

Improving the Efficiency of Animal Detection using Single Shot MultiBox Detector in Comparison with Region-based Convolutional Neural Network in Farms

INTRODUCTION

- This project aims to enhance the efficiency of animal detection in farm environments by comparing the performance of the SSD with the R-CNN method
- Due to several considerations such occlusions, changing stances,current animal detection systems have difficulty detecting animals and these restrictions leads to ineffective management chores, false alarms, and missed detections
- The performance of the R-CNN approach with the SSD algorithm known for its speed and precision in object detection, SSD is ideal for dynamic farm situations with moving animals and changing conditions due to its real-time detection
- Increasing the accuracy of animal detection helps scientists monitor species numbers, and evaluate habitat utilization for conservation purposes. It helps in agriculture with pest control, crop monitoring, and animal management
- A dataset comprising 10,000 annotated wildlife images with 20 iterations, employed to train and compare SSD and R-CNN algorithms for enhanced animal detection accuracy

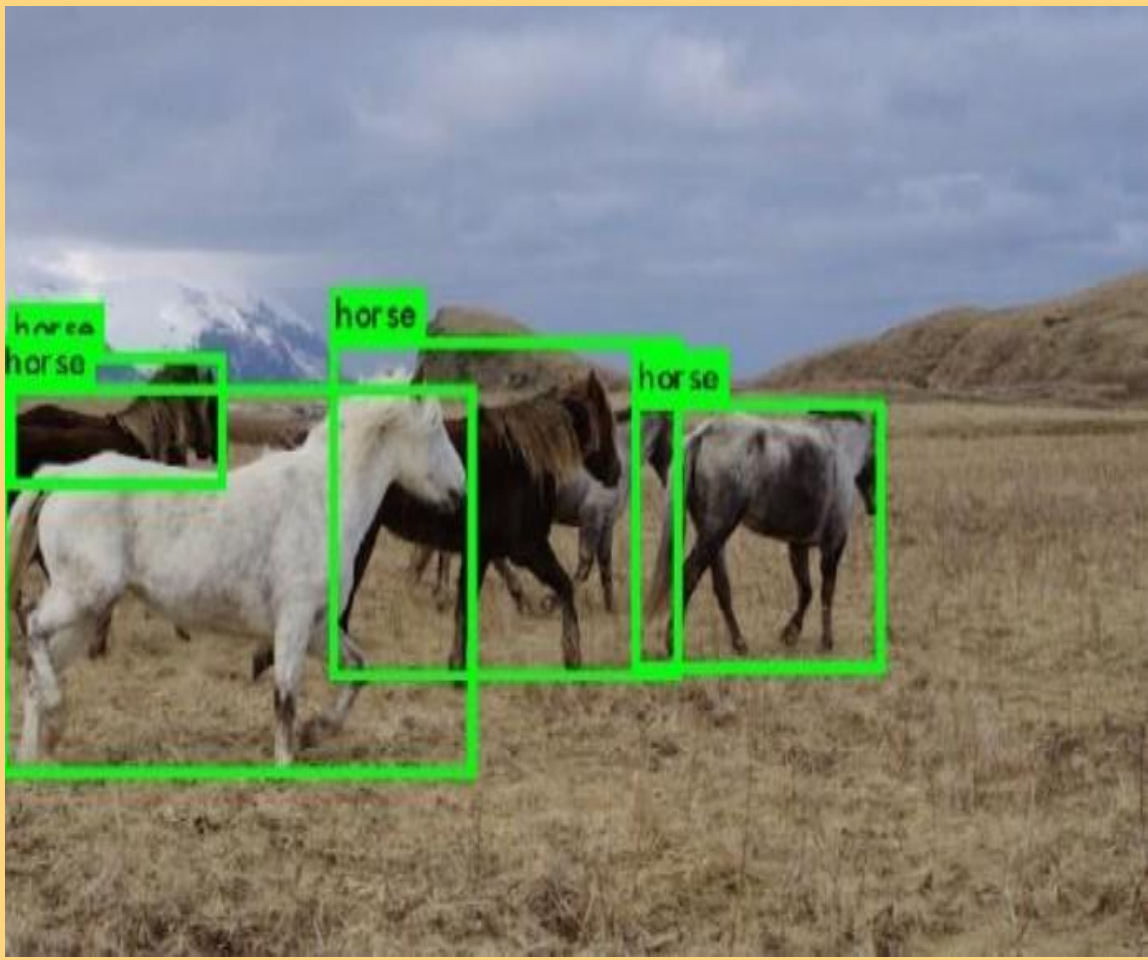
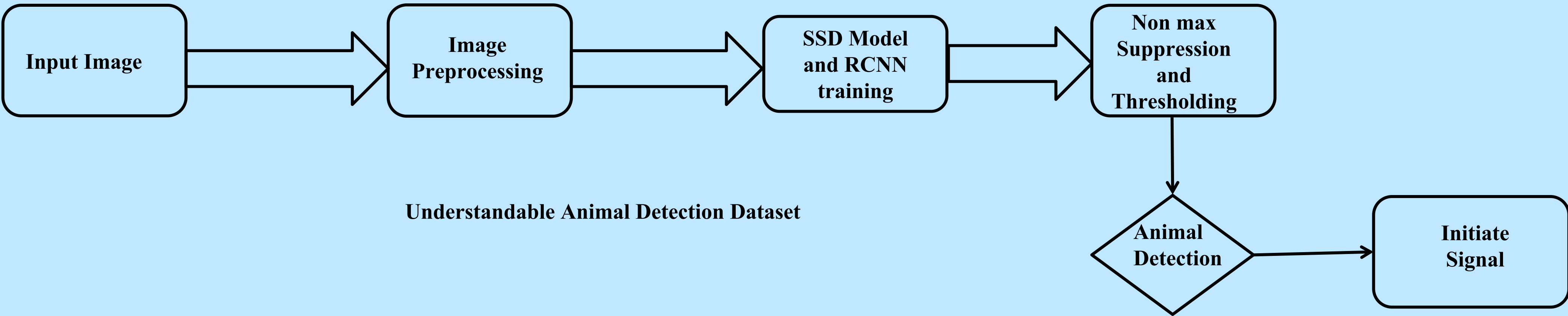


Fig. 1 Horse Detection in Farm

MATERIALS AND METHODS



RESULTS

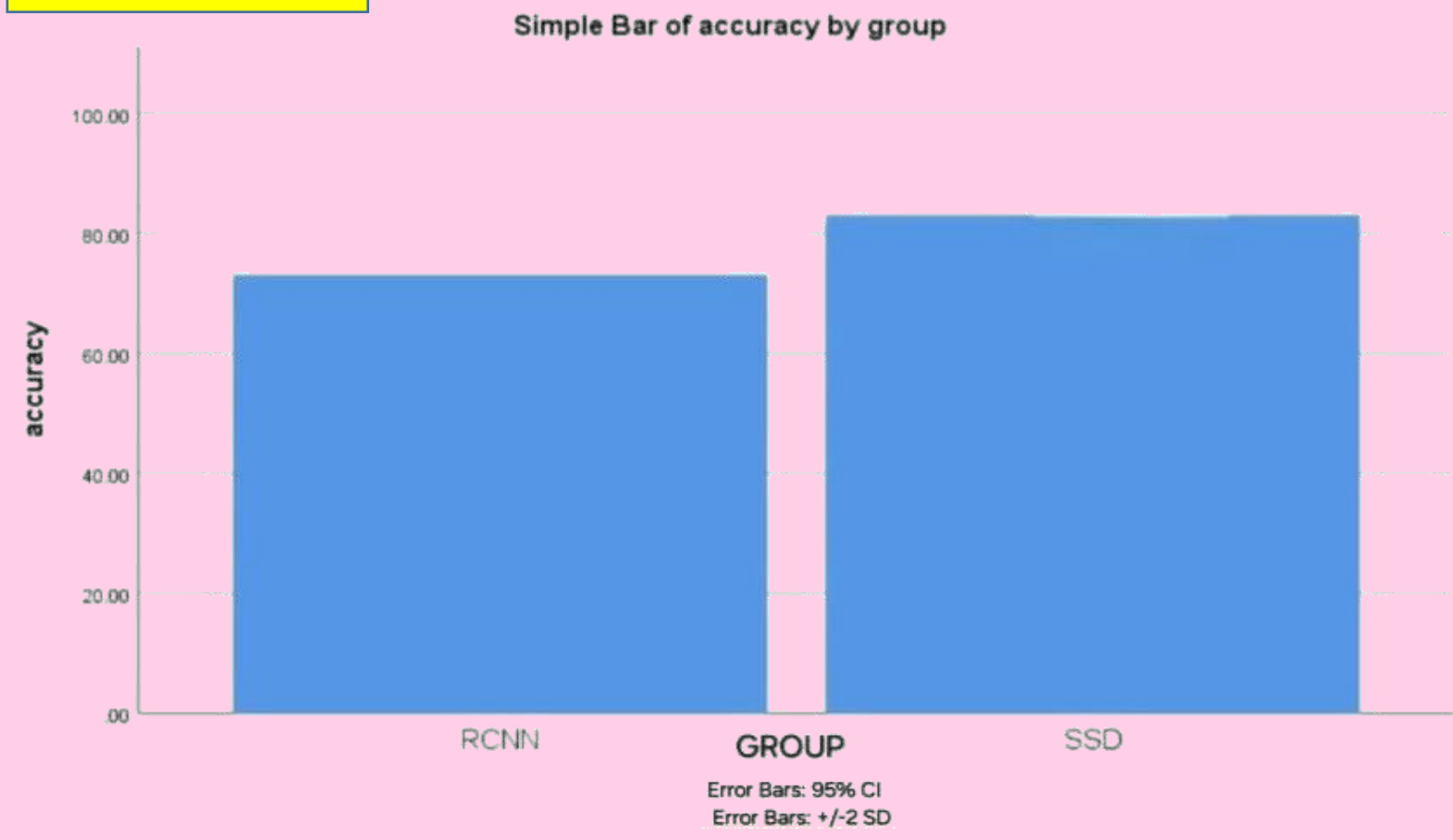


Fig. 2 Bar Graph showing the comparison of the mean accuracy of Animal Detection with SSD and R-CNN

Table 1: The independent sample t-test has a significant value $p=0.001(p<0.05)$ indicating the study between the SSD and the R-CNN is statistically significant

Accuracy	Independent Sample t-test								
	Levene’s Test for Equality of Variances					t-test for Equality of Means			
	F	Sig	t	df	Sig(2-tailed)	MeanDiffere nce	Std. Error Difference	95% ConfidenceInterval of theDifference	
Equal variances assumed	2.849	0.100	3.981	38	0.000	13.60000	3.41606	6.68455	20.51545
Equal variances not assumed			3.981	19.356	0.001	13.60000	3.41606	6.45900	20.74100

DISCUSSION AND CONCLUSION

- Based on t-test Statistical analysis, the significance value of $p = 0.001$ (independent sample t - test $p<0.05$) is obtained and shows that there is a statistical significant difference between the RCNN and SSD
- Overall , the accuracy of the SSD is 80 % and it is better than R-CNN which has up to 67%
- The group statics reveal that SSD with standard deviation of 1.472, whereas R-CNN with standard deviation of 15.20595
- Animal Detection using SSD and YOLO algorithms shows promise for improving accuracy and efficiency, SSD provides speed and simplicity, while YOLO excels at managing complexity, These developments might lead to earlier Animal Detection
- In colusion, the development of models adept at learning future dependencies could offer significant benefits across diverse domains, including artificial intelligence, These models could excel in tasks such as detecting and quantifying desolation dependencies

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