PAPER TITLE: Digital Naturalist Using Deep Learning

YEAR OF PUBLICATION: July 2021

AUTHORS: Aparna, Saloni M P, Chandana M, Neha U K, Banushree D J, Prof. Naresh Patel K M

JOURNAL: International Journal for Research in Applied Science & Engineering Technology (IJRASET)

KEYWORDS: Image Segmentation, Naturalists and Deep Learning

OBJECTIVES:

- To pre-processes the given image.
- To segment the image for accurate examination.
- To classify the image using CNN classifier algorithm.

METHODOLOGY:

It aims not only to identify flora and fauna but also to know about their habits, habitats, living and grouping lead to fetching services for protection as well. It uses web application to predict the given images from dataset using CNN and segmentation (process of partitioning a digital image into multiple segments). They applied image processing algorithms to detect the classes from given image for better accuracy. They classified birds using CNN technique based on colour features. It gives better and robust results for different images

PROCESS: Data Collection → Data Pre-processing → Model Building → Application Building

CONCLUSION:

This paper consists of the details about the model which was used for the detection of digital naturalists using the species images from the wild life and the species with flora part and with fauna part will be displayed as well.

PAPER TITLE: Bird Classification using Deep Learning

YEAR OF PUBLICATION: May 2020

AUTHORS: Piyush Bidwai, Vaibhav Mahalle, Eshan Gandhi, Sharda Dhavale

JOURNAL: International Research Journal of Engineering and Technology (IRJET)

KEYWORDS: Classification, Convolutional neural network (CNN), Pytorch, dataset, grey scale format.

METHODOLOGY:

Algorithm of deep learning in image classification are convolutional neural network (CNN) (Tenser Flow, Pytorch Models). It utilizes python language, Pytorch model and Raspberry pi to perform this bird classification. The input image is taken from electronic device and is converted into grey scale format. Deep learning models used to find vast number of neurons. These algorithms learn more about image as it goes through several neural networks. It consists of an input layer and output layer as well as multiple hidden layers. Every layer is made up of group of neurons and each layer is fully connected to all neurons of its previous layer. The CNN have two components: 1. Feature Extraction part, 2. Classification part. Image classification: image classification in machine learning is commonly done in two ways 1. Grey scale 2. Using RGB values.

PROCESS: Raw Data→ Training set→ Deep learning CNN→ Test Data→Feature Extraction→ Predictive model

CONCLUSION:

The proposed system will works on the principle based on detection of a part and extracting CNN features from multiple convolutional layers. These features will be given to the classifier for classification purpose. On basis of the results the system will try to achieve maximum accuracy in prediction of bird species.

PAPER TITLE: Bird Species Identifier using Convolutional Neural Network

YEAR OF PUBLICATION: 2021

AUTHORS: Kamlesh Borana, Umesh More, Rajdeep Sodha, Prof. Vaishali Shirsath

JOURNAL: International Journal of Engineering Research & Technology (IJERT)

KEYWORDS: CNN, Image processing, Neural networks and Transfer Learning

METHODOLOGY:

For Identification of the birds from an image they use image processing and Convolutional Neural Network (CNN) also they are using the transfer learning approach for training our neural model. They are creating their own neural network model for the species identification task will require greater amount of data i.e. images of a bird with their annotation as well as its needs huge computing power to create a neural model from scratch but also for better accuracy they use the pre-trained model and perform the transfer learning on our dataset. Transfer learning is an important development in machine learning and deep learning area. It solves the data insufficiency problem for training purpose. Transfer learning purposes the transfer of knowledge from the source neural model to the user's model if the source model and user model have a similar domain. Instances-based transfer ,Mapping-based transfer learning , Network-based transfer ,Adversarial-based transfer learning.

PROCESS: Image input → Mask RCNN → Image Segmentation and Cropping → Neural model →Top 5 accuracy

CONCLUSION:

In this paper, they have proposed a method to localize as well as classify the species of the bird from an image that is uploaded by the users by using techniques such as mask RCNN, transfer learning, and Convolutional Neural Network. The transfer learning technique helps to reduce the need for huge computing power for processing as well as speed up the learning process by reutilizing the knowledge.

PAPER TITLE: Texture Classification from Random Features

YEAR OF PUBLICATION: March 2012

AUTHORS: Li Liu and Paul W. Fieguth

JOURNAL: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

KEYWORDS: Texture classification, random projections, sparse representation, compressed sensing, textons, image patches, bag of words

METHODOLOGY:

At the feature extraction stage, a small set of random features is extracted from local image patches. The random features are embedded into a bag-of-words model to perform texture classification; thus, learning and classification are carried out in a compressed domain. The proposed unconventional random feature extraction is simple, yet by leveraging the sparse nature of texture images, our approach outperforms traditional feature extraction methods which involve careful design and complex steps. Detecting a sparse set of points in a given image by detecting points of interest, and then using local descriptors to extract features locally to each such point and densely extracting local features pixel by pixel over the input image.

PROCESS: Sparse Modelling of Textures→ Dimensionality Reduction and Information Preservation→ Random Measurements and Clustering → Patch Extraction→ Variability Analysis → Comparative evaluation

CONCLUSION:

In this paper, they have described a classification method based on representing textures as a small set of compressed, random measurements of local texture patches, leading to results matching or surpassing the state of the art in texture classification, but with significant reductions in time and storage complexity.

PAPER TITLE: Classification and Grading of Arecanut Using Texture Based Block-Wise Local Binary Patterns

YEAR OF PUBLICATION: May 2021

AUTHORS: Bharadwaj N K, Dinesh R, N Vinay Kumar

JOURNAL: Turkish Journal of Computer and Mathematics Education

KEYWORDS: Arecanut, Classification, Grading, Blockwise, LBP, Texture, SVM Classifier

METHODOLOGY:

In the proposed methodology the samples are segmented using Otsu's thresholding technique and necessary pre-processing is done. Classification and grading of processed Arecanut is usually done based on colour, shape and texture. For classification and grading of Arecanut we extracted different external features like Colour, Shape and Texture. In this work we explore the usage of LBP for texture description. LBP is most robust in identifying minute difference in the texture patterns. Initially LBP of the image is obtained as a whole and then as continued step Local Binary Histogram of an image is extracted in segments using with variable number of blocks by changing the K value and unknown samples are tested using Support Vector Machine classifier.

PROCESS:
Pre-processing → Segmentation → Feature Extraction → Classification → Validation

CONCLUSION:

In this paper a block wise approach in classifying Arecanut in to pre-defined 4 classes is proposed. In classifying Areca image, a Local Binary Pattern histogram of every data set is obtained for variable number of image blocks. The various combinations of Test and Training tests are also considered for image classification. Further SVM classifier is used for classification. The effectiveness of the proposed classification system is validated through well-known measures like accuracy, precision, recall and F-Measure.

PAPER TITLE: Automatic classification of grouper species by their sounds using deep neural networks

YEAR OF PUBLICATION: September 2018

AUTHORS: Ali K. Ibrahima and Hanqi Zhuang , Laurent M. Cherubin , Michelle T. Sch€arer-Umpierre, Nurgun Erdol

JOURNAL: The Journal of the Acoustical Society of America

KEYWORDS: LSTM, CNN, Discrete Wavelet Transform (DWT)

METHODOLOGY:

In this paper, the effectiveness of deep learning for automatic classification of grouper species by their vocalizations has been investigated. In the proposed approach, wavelet denoising is used to reduce ambient ocean noise, and a deep neural network is then used to classify sounds generated by different species of groupers. Experimental results for four species of groupers show that the proposed approach achieves a classification accuracy of around 90% or above in all of the tested cases, a result that is significantly better than the one obtained by a previously reported method for automatic classification of grouper calls.

PROCESS:
Acquisition/Denoising(DWT) → LSTM Layer → Fully connected → Classification Layer

CONCLUSION:

DWTs are used for signal denoising and deep neural networks are used for classification. They have compared the performances of the new method with those of the WMFCCs. They also tested two deep learning methods: LSTM networks and CNNs.

PAPER TITLE: Classifying Fish by Species Using Convolutional Neural Networks

YEAR OF PUBLICATION: 2021

AUTHORS: Abdullah Albattal, Anjali Narayanan

JOURNAL: University of California San Diego

KEYWORDS: Convolutional neural network, Fish identification, Fish species classification, The Nature Conservancy, Fish4Knowledge

METHODOLOGY:

Input images are normalized and are of the same size. Convolutional layers in the models presented result in either 32 or 64 feature maps that represent relevant features in the image detected by the convolutional layer. They built a CNN that can be applied to datasets collected by research organizations such as the Nature Conservancy and help identify fishes for research and fisheries purposes. Machine learning techniques provide a means to automate image processing and can be tailored to conduct efficient fish species identification and segmentation. using a convolutional neural network-based method, which is the Mask-RCNN with a Res- Net (152) as the backbone for feature extraction through the implementation provided in, they detect, isolate, and create masks for 99.6% of the images in the dataset.

PROCESS:
Pre-processing → Training dataset→ CNN → Classification Layer

CONCLUSION:

In addition to species classification, fish morphology and external characteristics, such as fin type, length, and color, may be resolved from the images in the datasets that are used in this project. Their work shows that our model can be applied to real-life datasets that are not necessarily noiseless, well-distributed, or robust such as the dataset provided by the Nature Conservancy.

PAPER TITLE: Research on image classification model based on deep convolution neural network

YEAR OF PUBLICATION: 2019

AUTHORS: Mingyuan Xin and Yong Wang

JOURNAL: EURASIP Journal on Image and Video Processing

KEYWORDS: Convolution neural network, Image classification, M3 CE-CEc

METHODOLOGY:

Based on the analysis of the error backpropagation algorithm, they proposed an innovative training criterion of depth neural network for maximum interval minimum classification error. At the same time, the cross entropy and M3 CE are analysed and combined to obtain better results. Finally, they tested our proposed M3 CE-CEc on two deep learning standard databases, MNIST and CIFAR-10. The experimental results show that M3 CE can enhance the cross-entropy, and it is an effective supplement to the cross-entropy criterion. M^3CE-CEc has obtained good results in both databases. They proposed an extension to the architecture of any convolutional neural network (CNN) to fine-tune traditional 2D significant prediction to omnidirectional image (ODI).

PROCESS:
Pre-processing → ZCA Process(mCNN)→ Image Feature Extraction → M^3CE constructed loss function → Evaluation.

CONCLUSION:

Deep convolution neural networks are used to identify scaling, translation, and other forms of distortion-invariant images. In order to avoid explicit feature extraction, the convolutional network uses feature detection layer to learn from training data implicitly, and because of the weight sharing mechanism, neurons on the same feature mapping surface have the same weight.