WILD ANIMAL INTRUSION DETECTION AND ALERT SYSTEM

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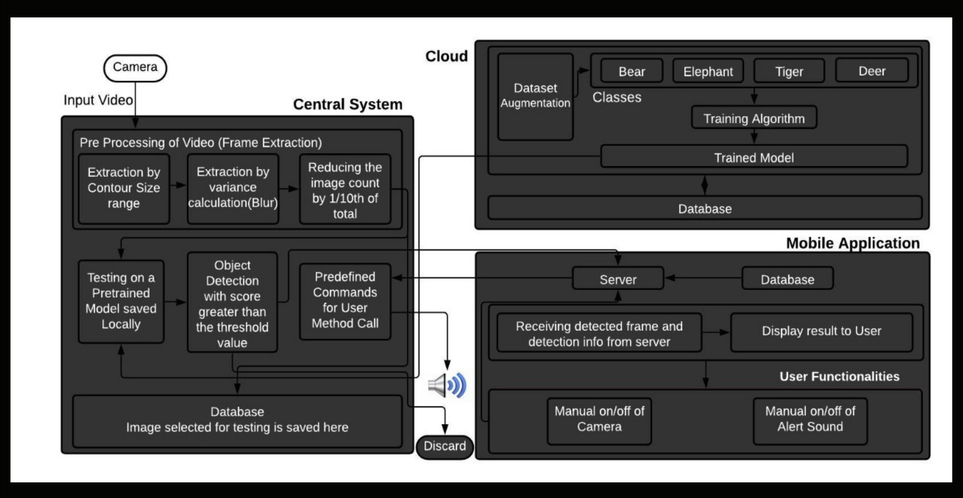
PROBLEM STATEMENT

* Human wildlife conflict has become a serious issue whicneeds to be addressed immediately.
* Humans started adopting inhuman methods to get rid of animals damaging their crops.
* Animal attacks on humans has been reported to have increased as well.

OBJECTIVES

* To provide smart solution to identify the wild animal before the situation escalates.
* To improve the performance of algorithms used in recognizing animals.

SYSTEM ARCHITECTURE



Detection and Alert System Architecture

DATASET AND TOOLS

	Training Set	Validation Set	Test Set
Images	55712	5200	2412
Objects	1.1 lakh	8712	

Statistics of Created Dataset

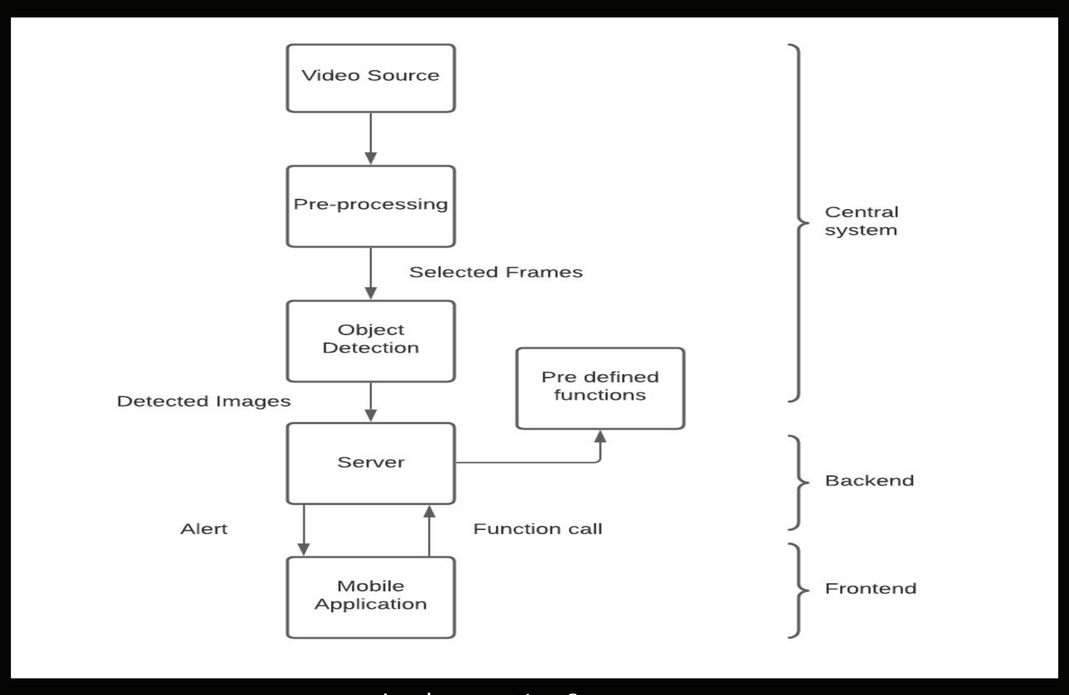
The proposed model was implemented using tools like Google Colab, Python, Firebase.

Following python libraried were used-
1.Tensorflow Object Detection API 2
2. Imageio

Tools Used

IMPLEMENTATION

* Video could be captured using any device and then that video was passed on to the central system.The video coming from the mobile is send to the pre processing part.
* Pre-processing reduced the amount of frames the video had.
* The images obtained after preprocessing were fed into the trained model which then identified the animal present in the image.
* The detected frame is given to the user by a mobile application named Detectoid, which gives user a real time data such as the detected frame, textual description about the animals detected and the date, day and time of detection, along with a alarm notification to alert the user of the intrusion in the guarded area.
* Datast was created with 55000 images and these images were used for training.
* EfficientNet_D0 and MobileNet_V2 along with the SSD object detection algorithm is used for training our dataset. After training with these algorithms, we obtained our trained model.



Implementation Steps

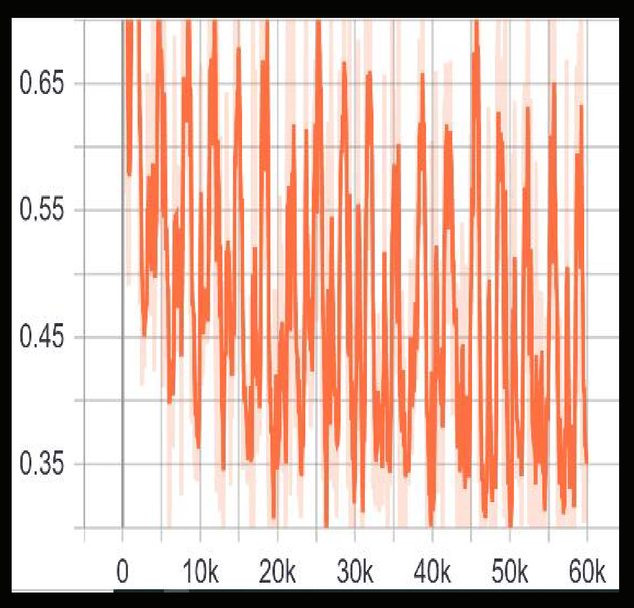
RESULTS AND ANALYSIS

ALGORITHMS

	NO of Steps	Training Time	Loss Value
SSD_MobileNet_v2	20 000	17 hours	2 - 5
SSD_EfficientNet_D0	60 000	18 hours	0.2 - 0.9

Comparison between algorithms

CLASSIFICATION



Total Loss= Localization Loss + Confidence Loss

MOBILE APPLICATION

Detected image is shown in Mobile Application

CONCLUSION

* Due to unavailability of proper dataset,we had to create a dataset with the desired set of images. Around 55000 images have been created.
* Our proposed system had reduced the number of frames by the process of blur detection and structural similarity index.
* From the project we had understood that the SSD models were more accurate in detecting animals with a higher confidence score, whereas the Faster RCNN models showed accuracy during night time conditions.
* Our proposed model could minimise the dependence on hardware and at the same time employed new and improved DL methods for accurate prediction of the animal.

FUTURE WORKS

* Existing dataset contains only four classes of animals, as a future work it could be extended to as many animals.
* The algorithm could be changed,there are various other algorithms but it has its own limitations, so those limitations can be rectified and it can be used for training.
* Additional functionlities like live video feed can be added to the mobile application.

REFERENCES

* Sharma, Sachin Umesh, and Dharmesh J. Shah. "A practical animal detection and collision avoidance system using computer vision techniques." IEEE Access 5 (2016): 347-358.
* Zhao, Weihong. "A Novel Animal Detection Technique for Intelligent Vehicles." PhD diss., Université d'Ottawa/University of Ottawa, 2018.
* Radhakrishnan, Saieshwar, and R. Ramanathan. "A Support Vector Machine with Gabor Features for Animal Intrusion Detection in Agriculture Fields." Procedia computer science 143 (2018): 493-5.