Amur Tiger Detection using Deep Learning

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Introduction

- Detecting Amur tigers by object detection using deep learning techniques is our challenge .
- The challenge was hosted by CVWC (Computer Vision for Wildlife Conservation)
- ATRW(Amur Tiger Re-identification for Wild) was the dataset used.

Dataset Used

- The dataset provided by CVWC was of 2.1GB.
- Consisted 2700 images of tigers and their annotation files in .xml format.
- Split Ratio:- 90:10.
- Training Set :- 2400 images.
- Testing Set :- 300 images.

Methodology / Model Used

- Dependencies :- Tensorflow-gpu 1.5.0, Python 3, Matplotlib, OpenCV and CUDA and cuDNN.
- Faster RCNN, SSD and SSD Lite were the models selected for this purpose.
- The Pre-trained models were downloaded from github repository and their hyper parameters were tuned to suit our dataset.
- With little amount of hyper-parameter tuning we were able to achieve the

Results Achieved

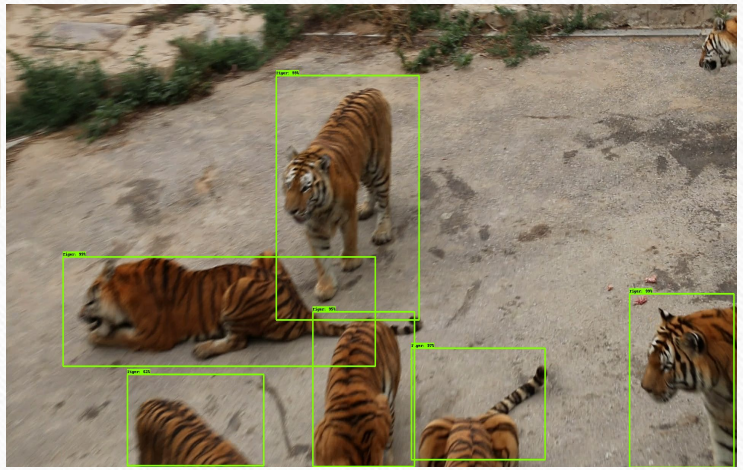
- Faster RCNN model :- 94% accuracy with low loss values.
- SSD inception v2 :- 90% accuracy with high classification loss.
- SSD Lite MobileNet :- 95% accuracy with high loss values.

Results Achieved

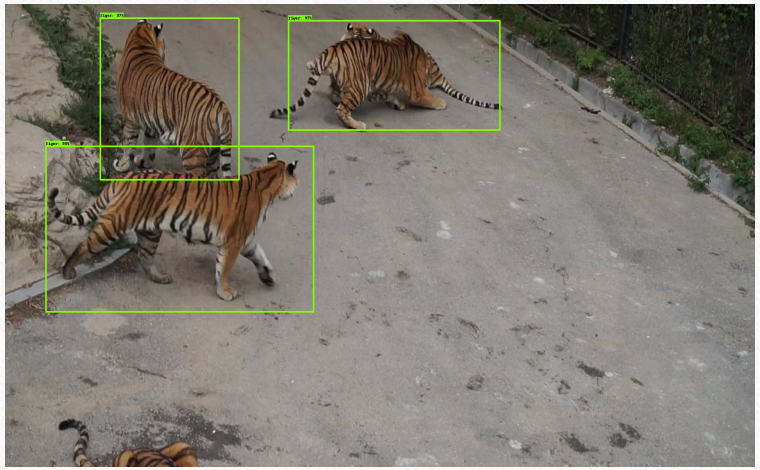
Models / Parameters	Faster R-CNN Inception v2	SSD Inception v2	SSD LITE Mobilenet
mAP@IoU0.5	0.9437	0.9095	0.9554
Steps	2,00,000	1,00,000	1,30,000
Classification Loss	0.123126	5.8326	3.052575
Localization Loss	0.112125	0.662244	0.442702

Results Achieved

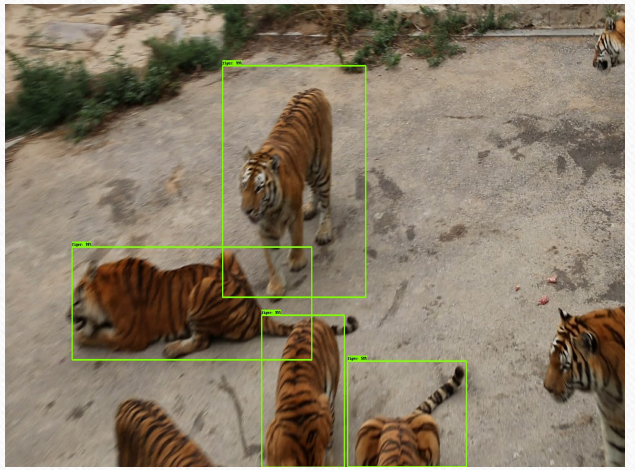
Faster R-CNN



SSD Inception v2



SSDLite Mobilenet



Conclusion

- We have presented a novel method to detect Amur tigers using deep learning techniques .
- 90% plus accuracy was achieved in all the three models that were trained.
- This project can be further progressed by training on tiger pose detection and Re-ID datasets by CVWC and deploying it on mobile computers like Raspberry Pi and NVIDIA Jetson Nano extending upto drones.

References

https://cvwc2019.github.io/challenge.html

- https://github.com/Edje-Electronic/tensorflow-object detection
- https://arxiv.org/pdf/1906.05586.pdf
- https://ieeexplore.ieee.org/document/8510564

Thank You