IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

DETECTION OF LUMPY SKIN DISEASE IN COWS

[1.]KUNCHA ROHIT KUAMR [2.]KORLA VAMSI [3.]LINGAM GANESH [4.]DRAKSHARAPU PRAVALLIKA

[5.] VIROTHI RAJESH [6.]SINGAMPALLI HYMA

Under the guidance of **P.PRASAD SIR**

Assistant Professor

Department of Computer Science and Engineering,

Visakha Institute of Engineering and Technology

Visakhapatnam

ABSTRACT: Cattle's lumpy skin disease is a viral disease that is transmitted by blood-feeding insects like mosquitoes. The disease mostly affects animals that have not previously been exposed to the virus. Cattle lumpy skin disease impacts milk,beef, and national and international livestock trade. Traditional lumpy skin disease diagnosis is very difficult due to the lack of materials, experts, and time-consuming. Due to this, it is crucial to use deep learning algorithms with the ability to classify the disease with high accuracy performance results. Therefore, Deep learning-based segmentation and classification are proposed for disease segmentation and classification by using deep features. For this, 10 layers of Convolutional Neural Networks have been chosen. The developed framework is initially trained on a collected Cattle's lumpy Skin Disease (CLSD) dataset. The features are extracted from input images; hence the color of the skin is very important to identify the affected area during disease representation we used a color histogram. This segmented area of affected skin color is used for feature extraction by a deep pre-trained CNN. Then the generated result is

converted into a binary using a threshold. The Extreme learning machine (ELM) classifier is used for classification. The classification performance of the proposed methodology achieved an accuracy of 0.9012% on CLSD To prove the effectiveness of the proposed methods, we present a comparison with the state-of-the-art techniques.

INTRODUCTION

The cattle industry contributes significantly to our country's GDP. However, when compared to the number of animals present, this is insufficient. One of the reasons for this is that the health of cattle is not as important in India.Although the health monitoring system is readily available for humans, it is not yet popular with cattle(Swain, Kunja Bihari et al.2017).The lumpy skin disease virus is the source of the serious skin condition lumpy skin disease in animals. Fever, swollen lymph nodes, firm, confined nodules in the skin, and nodules that are particularly noticeable in hairless areas are the characteristics that set animal lumpy skin disease apart[9].Skin nodules that are 5 to 50 mm in size and rise above the skin are a clinical indicator of lumpy skin disease. The nodules may appear sparsely or to cover the entire body. The nodules may go away or develop ulcers that leave scars. Laboratory testing of blood samples and tissue samples from the skin lesions confirms the clinical diagnosis [10]

Fig: IMAGES OF AFFECTED COWS

1. LITERATURE REVIEW

Skin Disease Detection Using Deep Learning

Methodology:

The first part of the system focuses on image processing techniques to enhance the quality of skin disease images captured using smartphone cameras. The process involves applying various filters to the images to remove noise and make them uniform. By removing unwanted elements from the images, the system aims to improve the accuracy and efficiency of the subsequent analysis. the methodology combines image processing techniques to improve image quality and machine learning algorithms to classify skin disease images and generate diagnoses.[14] This integrated approach utilizes the image processing part to preprocess the images and the machine learning part to analyze and classify the preprocessed data, enabling the proposed system to provide inexpensive and accessible skin disease diagnosis using smartphones.

Advantages:

1. It is easy to use by the people using their smart phones.
2. It is very less expensive.

Disadvantages:

1. It gave very less accuracy for unseen data.
2. It is limited to some kind of diseases only.

Skin Disease Diagnosis from Photographs Using machine learning

Methodology:

The proposed model involves studying the performance of different deep learning based approaches to automatically classify skin diseases from colored digital photographs.[15] Several network models were applied, including U-Net, Inception Version-3 (InceptionV3), Inception and Residual Network(Inception)(ResNetV2), VGGNet, and Residual Network (ResNet).

Advantages:

1. The model gave better results for ResNet.
2. The model is taking result from the ensembling multiple models.

Disadvantages:

1. The model gave better performance for training data only.
2. The model is trained with very less images so it has biased output.

2.

3.IMPLEMENTATION

Output Screenshots

This section discusses the outcomes produced by the suggested system.The suggested system's effective implementation yields the desired results. The dataset's photos are gathered from. The results of each module are displayed in this chapter.

Preprocessing

1. **Resizing:-** The resize() method is used for resizing the images into 256*256 pixels
2. **Histogram Equalization:-** The equalizes() method is used for enhancing a picture's overall appearance.
3. **Gaussian Filtering:-** we use GaussianBlur() method for smoothing the images in dataset.

Figure : Normal Image Figure : Pre-processed Image

Segmentation using canny edge detection

Canny:- The canny() method is used for identifying the nodules in the image.

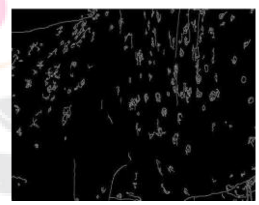


Figure :Normal Image Figure Segmented Image

Segmentation using Adaptive thresholding

Adaptive Threshold (blurred , 255 , cv2 .ADAPTIVE THRESH GAUSSIAN C, cv2

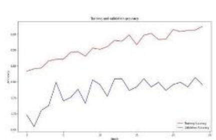
.THRESH BINARY INV, 15 , 3)

method is used for identifying the nodules in the image.

Figure : Normal Image Figure : Segmented Image

Analysis Graphs and Results

Here, we need to show the results of the lumpy skin detection performed by the resnet50 algorithm, along with the graphs that were used for training and validation accuracy and loss.



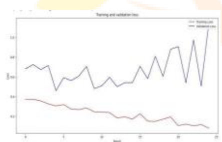


Figure Training Accuracy Figure : Testing Accuracy

The Accuracy occurred by the model is 92.92%

4. ALGORITHMS

Random Forest Algorithm to Predict Lumpy Skin Disease

Despite the difficulty of imbalanced data resulting from a lack of infected cases, the study's goal is to use machine learning algorithms to predict the presence of Lumpy Skin Disease (LSD) in a region. The researchers overcome this difficulty by training a Random Forest classification model on sample data and employing sampling techniques like Synthetic Minority Oversampling Technique (SMOTE) and Random Under-sampling.[2] The study concludes that the SMOTE technique outperforms Random Under-sampling in terms of performance metrics, especially when it comes to maximizing the Re-call rate for identifying lumpy cases.

Advantages:

1. It performs admirably on data that has been over- or undersampled
2. By using SMOTE, it has achieved precise results.

5. CONCLUSION

This project uses a machine learning model based on convolutional neural networks (CNN) to identify cow photos as lumpy or non-lumpy and the ResNet-50 algorithm was developed in this study. The goal was to address the difficulty of detecting lumpy-skindisease (LSD) in its early stages, which has been challenging owing to a shortage of veterinary expertise, particularly in areas where LSD is prevalent, such as Ethiopia. The suggested model made use of a dataset of cow photos, with 80% used for training and 20% for testing. To reduce noise and improve image intensity, preprocessing techniques such as Gaussian filtering and histogram equalization were used. Deep feature extraction was performed using Convolutional Neural Networks (CNN), which are well-suited for image analysis applications. The collected characteristics were then used to train the ResNet-50 algorithm, which classifies pictures into lumpy and non-lumpy categories with high accuracy. This method offers a viable alternative for automating the diagnosis of LSD, which has the potential to reduce economic losses in the agricultural business by enabling early identification and intervention.

The future work of the project s to Expanding the dataset by collecting more diverse and representative cow images from different regions and considering various factors such as breed, age, and geographical location can contribute to a more robust and reliable model and Integrating clinical information, such as symptoms or blood test results, along with the cow images can enhance the model's diagnostic capabilities and provide a more comprehensive analysis.

6. REFERENCES

1. E. Afshari Safavi, "Assessing machine learning techniques in forecasting lumpy skin disease occurrence based on meteorological and geospatial features," Tropical Animal Health and Production, vol. 54, no. 1, Jan. 2022, doi: https://doi.org/10.1007/s11250-022-03073-2.

2. S. Suparyati, Emma Utami, and Alva Hendi Muhammad, “Applying Different Resampling Strategies In Random Forest Algorithm To Predict Lumpy Skin Disease,” Jurnal RESTI, vol. 6, no. 4, pp. 555–562, Aug. 2022, doi:

3.M. GENEMO, “Detecting High-risk Area for Lumpy Skin Disease in Cattle Using Deep Learning Feature,” Advances in Artificial Intelligence Research, Nov. 2022, doi: https://doi.org/10.54569/aair.1164731.

4.B. Lake, F. Getahun, and F. T. Teshome, “Application of Artificial Intelligence Algorithm in Image Processing for Cattle Disease Diagnosis,” Journal of Intelligent Learning Systems and Applications, vol. 14, no. 04, pp. 71–88, 2022, doi: https://doi.org/10.4236/jilsa.2022.14400

5.Rai, Gaurav, et al. ”A Deep Learning Approach to Detect Lumpy Skin Disease in Cows.” Computer Networks, Big Data and IoT: Proceedings of ICCBI 2020. Springer Singapore, 2021.

6.Ahmed Ali, (2018),“Review on lumpy skin disease and its economic impacts in Ethiopia”,Journal of Dairy, Veterinary Animal Research, Volume 7 .