



# Wild Animal Detection in Farm using Image Processing and Machine Learning

Tushar Atkare, Snehal Khalkar, Pallavi Mandekar, Ganesh Kolhe, Anita Gawali

Department of Information Technology, Amrutvahini College of Engineering

**Abstract:** The state-of-the-art technique for animal detection and alerting for crop protection with the goal of achieving high precision with a real-time performance in addition to overcome the disadvantages of the traditional system this computer vision-based system will add more efficiency. In earlier, traditional system consist sensors and registers to identify the movement of object. Some human interventions are required to handle the traditional system, overcome that problems this Image processing based system will work efficiently. The resulting system is fast and accurate, thus aiding those applications which require animal detection.

**Keywords:** Smart Farming, Wild Animal, Image Processing, Machine Learning, Computer Vision technique.

## I. INTRODUCTION

Due to deforestation lot of wild animals have become homeless. As a result they attack humans for food. As the number of cases of animals found in cities have increased. So it is very important to track them to make humans safe. There is no such mechanism yet to find the wild animals. As we cannot fix any kind of tracker on animals. There is no proper way to alert the people and forest officers. There is no such mechanism for Night Vision. Use of Electric Fence becomes dangerous sometimes as it can endanger the wild animal. Computer vision is applicable to many fields like medical field, robotics, remote sensing, machine vision, content-based image retrieval. Computer vision solves many problems in different disciplines. Computer vision also applied in the security field to perform automatic surveillance and access control and attendance management. The computer vision can be applied in agriculture field in many ways like disease detection of a tree by examining leaves or flowers or fruits and quality control of agricultural products. The computer vision techniques can be applied in order to provide security from wild animals in agriculture. In agriculture fields near to forest areas have a severe threat from wild animals, which attacks regularly on farms. These attacks causing huge damage to agricultural crops subsequently causes significant financial losses to farmers.

## II. LITERATURE SURVEY

There are different approaches had been presented by different researchers. Some of the methods have been presented in this section. To provide related functionalities to facilitate safe animal detection use of many related tools have been developed and assessed.

Mangai, NM Siva, P. Karthigaikumar, Shilu Tresa Vinod, and D. Abraham Chandy. "FPGA implementation of elephant recognition in infrared images to reduce the computational time" H. Yin, B. Cui, H. Lu, Y. Huang, and J. Yao stated about how the focus time and expression for each news can help to rank it. [3]

Andavarapu, Nagaraju, and Valli Kumari Vatsavayi. "Wildanimal recognition in agriculture farms using W-COHOG for agro-security."

Zhang, Xiaoyu, Wei Huang, Xiao Lin, Linhua Jiang, Yan Wu, and Chunxue Wu. "Complex image recognition algorithm

Bharath, H. P. "Vision Based Animal Detection and Alerting For Crop Protection"

## III. METHODOLOGY

The system operates in two modes: learning mode and recognition mode. The first mode operates aiming Wild Animal profiling and storage. This mode starts by acquiring the image containing Name, Image and Information of Wild Animal. Then, it performs image size normalization (1024x768). After detection, the referred profiling is performed based on Animal shape, size estimation and color detection.

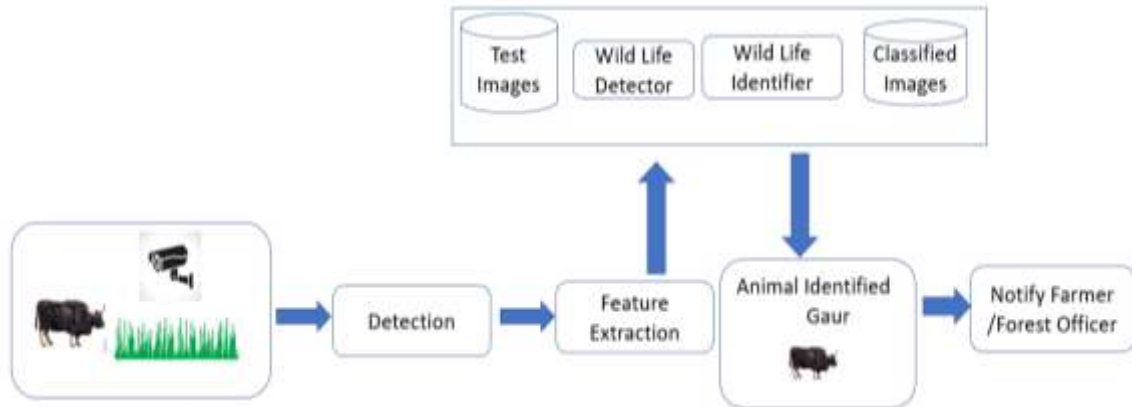


Fig. 1. Architecture Diagram of System

Finally, all of this data is properly stored on system’s database for further consultation. On the other hand, the recognition mode aims Animal detection based on Animal’s profile and feature filtering. Just like learning mode, the recognition starts by image acquisition and resizing follows:

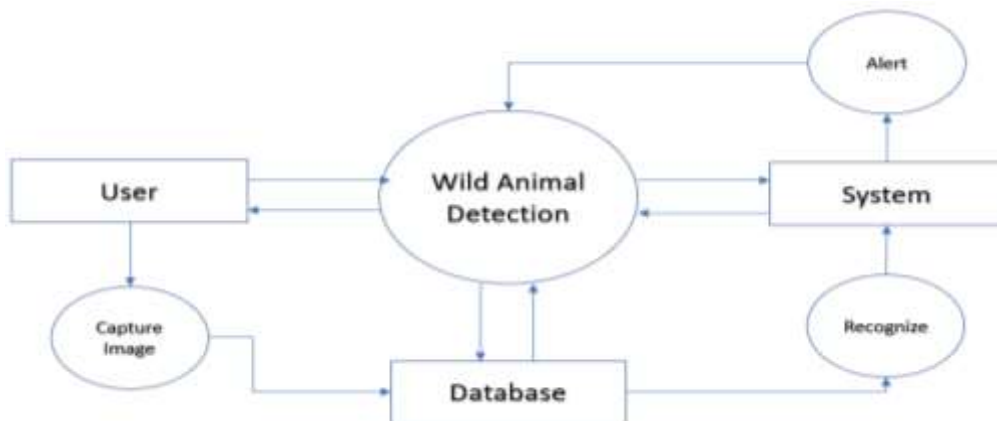


Fig. 2. Data Flow Diagram of System

In that data flow diagram where customer creates account and stores his information and registers himself into the system, After registration he can find news or he can also comment on earlier news. Comments placed are again documented as comment history to keep track of comments and detect spam if any [shown in below figure 2]. Data flow diagram shows basic entities through which data flows which are News Feed where the query is processed. The User who puts forth the query and the system which processes it [shown in below figure 2]. There are total seven phases as shown in following format:

1. Image capture: The image will be captured through camera and sent to the system for detection[8].
2. Detection: The animal Detection is done through the Google Vision-api through the cloud based server. Image classification and identification according to CNN algorithm [2]
3. Alert System: The hardware consist one alarm and electric fence covered will be activated on successful detection of animal and will be active according to the delay time provided by ssystem.
4. Time Tagging: Each document split and is time tagged which is used for determining the ranking of the news.
5. Shape Estimation: The animal is detected, it is segmented and the filtering task takes place. The main objective of this filtering is to sequentially exclude groups of animals which are not wild, during feature detection.
6. Size Detection: After shape estimation, the system queries database to retrieve the shapes accordingly with the estimated one. Then, size is calculated in order to filter animals, by width and height approximation
7. Evaluation: Evaluation is final step which provide us the accuracy result of animal detection.

A sequence diagram is a type of interaction diagram because it describes how and in what order a group of objects works together. These diagrams are used by software developers and business professionals to understand requirements for system there is need to design the sequence diagram it becomes easy to implement system or to document an existing.

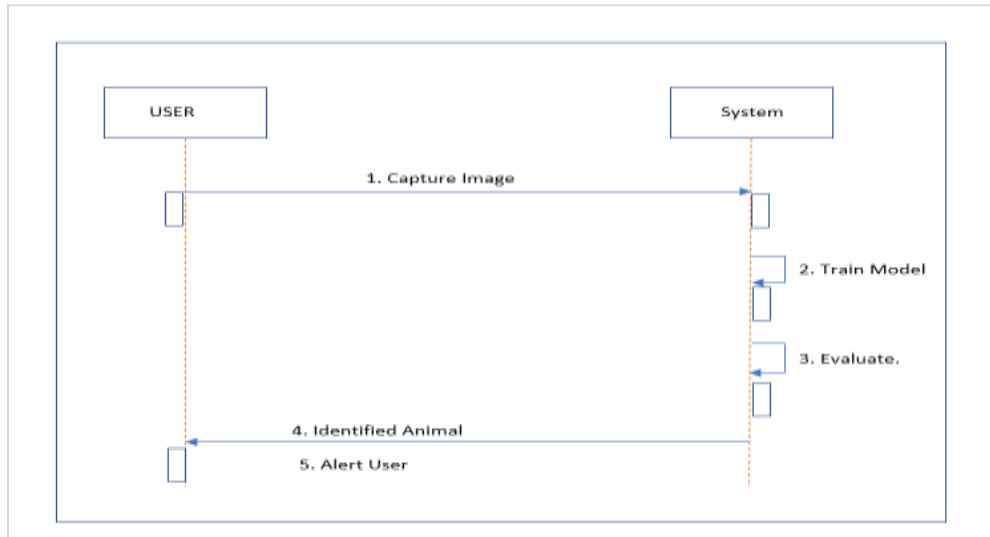


Fig.3 Sequence Diagram Of System

Objective:

1. Alert is generated when wild animal is detected near farm
2. Soon as wild animal found the location and type of animal will be sent to Farmer and area's concerned forest officers.
3. The system must be with low cost so that it will be affordable to rural areas.
4. The system must be able to detect animal at night.
5. Easy to use and can do real time detection.
6. Attractive user interface

#### IV. RESULT

Python language is used for wild animal detection. We have used tensor Flow library for recognition, also used google vision library. A system that uses the camera as security substance for capturing images when object is detected which will be used for object detection and recognition for further process. The experimental setup covers farm with LED fence connected to Arduino.

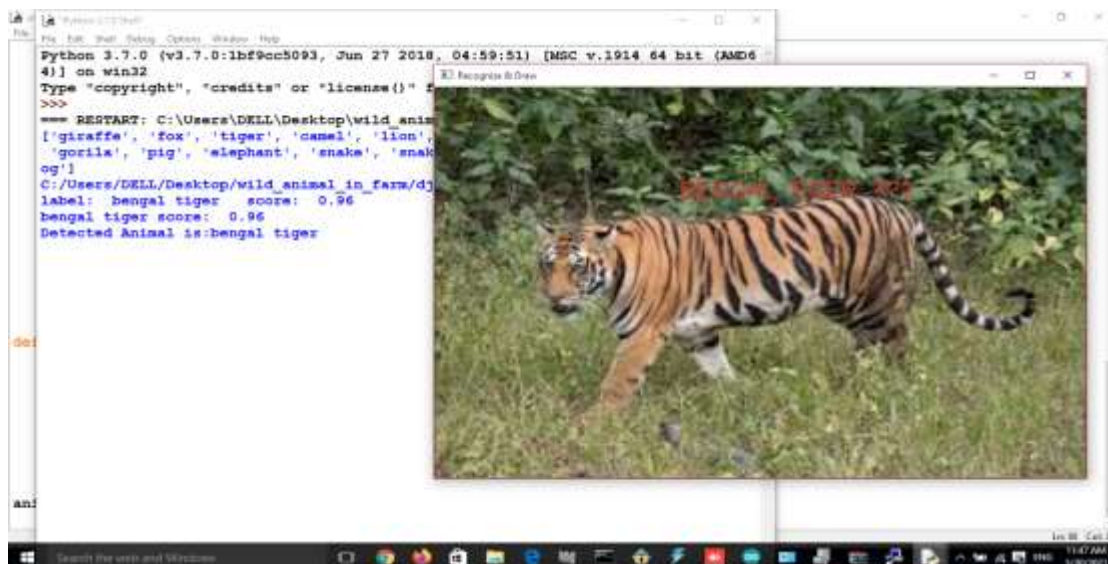


Fig 4. Result Of Experiment

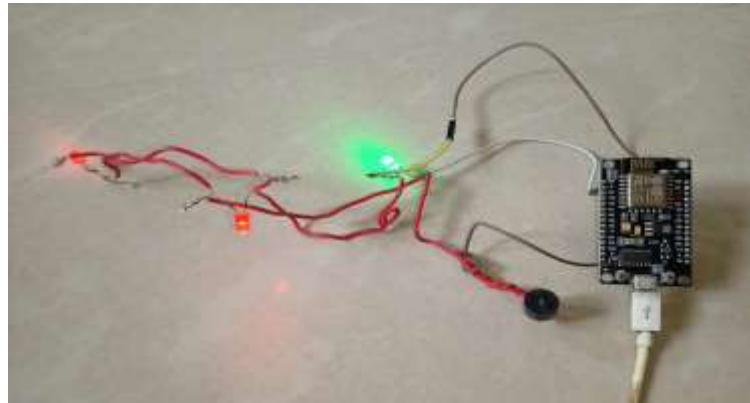


Fig 5. Hardware Setup for Alert System.

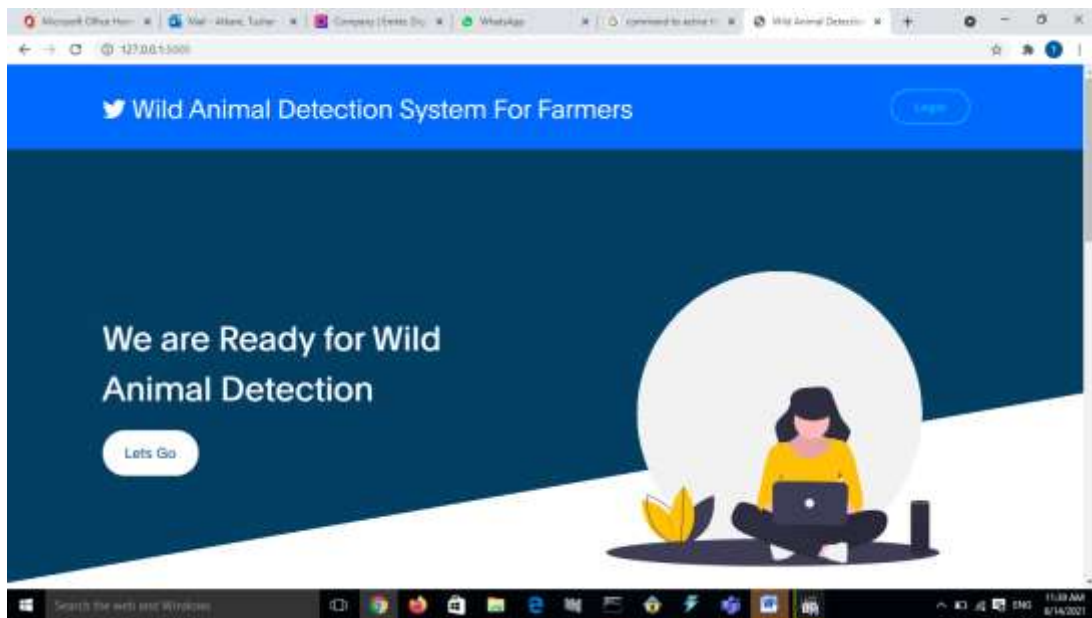


Fig 5. Web Application For Farmers And Forest Registration

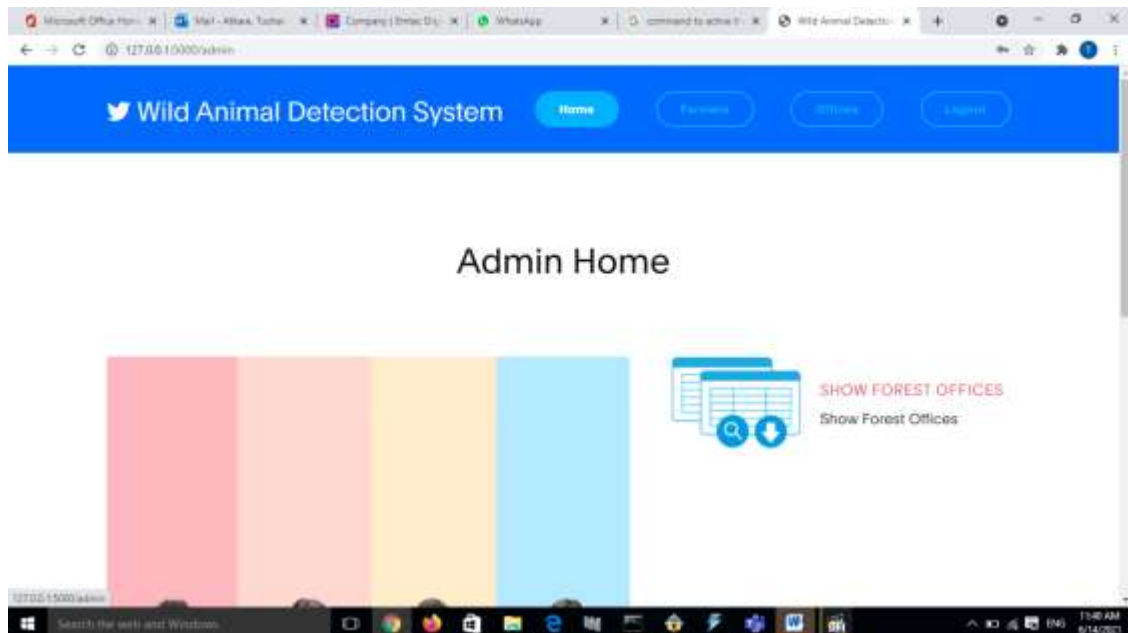


Fig 6. Forest Officer Details Page.



## V. CONCLUSION

We have presented a smart farmland system for the wild animal detection and recognition.. An efficient and accurate object detection has been an important topic in the advancement of computer vision systems. With the arrival of deep learning techniques, the accuracy for object and animal detection has increased extremely. The project aims to include state-of-the-art technique for animal detection and alerting for crop protection with the goal of achieving high precision with a real-time performance. In addition to overcome the disadvantages of the traditional system this computer vision based system will add more efficiency. The resulting system is fast and accurate, thus aiding those applications which require animal detection. The experimental setup covers farm with LED fence connected to Arduino. The fence is electrified ,when any wild animal approaches the fence the alarm is set off and image is captured. Python is used for wild animal recognition. We have used google vision library.

## REFERENCES

- [1]. N. M. Siva Mangai1 · P. Karthigaikumar2 · Shilu Tresa Vinod1 · D. Abraham Chandyl1,“ implementation of elephant recognition in infrared images to reduce the computational time ”, c Springer-Verlag GmbH Germany, part of Springer Nature 2018.
- [2]. Chandana H C[1], Amruth[1], Akash P S[1], Shilpa K Allurkar[1] Bharath H P[2] ,“Vision Based Animal Detection and Alerting For Crop Protection ”,2International Journal of Scientific Research and Review ISSN No.: 2279-543X ,Volume 07, Issue 03, March 2019
- [3]. Balch T, Dellaert F, Feldman A, Guillory A, Isbell C, Khan Z, Pratt S, Stein A, Wilde H “ multi-robot systems research will accelerate our understanding of social animal behaviour”, Proc IEEE 94:1445–1463
- [4]. Xiaoyu Zhang1 · Wei Huang2 · Xiao Lin2,3 · Linhua Jiang2 · Yan Wu4 · Chunxue Wu2,‘Complex image recognition algorithm based on immune random forest model”, Springer-Verlag GmbH Germany, part of Springer Nature 2020Y.
- [5]. Shuqiang Jiang, Senior Member, IEEE, Sisi Liang, Chengpeng Chen, Yaohui Zhu, Xiangyang Li“Class Agnostic Image Common Object Detection ”, Int. J. Comput. Vis., vol. 80, no. 3, pp. 300–316, 2008.
- [6]. S. Gould, J. Rodgers, D. Cohen, G. Elidan, and D. Koller,““Multi-class segmentation with relative location prior”, Int. J. Comput. Vis., vol. 80, no. 3, pp. 300–316, 2008.