

Technique for Enhancing Animal Detection using a Single Shot MultiBox Detector Algorithm over Random Forest Classifier to Improve the Accuracy of Detection

INTRODUCTION

- Our goal is to recognize animals in photos or movies in real-time and with robustness by utilizing SSD capabilities for animal detection in farms
- Due to cluttered backgrounds, occlusions, and variations in illumination, existing animal detection methods frequently suffer from low accuracy in complex environments
- We propose to utilize the SSD algorithm for its speed and accuracy in detecting multiple objects within images, supplemented by the Random Forest classifier to handle complex datasets and mitigate overfitting
- Enhancing animal detection accuracy across various sectors wildlife conservation, agriculture,habitat use, pest control, crop and livestock management and ultimately leads to a reduction in human and animal fatalities
- A dataset comprising 10,000 annotated wildlife images with 20 iterations, employed to train and compare SSD and Random Forest Classifier algorithms for enhanced animal detection accuracy

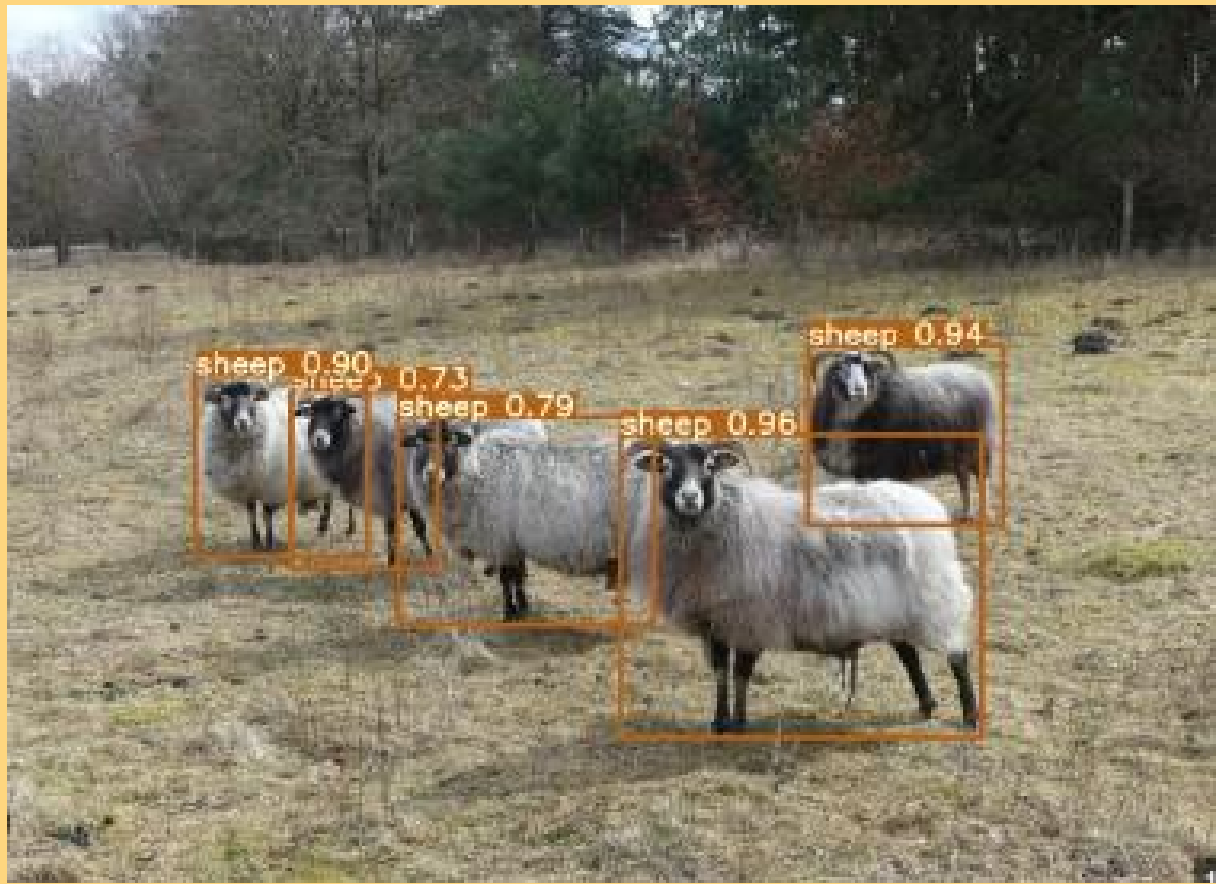
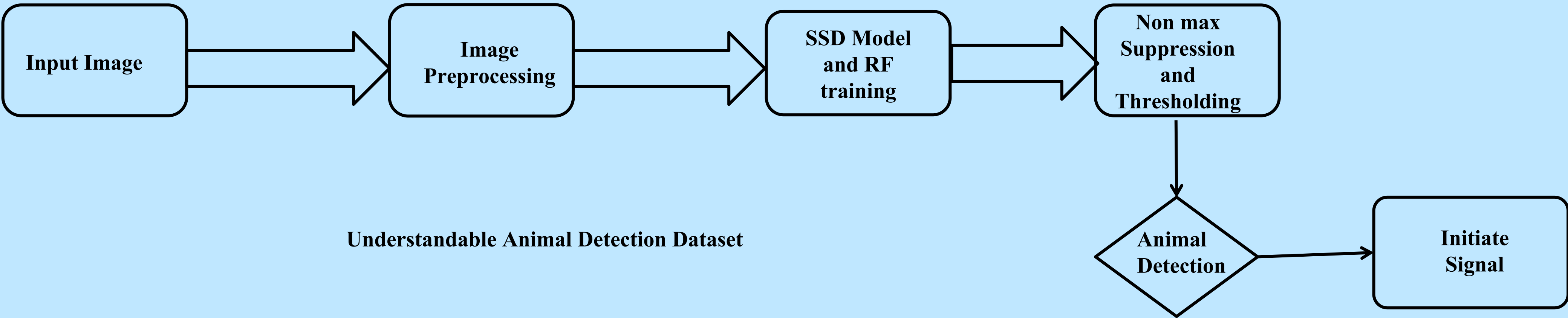


Fig. 1 Sheep Detection in Farm

MATERIALS AND METHODS



RESULTS

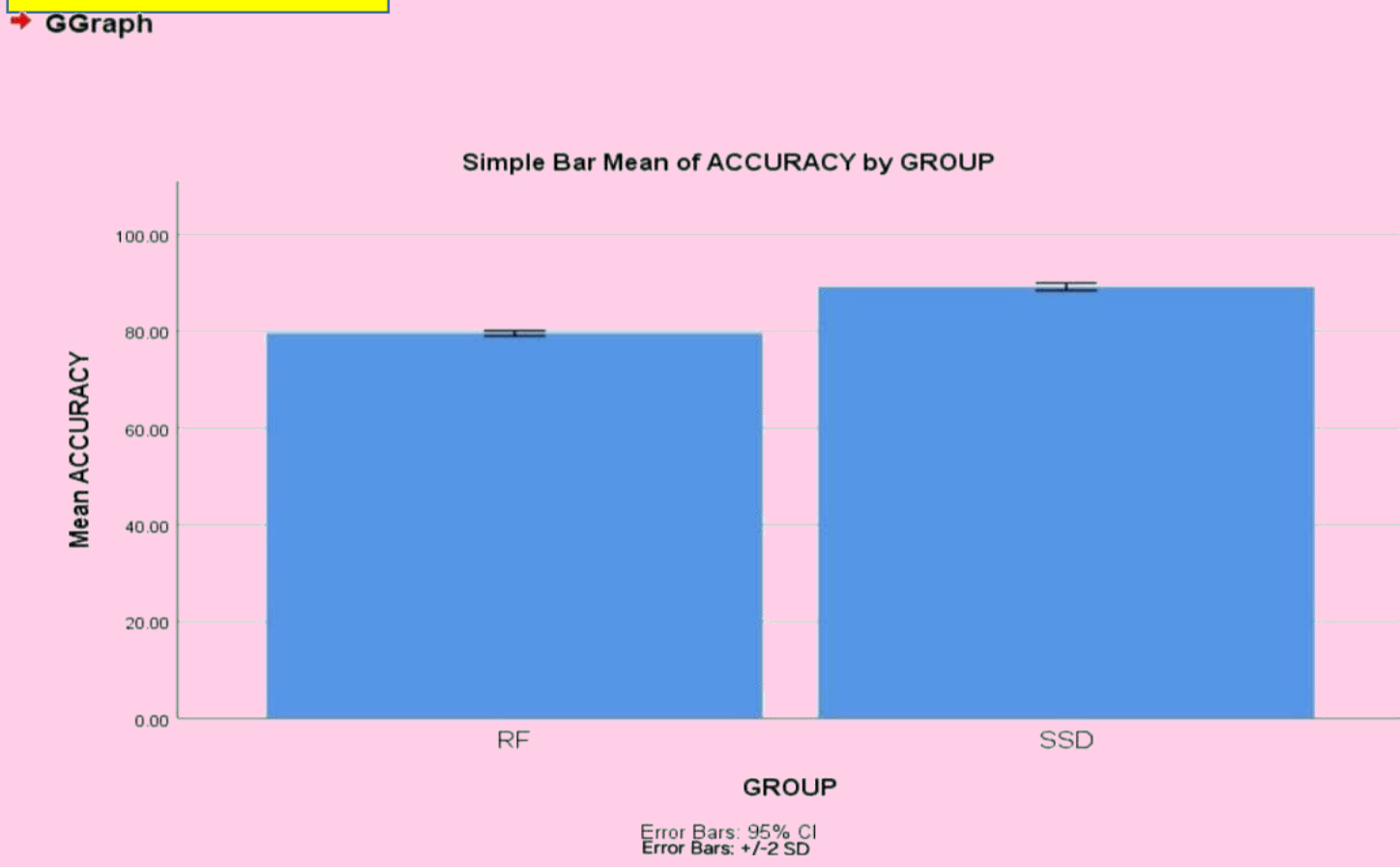


Fig. 2 Bar Graph showing the comparison of the mean accuracy of Animal Detection with SSD and RF

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 RF 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)	MeanDifference	Std. Error Difference	95% ConfidenceInterval of theDifference	
Equal variances assumed	2.555	0.118	21.754	38	0.000	9.60000	0.44129	Lower	Upper
								8.70666	10.49334
Equal variances not assumed			21.754	34.274	0.000	9.60000	0.44129	8.70354	10.4655

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 RF and SSD
- Overall , the accuracy of the SSD is 89 % and it is better than RF which has up to 79%
- The group statics reveal that SSD with a standard deviation of 1.60918, whereas RF with a standard deviation of 1.14248
- Animal Detection using SSD and RF algorithms shows promise for improving accuracy and efficiency, SSD provides speed and simplicity, while RF 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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