PAPER TITLE:AI ENABLED TOOL FOR BIODIVERSITY AND RESEARCHERS

YEAR OF PUBLICATION: 2021

AUTHORS: Anna K. Monfils, Karen E. Powers, Christopher J. Marshall

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

KEYWORDS: Naturalist Enabled Tool for Biodiversity Researchers

METHODOLOGY:

A naturalist is someone who studies the patterns of nature, identifies a different kind of flora and fauna in nature. Being able to identify the flora and fauna around us often leads to an interest in protecting wild spaces, and collecting and sharing information about the species we see on our travels is very useful for conservation groups like NCC.When venturing into the woods, field naturalists usually rely on common approaches like always carrying a guidebook around everywhere or seeking help from experienced ornithologists. There should be a handy tool for them to capture, identify and share the beauty to the outside world.

PROCESS:

Image data→ Data preprocessing → CNN Algorithm → Evaluation

CONCLUSION:

In this project, we are developing a web application that makes use of a deep learning model that has been trained on various bird, flower, and mammal species (two subclasses in each for ease of understanding).

PAPER TITLE: Bird Classification using Deep Learning

YEAR OF PUBLICATION: 2022

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: The input image is taken from electronic device and then transformed into grey scale format. Many neurons were found using deep learning models. The more neural networks an image passes through, the more these algorithms learn about it. There are several hidden layers as well as an input layer, an output layer, and more. Each layer is composed of a group of neurons, and every layer is completely connected to every neuron in the layer below it.

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

CONCLUSION: The suggested system would operate according to the principle of part identification and CNN feature extraction from multiple convolutional layers. These features will be given to the classifier for classification purpose. The system will attempt to maximise bird prediction accuracy based on the results..

PAPER TITLE: Bird Species Identifier using Convolutional Neural Network

YEAR OF PUBLICATION: 2022

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:Convolutional Neural Networks (CNN) and image processing are used for bird identification from images, and transfer learning is used to train our neural model. They are building their own neural network model for the task of identifying species, which requires a larger amount of data, such as images of birds with annotations, as well as a lot of computing power. However, they also use pre-trained models for better accuracy and carry out transfer learning on our dataset.

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

CONCLUSION: Using methods such mask RCNN, transfer learning, and convolutional neural networks, the authors of this research suggest a method for localising and classifying the species of bird from an image that users provide. By reusing the knowledge, the transfer learning technique helps to reduce the need for significant processing power and accelerates learning.

PAPER TITLE: Texture Classification from Random Features

YEAR OF PUBLICATION: 2022

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:A small group of randomly selected features are extracted from small local image patches during the feature extraction stage. To execute texture classification, the random features are incorporated into a bag-of-words model; as a result, learning and classification are completed in a condensed domain. The proposed unconventional random feature extraction is straightforward, but by taking advantage of texture images' inherent sparsity, our method outperforms conventional feature extraction techniques, which call for careful planning and numerous complicated steps.

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

CONCLUSION:In this paper, the authors describe a classification method that uses a small set of compressed, random measurements of local texture patches to represent textures. This method produces results that are on par with or better than the state of the art in texture classification, but with a sizable reduction in processing time and storage complexity.

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

YEAR OF PUBLICATION: 2022

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 suggested methodology the samples are segmented using Otsu's thresholding technique and essential pre-processing is done. Processed arecanut is typically categorised and graded according to its color, shape, and texture. We extracted various external features, such as colour, shape, and texture, for the classification and grading of arecanut. In this work, we investigate how LBP can be used to describe textures. LBP excels in spotting even the smallest variations in texture patterns. The local binary histogram (LBH) of an image is first collected as a whole, then as a further step, LBH is recovered in segments using a variable number of blocks by adjusting the K value, and unknown samples are assessed using an SVM classifier.

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

CONCLUSION:This paper proposes a block-wise classification of arecanut into 4 pre-defined classes. A Local Binary Pattern histogram of each data set is obtained for a variable number of image blocks in the classification of Areca images. For image classification, different combinations of Test and Training tests are taken into account. For classification, an additional SVM classifier is used. Known metrics like accuracy, precision, recall, and F Measure are used to verify the effectiveness of the proposed classification system.

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

YEAR OF PUBLICATION: 2022

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:The effectiveness of deep learning for automatically classifying grouper species based on their vocalisations has been examined in this paper. The suggested method employs wavelet denoising to lessen background noise from the ocean, followed by a deep neural network to categorise sounds produced by various grouper species.

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

CONCLUSION: The effectiveness of deep learning for automatically classifying grouper species based on their vocalisations has been examined in this paper. The suggested method employs wavelet denoising to lessen background noise from the ocean, followed by a deep neural network to categorise sounds produced by various grouper species.

PAPER TITLE: Classifying Fish by Species Using Convolutional Neural Networks

YEAR OF PUBLICATION: 2022

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: The input images are of the same size and have been normalised. In the models shown, convolutional layers produce either 32 or 64 feature maps, which represent important features in the image that were picked up by the convolutional layer. They created a CNN that can be used to identify fish for research and fisheries purposes and be applied to datasets gathered by research organisations like the Nature Conservancy. 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.

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

CONCLUSION: Fish morphology and external characteristics, such as fin type, length, and colour, may be determined from the images in the datasets used in this project in addition to species classification. Their study indicates that our model may be used to real-life datasets that are not always 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: 2022

AUTHORS: Mingyuan Xin and Yong Wang JOURNAL: EURASIP Journal on Image and Video Processing

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

METHODOLOGY: They proposed an innovative training standard for depth neural networks for maximum interval minimum classification error based on analysis of the error backpropagation algorithm. In order to produce better results, the cross entropy and M3 CE are analysed concurrently. Finally, they used two deep learning benchmark databases, MNIST and CIFAR-10, to test our proposed M3 CE-CEc. According to the experimental findings, M3 CE can increase cross-entropy and is a useful addition to the cross-entropy criterion. M3CE-CEc has achieved successful outcomes in both databases. They presented an extension to the architecture of any convolutional neural network (CNN) to fine-tune typical 2D significant prediction to omnidirectional image (ODI) (ODI).

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

CONCLUSION:

In order to recognise scaling, translation, and other types of distortion-resistant images, deep convolution neural networks are used. Convolutional networks use feature detection layers to learn from training data implicitly rather than explicitly extracting features, and because of the weight-sharing mechanism, neurons on the same feature mapping surface have the same weight.