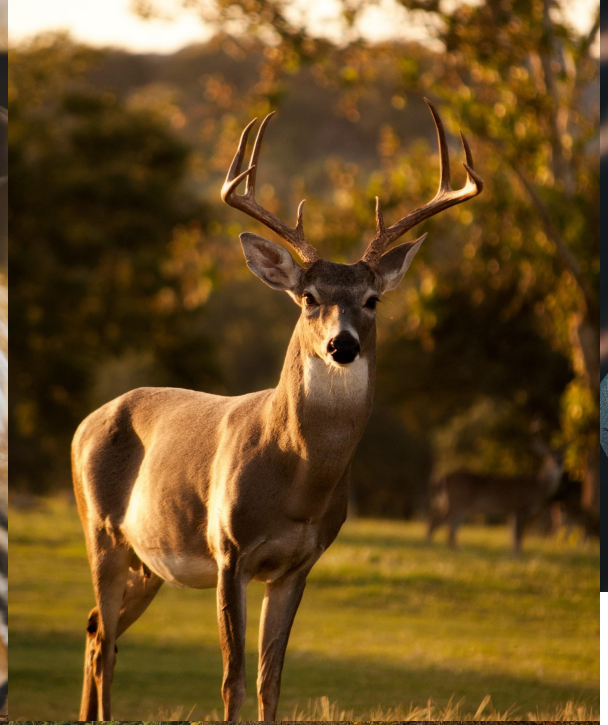


HERDWATCH

ZooHackathon
•November 17, 2019

Team Members

1. Hevjin Yarar
2. Guillaume Stern
3. Konstantinos Samaras-Tsakiris
4. Akanksha Ahuja
5. Ian Jang
6. Hana Jang

National Parks Statistics

Poaching around the globe:

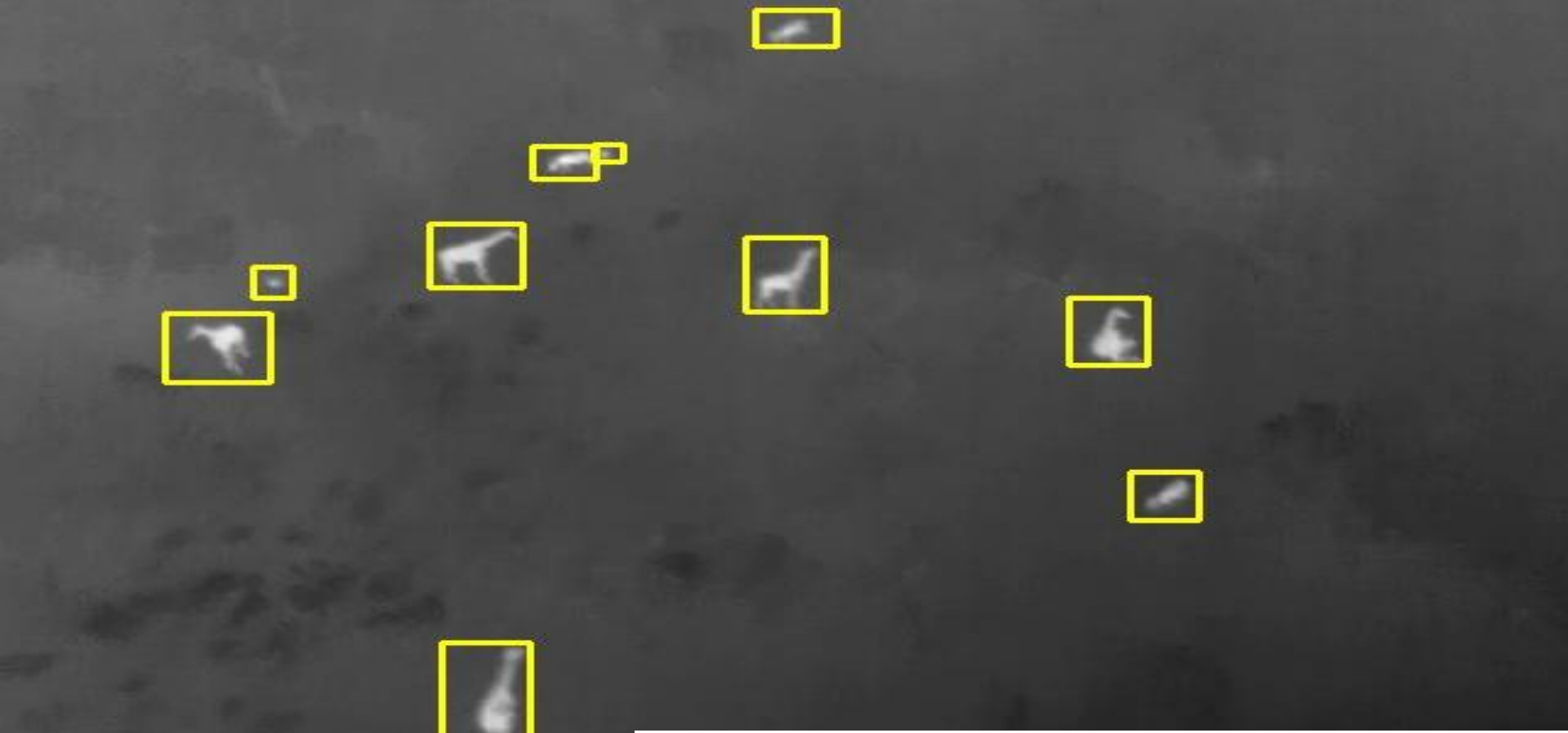
- 100,000 in Africa!
- 20 million in the world!

What is the
most dangerous animal?

Poachers

Drone patrols

The DATA



Automate human / animal detection

Dataset Description

Training Data: 34,946 images
Test Data: 5747 images

“Air Shepherd”



Balancing the dataset

Type of Data: Image frame of a video recorded by the drone “Air Shepherd”

- Training data has 4 ‘species’ only: unknown, human, elephant and giraffe
  - We drop all the unknown species.
  - Final number of samples:

humans	elephants	giraffes
6369	5095	1257

↠ Now we have a balanced dataset of humans and animals.

- Training Data Cleaning:
  - There is no noise element in the dataset.
  - Filtering out unknown species.
- Training/Test Data Preprocessing:
  - Resizing, cropping and normalizing of images.

Model Architecture for Classification of Humans and Animals

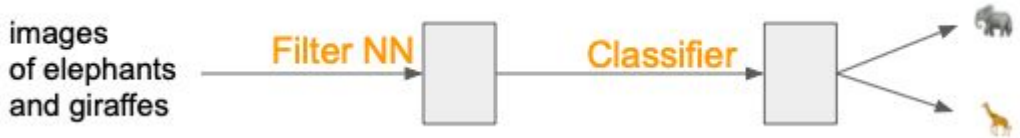
Primary Goal : Identification and Classification of

1. Humans
2. Animals and their species

- Deep Learning Framework: **PyTorch**
- Model for classification: **MobileNetv2**
- Loss Function: Cross Entropy Loss

Ideas

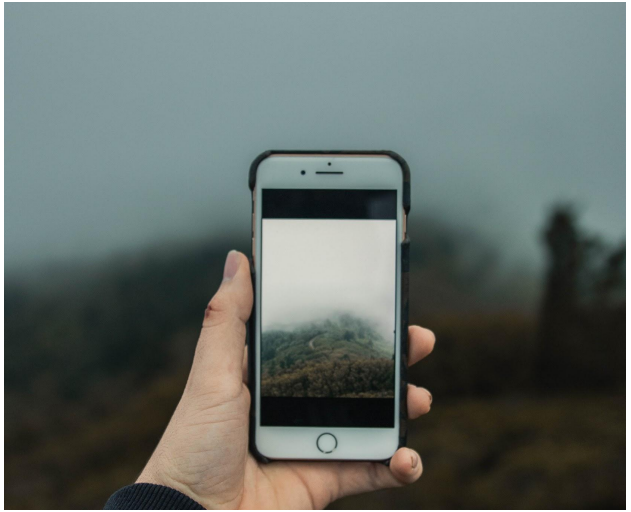
- Transfer Learning for human/animal prediction (implemented)
  - we split the train dataset into a smaller train dataset and a validation set.
  - We do transfer learning from mobilenet_v2, where we take the pretrained model and train it on our own images (the small train dataset) and evaluate the model on the validation set.
- A “Filter Neural Network” to filter out the animal images in the training dataset that do not have high prediction probabilities to be either elephant or giraffe (not yet implemented)
- Use number of objects (predicted for the test data from an NN) in the data as additional feature (not yet implemented)



The drone scans the areas to identify humans in real time

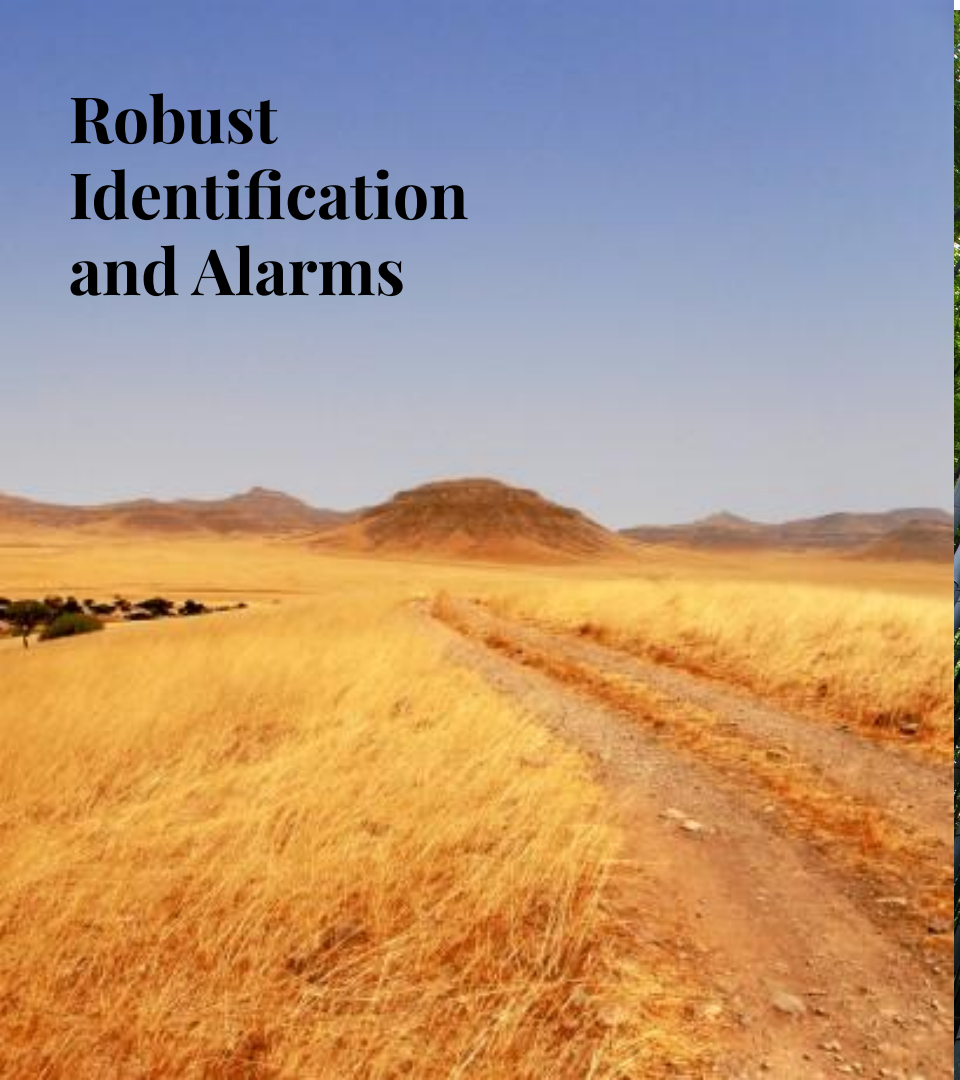
Sends an alert - “{Humans|Animals} found at ${location}”

Officer communicates message to the team - and **takes action**



Trafficking Monitoring

Robust Identification and Alarms



References

References

1. Birds AI paper
2. Tutorial : https://pytorch.org/tutorials/intermediate/torchvision_tutorial.html
3. MobileNetv2, arXiv:1801.04381

Link to Code

https://github.com/hevjinyarar/zoohackathon

Thank You

HerdWatch