish behavior.

Fish Recognition

Metaphors record of trawl found time unbearable and expensive during development and analysis manually. On behalf of this cause, readily available huge attention in habitual categorization, as well as, and dimension of fish. Consequently, elevated accurateness fish categorization is mandatory for better considerate of fish performance for oceanic scientists [3]. As a result, a computerized technique and most favorable attribute choice are necessary, even though getting better its efficiency leftovers a test to distinguish the trawl kind. This research proposed the novel Optimal Archimedes Shooty Term Deep Network (OASTDN) to classify the fish species in accurate manner. Thus, the optimal tuning is performed to enhance the performance of deep learning Deep Belief Network (DBN) classifier. In accumulation, process of segmentation, characteristic removal, attribute optimize, and categorization be five steps in the planned proposal [4]. Then, the planned structure is evaluated and analyzed with existing approaches with respect to accuracy, Mean Square Error, Precision, Recall, F-measure, R2, Sensitivity Specificity. Following that, the proposed model proved that outstanding performance in fish species recognition than other approaches. Due to this reason, we attract more spontaneous ordering, calculating, and size of catch fish data. Fish class credentials are conventionally centered on peripheral morphological geographies, comprising physique contour, shape of standards, measure scope and reckoning, numeral and absolute location of fins, quantity, kind of organ waves, or several comparative dimensions to physique quantities. In order to perform high-accuracy fish classification, we require great understanding and in-depth knowledge of fish behavior in a strong manner by our marine biologists and scientists. Example can be detrimental to the marine heaven. They may be wasteful but significance in deficient data and deficiency of fish experts may origin inappropriate and independent documentation. Programmed structures can help correctly to categorize these fish reliably. It is believed that fish recognition is the latest research going on these days in the field of electronics and communication engineering department below block diagram is used to describe complete fish recognition process in detail and each block has special signification and contribution equally for the complete process of fish classification and recognition. These are established for expression discovery and reaction remark in the airfield and other sanctuary inspection. Google is scheming its individual carriage that can identify traffic ciphers and evade walkers. All other kinds of blocks have been discussed in the mentioned diagram. Fish is always very difficult to locate in the sea water but even how we have managed a lot to find its all details like feature selection detection and so many other features related with that and we have been examining this scenario in detail with this above design. With the help of this review paper and it is also found to prepare for cell feature analysis and extraction through the detect the target peripheral morphological geographies, comprising physique contour, shape of standards, measure scope and reckoning, numeral and absolute

location of fins, quantity, kind of organ waves. Moreover, the initial fish families stood in jawless fish creatures and premature fish from vestige histories remain characterized through a cluster of minor armored jawless fish [5]. Theory remained recognized by way of accurateness. Also jawless fish families stand typically inexistent nowadays.

Though, an existing clade, lampreys might be recognized during evolution of earliest pre-jawed category of fish. Here is great necessity of present fish organization for accurately that categorize various fish species used to systematize in profitable way for better understanding of this concept. During process of fish recognition first step is to take fresh image of fish, after taking fresh images we have to sense the object, after object sensation attribute selection is done and after that each fish like fish 1 and fish 2 and so on all fish attributes are to be measured and in parallel we will use test image and after taking test image object detection is required and after that feature selection process is adapted and then fish organization is maintained then in the later stage fish characteristics measured.

Deep Learning

Ideas in deep knowledge with neural grid have risen in periods of past history. It was initially established by expert LeCun et al. in 1998. Due to histrionic development in calculating supremacy of burst of large statistics, profound knowledge is intelligent of type great accomplishments during earlier numerous ages. Profound education centered on large data composed for positive ground. It means from enormous statistics that are tremendously significant. Neural system has stacks for sheets in duplicating the mind. By means of the foundation of high-performance accelerators, haze loading, and influential calculating capacity, it is now likely to gather, accomplish, and examine large data groups. Since individual with statistics groups are found sufficient, can make complications that ought to be resolved in bottomless education. Profound leaning established progressively useful in every grounds, important benefit in outdate procedures for processor apparition [6]. Presentation of engineering organizations used to enhance our profound education. Fishes ought to exist sprouting and fluctuating in lieu of very long decade. It is found that study of Fishes that needs to advance throughout the Cambrian detonation about 530 million ages past [7]. The first chordates shaped skulls then spinal pillars that facilitated to grow vertebrates for image processing. Moreover, the initial fish families stood in jawless fish creatures and premature fish from vestige histories remain characterized through a cluster of minor armored jawless fish. Theory remained recognized. Also jawless fish families stand typically inexistent nowadays. Though, an existing clad, lampreys might be recognized during evolution of earliest pre-jawed category of fish. Like Deep learning is a type of a precise division of apparatus knowledge base on artificial neural networks collective with illustration learning. It is a form of machine learning with the aim of focus on knowledge information representations slightly than algorithms explicit to a task. The objective of this is to offer superior competence, presentation for profound knowledge altos like universal main processor plus [graphics](#) parts. mainly it utilize a great numeral of calculation mechanism to influence big information part mechanism, as these are particular for consecutively learning protocols, while AI procedures are basically more dedicated for conclusion. On the other hand, the two conditions are not used thoroughly and readily available is frequently extended beyond stuck between the others. so many other features related with that and we have been examining this scenario in detail with this above design

with the help of this review paper and it is also found that this is the best way to describe [8]. We have highlighted every important block needed for proper function of image processing of fish various attributes and after that classification of various important attributes is very necessary and author predict that without this information. The optimal feature selection procedure is used for fish species categorization algorithm is performed using a novel hybrid algorithm. So it has been used the deep learning here. Fishes ought to exist sprouting and fluctuating in lieu of very long decade. It is found that study of Fishes that needs to advance throughout the Cambrian detonation about 530 million ages past. The first chordates shaped shells then spinal pillars that facilitated to grow craniates then vertebrates for image processing. These are established for expression discovery and reaction remark in the airfield and other sanctuary inspection. Google is scheming its individual carriage that can identify traffic ciphers and evade all of them have significant type of parameters. We also face so many challenges for fish identification in sea few have been discussed herewith like [9]. Thus, the ecological differences deliver a main context for fish credentials and are also characterized as marks:

- i. Blurry, including three low dissimilarity. as we found this is main common challenge in this kind
- ii. Difficult contextual, rich seabed assemblies that deliver a high grade of education misperception.
- iii. Location challenge is taken very serious and it can also be optimized and we can save this also.
- iv. Great concreteness of moving fish in every video structure that executes the specific encounters.
- v. Vibrant contextual, in which videos are delivered with the irritant consistencies of coral range.

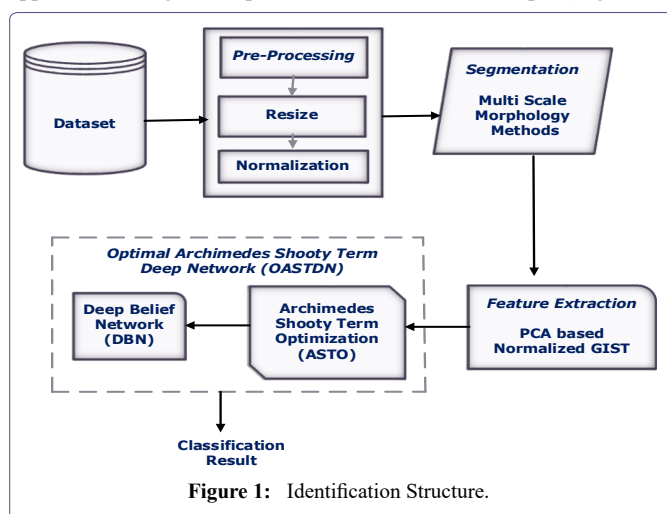
Populations of various species of fish is progressively squeezed by ecological gravities like worldwide roasting, naval retorts to weather alteration and smog, and general densities such as tolerant and over-fishing and supportable misuse of naval ordinary possessions [10]. The implications of these bring further interest to produce a reliable, lucrative, and persistent system to show fish across environments. Labor-intensive methods to organize fish can be inspiring and they can be wasteful and they may dictate large choice applications. Example can be detrimental to the marine heaven. They may be wasteful but significance in deficient data and deficiency of fish experts may origin inappropriate and independent documentation. Mountain and river is suitable a realism with the expansion of new schemes like tide and turbines that produce electrical energy from logically flow wet. Schemes used for sound on trawl and nature submerged record. Ways programmed study of submerged compulsory to inferior expenses study get better accurateness. A bottomless knowledge representation, YOLO, skilled distinguish trawl in submerged using image processing. We are having detailed knowledge of challenges that we found in underwater sea for their basic food demands Sub aquatic educations and various surveys have been extended in the modern ages and the stimulating brightness wishes to make a speech using processor and vision-based algorithmic strategies [11]. These images normally affects owing to bright dusting and blare primary to little divergence and distortion pictures. Identification of fish with respect to their characteristics found more important in large number of factories during researching the new natural life, owing to deformation, sound in digital images [12]. In the classification, organization is done in

two self-determining undergrowth. The initial categorization forecast completed in the two kindling is then re biased and averaged as the final calculation. In the universal contest they obtained good results in this framework, we studied a lot about fish species classification and its identification with the help of image processing application. We also studied various stages advanced in fish acknowledgment and organization of species. Due to this reason, we attract more spontaneous ordering, calculating, and size of catch fish data. Fish class credentials are conventionally centered on peripheral morphological geographies, comprising physique contour, shape of standards, measure scope and reckoning, numeral and absolute location of fins, quantity, kind of organ waves, or several comparative dimensions to physique quantities. Through this way we can say that In order to perform high-accuracy fish classification, we require great understanding and in-depth knowledge of fish behavior. The pre-trained and scrutinize of audio trawl class information have for all time been by hand conduct and have been careful sustained [13]. In the meantime, profound knowledge and mechanism learning-focus approach have also been used to mechanize or incompletely computerize the audio resonance scrutinize procedure and construct a purpose procedure with which the type resonance categorization improbability is normal to be subordinate than the indecision of scrutinizing well known. A reconsider of the high-tech of dissimilar profound knowledge and mechanism knowledge application in audio trawl type resonance categorization has been extremely required. Consequently, at hand it is used to recognize and examine the study conduct on audio trawl resonance classification by means of profound knowledge and mechanism knowledge approach. This text can be comprehensive to comprise other maritime organisms quite than now trawl type. To look for associated study, we used an organized advance to look for the mainly known electronic information over the previous lifetime [14]. We were capable to recognizing associated mechanism, which have been utilized to give an outline of numerous profound and mechanism education approach used in audio trawl type classification. Objective categorization difficulty slurs at the centre of the work of approximation the incidence of each trawl type. Many likely variables may be use in image classification such as figure and touch and it can be completed by the characteristic removal process and we can handle image processing in very best and Broadway manner for future.

Optimal Archimedes Shooty Term Deep Network

The proposed Optimal Archimedes Shooty Term Deep Network (OASTDN) model employs image resize and normalization as a pre-processing step to enhance the image. The picture is segments using large-scale morphological way to get ready for cell attribute investigation and removal through the sense the goal. Following that, the feature extraction is performed using the PCA based Normalized GIST. Moreover, a novel optimization algorithm is presented for optimal feature selection [15]. The optimal feature selection type deep principle system representation is engaged for fish type categorization the excited constraint tuning of the representation is perform using a original amalgam algo which in revolve boost the categorization outcome as cancer and non-cancer [16]. At last, the planned model is evaluated using metric parameter to study the presentation in detection and classification of the trawl variety is shown in Fig. below. With the help of our proposed model we will be able to analyze and classify various images of fish Here in this proposed model we have seen that every block has some special significance and this model will be more useful in deep learning networks for extraction of features for better results for their recognition and their classification

of their various features and later we will extract various features. This proposed model we will perform using mat lab programming and later. We will get results and then we will compare our results with other conventional methods to show that our model is having better results that other models sea scientists employ distant under-water picture and videotape footage to learn fish type in their usual habitat. This is second-hand to find a one footstep nearer to appreciate and forecast how trawl counter to climate change, environment deficiency and fish bulk. This in sequence is needed for just establishment sustainable fisher for being utilization, and intended for conserve ambience. Though, the massive quantity unruffled video take out in twist frightening like long-lasting person life form [17]. Talented way to speak to this difficulty is the higher deep knowledge facts. It can help maritime scientists parse huge power of videocassette rapidly and inexpensively, undo niche in series that should not be second-hand using unsurprising manual watch process. Here, we unique give a test of pc visions and DL information behavior during time 2003 and time 2021 on fish association in marine environment. We then provide a universal idea of the go into concept of this, while appreciate and manufacture our imagery. We also present the main procedure face when promising for subordinate aqua image allowance and propose method to recognize them. Trawl selection acknowledgment is a not simple task for explore. Huge challenge for grab fish acknowledgment approach into sight unexpected outcomes of marine tapes (Figure 1).



Stages Developed For Acknowledging Classification of Species

- i. Gather Data
- ii. Pre-process Data
- iii. Segmentation Process
- iv. Feature Extraction
- v. Classification

In fish re-examine application submarine trawl noteworthy responsibility. Great quantity of information essential categorization expansion. Readily available are many challenge taking agent samples for the alike. It covers poor shape quality, deserted objects in the state of affairs [18]. Existing characteristic removal techniques use frequent being rule. Example being endeavour. Dissimilar kind

of trawl figure engaged their photo and recording are manually examine by maritime to find helpful in turn. This wants more interval and attempt. Some trawl class check-up use as well as well [19]. we have managed a lot to find its all details like feature selection detection and so many other features related with that and we have been examining this scenario in detail with this above design with the help of this proposed study and it is also found that this is the best way . described we have highlighted every important block needed for proper function of image processing of fish various attributes and after that classification of various important attributes is very necessary and author predict that without this information .So it is essential to be familiar with the group of pupils of fish as of the marine fish picture. preceding system groups the angle picture in to cluster depends on dimension, draw round [20].This also help to categorize the trawl set and it is observed that recognition of fishes are very important to play the system implications for better understanding mathematical procedures and their well beings in whole system. Due to histrionic development in calculating supremacy of burst of large statistics, profound knowledge is intelligent of type great accomplishments during earlier numerous ages. Profound education centred on large data composed for positive ground. It means from enormous statistics that are tremendously significant. Neural system has stacks for sheets in duplicating the mind Great concreteness of moving fish in every video structure that executes specific encounters for fish detection procedures Profound leaning established progressively useful in every grounds, important benefit in outdate procedures for processor apparition. Presentation of engineering organizations used to enhance our profound education. We have highlighted every important block needed for proper function of image for their better efficiency and accurateness for wit drawl of all possible results There has been an increasing concentration in misusing automated intensive care, electrical broadcasting These are established for expression discovery and reaction remark in the airfield and other sanctuary inspection. The planned technique is evaluate with dissimilar Scheme of the deep learning model, plus fully linked layer, iterations, with optimization. The experiment image of fish and the ground reality picture have to be evaluated [21]. Different kinds of universal presentation way that are normally used for categorization are use to the study the accurateness of the planned categorization arrangement: accuracy performance measure, sensitivity performance measure, specificity performance measure, precision performance measure, and F1 score performance measure. The different kinds of all performance accuracy measures are based on the subsequent variables. In case the planned scheme accurately be familiar with and categorize trawl type from undersea metaphors, this categorization is recognized as a true positive trawl type categorization. The changeable variable TP specify the categorization of true positive trawl type. True negative trawl species categorization: in case the planned scheme accurately recognize and classify non-trawl species from submerged metaphors, this categorization is recognized as true negative trawl species categorization. Programmed structures can help correctly categorize these fish reliably. There has been an increasing concentration in misusing automated intensive care, electrical broadcasting, and reproduction intellect for fish documentation drives and to recover present approaches. Using pictures of fish are fetching mutual. Transportable can offer high excellence pictures at a reasonable price [22]. Mechanism educations practices deliver resources to systematize image handling and can be personalized to behaviour the changeable variable TN specify categorization of true negative trawl kind. In case the planned scheme incorrectly recognizes and categorizes non-trawl species as trawl species from

submerged metaphors, this is called as a false positive trawl species categorization. In this learning, the meaning of accuracy is the accurate categorization of trawl species from submerged metaphors [23]. To make sure the consistency of planned representation, it is necessary to decide the quantity of true positives and true negatives amongst the entire occurrence that include been examined. In our proposed model we have to measure all different kinds of parameters accurately to know changes that occurs while study of these schemes here for this kind of procedures and it is also noted that without the knowledge of these parameters we cannot be able to find accuracy which is main part of our study in proposed literature work Scientifically, accuracy is uttered as:

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} \quad (1)$$

According to the categorization of trawl species, sensitivity involve correctly recognize trawl species. Sensitivity can be strong-minded by tentative the quantity of true positives. Sensitivity has the subsequent numerical term:

$$\text{Sensitivity} = \frac{TP}{TP+FN} \quad (2)$$

According to the categorization of trawl species, specificity decides the consistency of non-trawl categorization grades. To calculate it, compute the percentage of authentic negatives. Specificity has the subsequent numerical term:

$$\text{Sensitivity} = \frac{TN}{TN+FP} \quad (3)$$

Precision is the proportion of the amount of exact fish categorization to the whole quantity of positive fish calculation. Precision is designed by the subsequent rule.

$$\text{Sensitivity} = \frac{TP}{TP+FP} \quad (4)$$

In an AI-type categorization scheme, the F1-score is considered by means of the in general precision and recall standards. Procedure for manipulative the F1-score is as described below.

$$\text{F1 - score} = \frac{2(\text{Recall} \times \text{Precision})}{\text{Recall} + \text{Precision}} \quad (5)$$

Acknowledgment and organization as a process gained a lot of attentiveness in the last duration wherever a lot of biologists utilize these events in direct to get better the mechanical field. Trawl acknowledgment and categorization at a standstill lively province in the agriculture sphere and considered as a probable research in make use of the alive knowledge for give confidence and approaching the cultivation research a head. even though advancement have been broken in the area of just opening real occasion information compilation and on accomplishment better variety declaration , alive system are silent defective in their aptitude to sense or categorize trawl, in ill will of the inclusive development in the ground of processor and programmer. Readily available are many of people die each daylight hours since they do not contain the skill to distinguish connecting venom trawl and non-venom. The fish types -based information is taken to study the presentation of planned representation from beginning to end model proposal. In addition, the presentation of planned model is compared and computed with respect to predictable approaches python compiler as simulated Neural arrangement, YOLO in term of accuracy, recall, f-measurement, Sensitivity. Knowledge algorithms which are employ jointly during categorization and deterioration.

Though in general, they are employing in categorization difficulty. In 1960s, SVMs were initial introduced but in a while they get distinguished in 1990. SVMs include their exceptional way of functioning as compare to former machine learning algorithms. Currently, they are tremendously well-liked because of their ability to feel multiple permanent and definite variables. YOLOv3 is an instantaneous thing discovery algo that recognize exact matter in video, live feed, or metaphors [24]. The YOLO machine knowledge algo uses category educated by a system intelligence and thing. Hand out predetermined array of in sequence such as metaphors. Convolution neural network are at length used in pc vision and have twist into the circumstances of the skill for many visual submission such as picture association, and have also produce achievement in usual speech dealing out for passageway categorization. Convolution neural networks are tremendously high-class at picking up on pattern in the key picture, such as appearance, incline circle, or even eye and face. It is this control that makes convolution neural networks so significant for processor idea [25]. Unlike previous CPU idea algo, convolution neural networks can purpose in a straight line on an uncommon picture and do not need any pre-processing. The structural plan of a this network is a thoughtful, ended by stack a lot of hidden layer on height of every previous in series. It is this sequential plan that let convolution neural networks to learn hierarchical account. The unseen layer is typically convolution layers go behind by start layers, a numeral of of them go after by pool layer. A simple convolution neural network that help thoughtful of the middle part plan beliefs is the near the start convolution neural network LeNet-5, obtainable by Yann LeCun in 1998. LeNet is intelligent of recognize handwritten font. It is one of the best techniques to detect and sense images because in our proposed model detection of images and sensation of images are very necessary and then we will extract and process certain features of object so it is noted that image processing is very important in these system of orientations for better results that withstand few of your outcomes of our proposed model in literature of whole process for better results fish various attributes and after that classification of various important attributes is very necessary and author predict that without this information. Classification was established with numerous structures like occurrence, figure, location, nature of fish with very beneficial assistance of maritime environmentalists Labour-intensive methods to organize fish can be inspiring and they can be wasteful and they may dictate large choice applications. Example can be detrimental to the marine heaven. They may be wasteful but significance in deficient data and deficiency of fish experts may origin inappropriate and independent documentation. Programmed structures can help correctly categorize these fish reliably. There has been an increasing concentration in misusing automated intensive care, electrical broadcasting, and reproduction intellect.

Conclusion

Thus, the optimal tuning is performed to enhance the performance of deep learning Deep Belief Network (DBN) classifier. In accumulation, process of segmentation, characteristic removal, attribute optimize, and categorization be five steps in the planned proposal. Here we discussed various stages advanced in fish acknowledgment and organisation of species. We also discussed in detail about our proposed Optimal Archimedes Shooty Term Deep Network model which found very useful in order to resize image and during normalization of data to enhance the image.

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