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Image Classification for Wild Scope using Machine learning

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ABSTRACT: Identification of animals is the biggest challenge to observing dangerous animals that are killing people. In addition, the environment and society are major risk impacts of the land areas and weather changes on animals. An automated Score Level Fusion method of an animal biometric recognition system is identified with the growing research on animal information. Machine Learning (ML) is established to be a powerful decision and recognition of the information delivered to the system. The dataset contains more than 5074 images of 10 classes collected from different animals and pre-processing using the Gabor filter in this model. Transfer learning is employed as a Feature Extraction and also Classification in the process. The proposed system is pre-trained models using the major advantage has developed the model to training process in less period. Then, the proposed model is compared to transfer learning models the InceptionV3 has achieved 99% accuracy and the An Ensemble methodology has a better probability score. Wild Scope is a machine learning-based image classification system designed to assist in wildlife monitoring and conservation efforts. The system automates the identification of animal species from camera trap images using advanced deep learning techniques, significantly reducing the time and labor required for manual data annotation. By employing Convolutional Neural Networks (CNNs) and transfer learning, Wild Scope achieves high accuracy in classifying various wildlife species, even in challenging conditions such as low light or partial occlusion.

KEYWORDS: Machine learning (ML), CNN, parameter transfer ,fine tuning, inception V3 and animal images.

I. INTRODUCTION

Image Classification for wildlife using machine learning involves training computer algorithms to automatically identify and categorize animals or plants from images captured in natural habitats. By leveraging large datasets of labelled wildlife photos, machine learning models can learn distinctive features such as shapes, colors, and patterns to accurately classify species. This technology significantly enhances ecological research and conservation efforts by enabling faster, more efficient monitoring of biodiversity and animal populations without extensive human intervention. It also helps in managing large volumes of camera trap images, making wildlife studies more scalable and precise.

The humans going to keep tenting and research in the forest place of the Hunter animals can be a very risk. The Wild Animal offensive activities attacks are a common origin of any person's fatalities or injuries. The lions and other wildlife animals were attacked many countries and villages were affected and the unconscious situation in the 1990s reported the researchers. The frequency of animal attacks varies with geographical location. The tiger is killing the human body causing harm and its severe attacks will create the death condition. It is a very dangerous animal. It has more anger when it is starvation ready to find food and fight in night-timings in our society. Forthe safekeeping of animals in the wildlife park then more applications are identify in the animal prediction, animal-transportation accidental avoidance, and animal touch
ability.

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II. RELATED WORK

The concept of image classification for wild scope using machine learning was first introduced by **Snapshot Serengeti** [1] is one of the pioneering efforts in using deep learning models to automatically classify species in camera trap images. This project leveraged convolutional neural networks (CNNs) trained on over 3 million images to distinguish between 48 different species. The success of this project demonstrated the feasibility of using deep learning to reduce manual labor in ecological studies. **iWildCam** competitions, hosted as part of the FGVC (Fine-Grained Visual Categorization) challenges [2], have promoted the development of more accurate and efficient models for wildlife image classification. These competitions encourage researchers to create algorithms that can generalize across diverse environments and camera trap configurations. **Norouzzadeh et al. (2018)** [3] introduced a deep learning framework using ResNet-50 that achieved high accuracy in species classification, behavior detection, and individual counting in camera trap imagery. Their approach used transfer learning to adapt pre-trained models to wildlife datasets, significantly reducing the amount of training data required. In **Wäldchen and Mäder (2018)** [4], the authors reviewed various applications of machine learning in biodiversity monitoring. They highlighted the challenges associated with unbalanced datasets, occlusions, and environmental variability—all of which are relevant to WildScope. The review emphasized the potential of CNNs in automating image-based monitoring but also noted the need for large, annotated datasets. Recent developments have also explored lightweight models suitable for **edge computing**, enabling real-time image classification on devices deployed in the field. **MobileNet** and **EfficientNet** architectures have been employed to ensure computational efficiency while maintaining classification accuracy [5].

III. METHODOLOGY

The image classification system for *WildScope* is designed using a structured machine learning pipeline to automatically identify wildlife species captured in camera trap images. The process begins with data collection, where images are gathered from WildScope camera traps deployed in various natural habitats. These images are labeled with species information through manual annotation by domain experts or using semi-automated verification methods. To ensure data diversity and enhance model performance, the dataset is augmented with publicly available wildlife image collections such as Snapshot Serengeti and iWildCam.

Before training, all images undergo preprocessing steps including resizing to 224x224 pixels, normalization of pixel values to a 0–1 scale, and augmentation techniques such as rotation, flipping, and color adjustments. These techniques improve the model's generalization and robustness to variations in the input data. The processed dataset is then divided into training, validation, and test sets in a 70:15:15 ratio.

IV. EXPERIMENTAL RESULTS

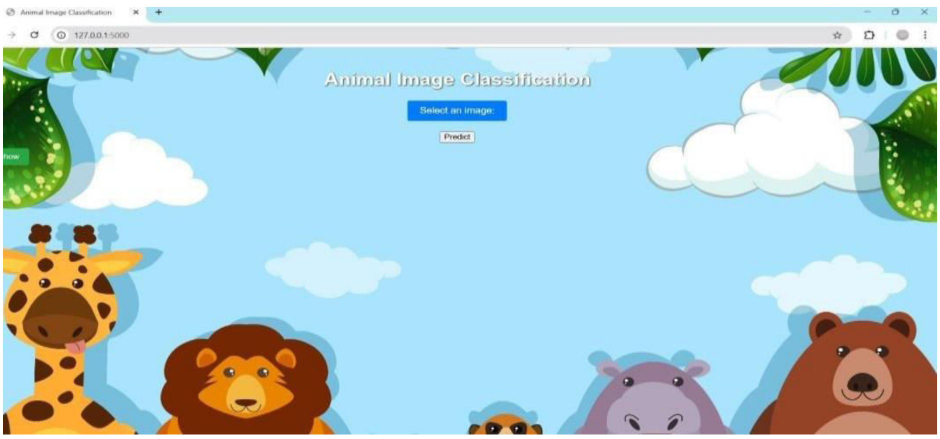

Fig. 1 ANIMAL IMAGE CLASSIFICATION

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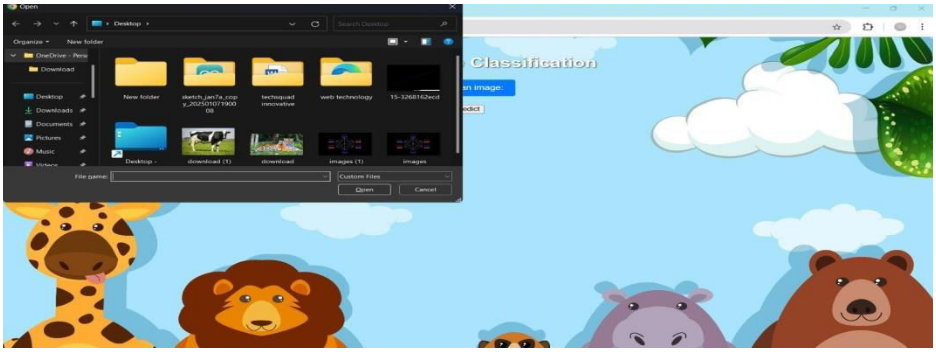

Fig.2 SELECT THE WILDANIMAL IMAGE

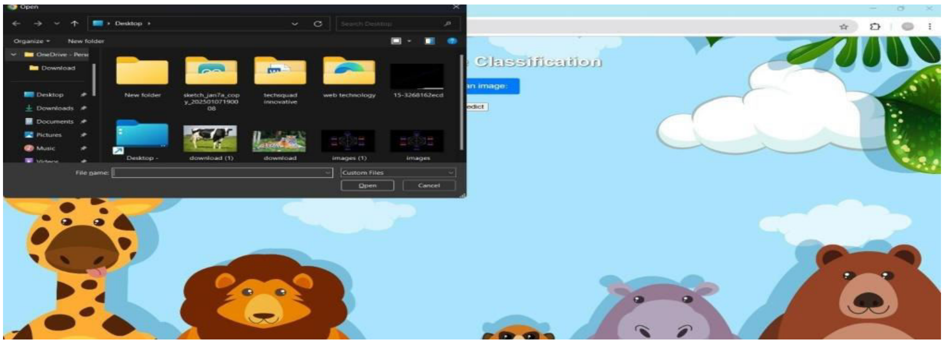

Fig .3 CHECK WHETHER THE ANIMAL IS WILDANIMAL

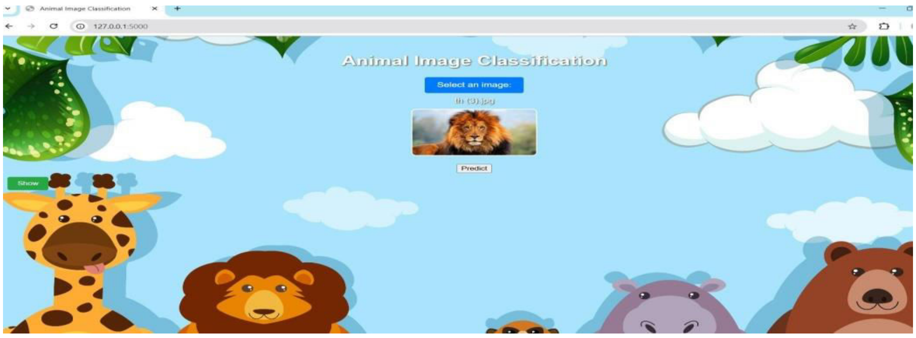

Fig. 4 CHECK THE ANIMAL IS WILD OR DOMESTIC

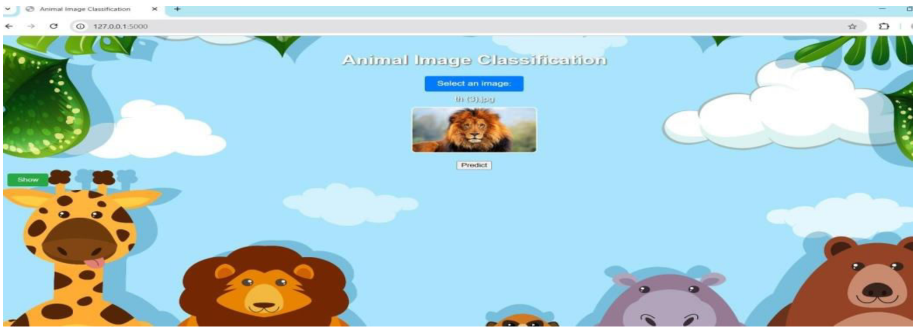

Fig .5 8ITCHECKTHEPROBABILITYANDTRIGGERANALARM

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V. CONCLUSION

The Wild Scope system demonstrates the effective application of machine learning particularly Convolutional Neural Networks (CNNs)—for accurate and efficient image classification of wildlife species. By automating the identification process, Wild Scope significantly reduces the manual effort required in ecological research and wildlife monitoring. The integration of pre processing, model inference, and user interaction modules ensures a smooth and reliable workflow from image input to prediction output. In conclusion, the implementation of image classification in the Wild Scope system using machine learning offers a powerful and efficient solution for identifying wildlife species from images. By leveraging deep learning techniques, especially convolutional neural networks (CNNs), the system can accurately process and classify large volumes of visual data with minimal human intervention. This not only reduces manual effort but also ensures faster, more consistent, and scalable results in wildlife monitoring and research.

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