IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 2, February 2024

DOI: 10.17148/IJARCCE.2024.13244

MEDIHERB INSIGHT

Dr. Bhanu Prakash Battula [1], Alaparthi Sneha Madhuri[2], Kottamasu Naga Vinaya Sree[3], Patalam Asfiya[4], Kollipara Naga Sai Varshitha[5]

Professor & Head Of Department of CSE-Data Science, KKR & KSR Institute of Technology and Sciences. [1]

BTech CSE-Data Science, KKR & KSR Institute of Technology and Sciences, Guntur, Andhra Pradesh, India. [2-5]

Abstract: Medicinal plants have been utilized for centuries in traditional medicine Known as Ayurveda. However, manual identification and classification of these plants are time-consuming and error-prone tasks. In this study, we introduce "MediHerb Insight," an automated system using deep learning techniques for the identification and classification of medicinal herbs. Through the implementation of a convolutional neural networks (CNN), specifically Xception Architecture, our model demonstrates impressive accuracy in classifying medicinal plant species based on leaf images. Additionally, we present a user-friendly web application that allows users to upload leaf images for instant classification. This project holds significance in advancing research in botany, providing a valuable tool for plant species identification and analysis.

Keywords: Medicinal Plants, Classification, Automated system, Deep learning techniques, Convolutional neural network (CNN),Xception architecture,Plant species identification.

I. INTRODUCTION

In recent years, there has been a growing interest in the identification and classification of medicinal plants due to their potential health benefits. These benefits may include boosts immunity, heals infections, good sleep,relief from headache ,improves digestion etc. Thus offering natural remedies to treat diverse diseases. Some examples of medicinal herbs are aloe vera, turmeric, mint, neem, tulasi, ginger, lavender, hibiscus. However, the manual identification and classification of these plants can be prone to errors. Traditional methods of plant identification often require extensive botanical expertise and are not scalable for large-scale analysis.

To address these challenges, we propose "MediHerb Insight," an innovative approach utilizing deep learning techniques for automated plant species identification. By using the power of convolutional neural networks, specifically the Xception architecture, our system aims to accurately classify medicinal plant species based on leaf images. Furthermore, we develop a user-friendly web application for the identification process, making it accessible to botanists.

II. METHODOLOGY

The methodology employed in "MediHerb Insight" contains several key steps. Firstly, a diverse dataset comprising images of medicinal leaves from various plant species is collected and preprocessed. This dataset is then split into training and validation sets, with data augmentation techniques applied to enhance model robustness. For model training, we adopt transfer learning, utilizing the pre-trained Xception model as the base architecture. Additional fully connected layers are added to the model to improve feature representation, followed by fine-tuning of the last few layers. The model is compiled using the Adam optimizer with a lower learning rate and categorical cross-entropy loss. During the training phase, the model undergoes multiple epochs, with callbacks implemented to monitor training progress and prevent overfitting.After completion of training, the model is evaluated on the validation dataset to assess its performance in classifying unseen data.

III. MODELING AND ANALYSIS

The core of our project lies in the modelling and analysis phase, where the trained deep learning model is assessed for its performance. The Xception model, augmented with additional layers, serves as the backbone for our classification system. Training involves iterating over batches of augmented images and updating model parameters using back propagation.

After completion of training, the model is evaluated on the validation dataset to measure its accuracy.Metrics such as validation loss and accuracy provide insights into the model's performance in classifying medicinal leaves.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

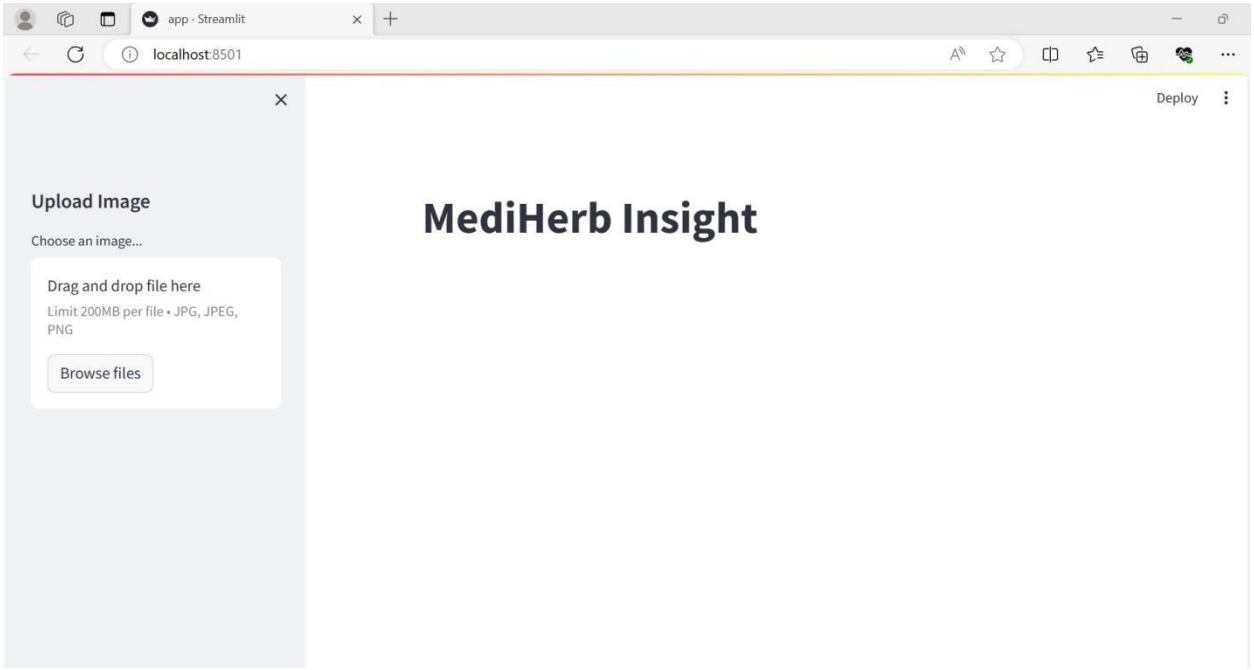
Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 2, February 2024

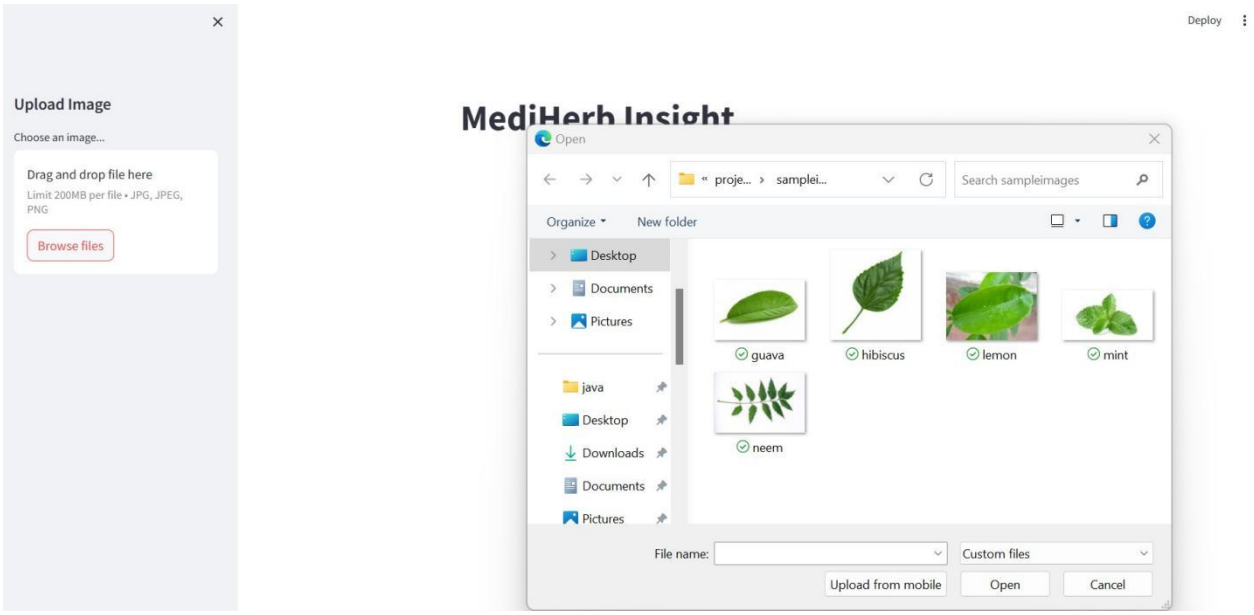
DOI: 10.17148/IJARCCE.2024.13244

IV. RESULTS AND DISCUSSION

The results obtained from our trained model demonstrate its efficiency in accurately classifying medicinal leaves. The model achieves a high accuracy rate on the validation dataset, indicating its ability to generalize well to unseen data. Additionally, the incorporation of data augmentation techniques enhances model robustness and reduces overfitting.

The development of a user-friendly web application using Streamlit further enhances accessibility and usability, allowing users to upload leaf images for instant identification of Medicinal plants.



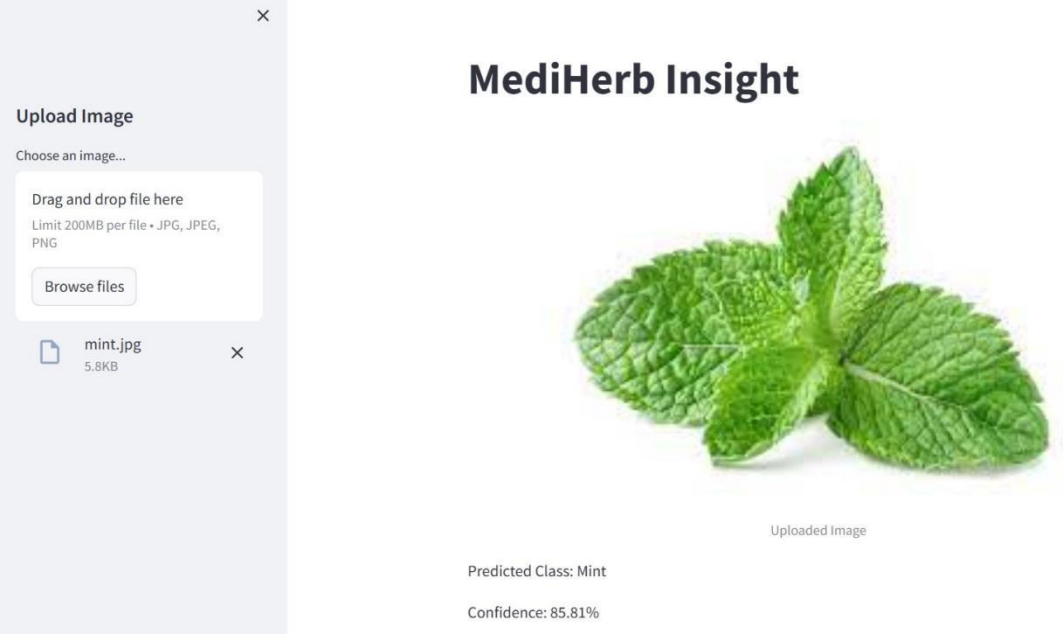


IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 2, February 2024

DOI: 10.17148/IJARCCE.2024.13244



V. CONCLUSION

In Conclusion, "Medi Herb Insight" presents a novel solution for the automated identification and classification of medicinal leaves using deep learning techniques, by using the convolutional neural networks and transfer learning, our system provides an efficient and accurate method for plant species identification.

The integration of a user-friendly web application enhances accessibility and usability, making it a valuable tool for researchers and botanists. The identification and uses of medicinal herbs empowers individuals to take control of their health, embrace natural healing, and connect with cultural traditions.

REFERENCES

[1]. Chollet, F. (2017). Xception: Deep learning with depthwise separable convolutions. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 1251-1258).
[2]. Abadi, M. et al. (2016). Tensorflow: A system for large-scale machine learning. In 12th USENIX Symposium on Operating Systems Design and Implementation (OSDI 16) (pp. 265-283).
[3]. Muller, A. C., & Guido, S. (2016). Introduction to Machine Learning with Python: A Guide for Data Scientists. O'Reilly Media, Inc.
[4]. Chollet, F. (2017). Xception: Deep learning with depthwise separable convolutions. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 1251-1258).
[5]. Simonyan, K., & Zisserman, A. (2014). Very deep convolutional networks for large-scale image recognition. arXiv preprint arXiv:1409.1556
[6]. Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). ImageNet classification with deep convolutional neural networks. In Advances in neural information processing systems
[7]. He, K., Zhang, X., Ren, S., & Sun, J. (2016). Deep residual learning for image recognition. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 770-778).
[8]. Szegedy, C., Vanhoucke, V., Ioffe, S., Shlens, J., & Wojna, Z. (2016). Rethinking the inception architecture for computer vision. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 2818-2826).
[9]. Deng, J., Dong, W., Socher, R., Li, L. J., Li, K., & Fei-Fei, L. (2009). ImageNet: A large-scale hierarchical image database. In 2009 IEEE conference on computer vision and pattern recognition (pp. 248-255). Ieee.
[10]. Goodfellow, I., Bengio, Y., Courville, A., & Bengio, Y. (2016). Deep learning (Vol. 1). MIT press Cambridge.
[11]. Kingma, D. P., & Ba, J. (2014). Adam: A method for stochastic optimization. arXiv preprint arXiv:1412.6980.
[12]. Abadi, M., Agarwal, A., Barham, P., Brevdo, E., Chen, Z., Citro, C., ... & Ghemawat, S. (2015). TensorFlow: Large-scale machine learning on heterogeneous systems. Software available from tensorflow. org.
[13]. François, C., & Chollet, F. (2017). Deep Learning with Python. Manning Publications.
[14]. Géron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems. O'Reilly Media, Inc.

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 2, February 2024

DOI: 10.17148/IJARCCE.2024.13244

[15]. Goodfellow, I., Courville, A., & Bengio, Y. (2016). Deep Learning. MIT Press.

[16]. Ayyappa Chakravarthi M, Dr M. Thillaikarasi, Dr Bhanu Prakash Battula, published "Classification of Image Spam Using Convolution Neural Network" in International Information and Engineering Technology Association (IIETA) - "Traitement du Signal" Volume 39, No. 1

[17]. Ayyappa Chakravarthi M, Dr. M. Thillaikarasi, Dr. Bhanu Praksh Battula, published "Classification of Social Media Text Spam Using VAE-CNN and LSTM Model" in International Information and Engineering Technology Association (IIETA) - Ingénierie des Systèmes d'Information Volume 25, No. 6.

[18]. Ayyappa Chakravarthi M, Dr. M. Thillaikarasi, Dr. Bhanu Praksh Battula, published a paper "Social Media Text Data Classification using Enhanced TF_IDF based Feature Classification using Naive Bayesian Classifier" in IJAST 2020

[19]. Ayyappa Chakravarthi M, Dr. M.Thillaikarasi, Dr. Bhanu Prakash Battula published "Social Media Data Classification – a Survey" in "Journal of Information and Computational Science" Volume 10, issue 3, March 2020