

Wildlife Detection and Classification from Trail Cam Video using Deep Learning

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Introduction

- There has been an increase in Wildlife-Vehicle Collisions (WVCs) at Raton Pass post fencing by NMDOT
- There is a need to identify the new WVCs hotspots
- However, there are technical challenges to identify and track new wildlife species near the hotspots
- No Efficient AI Model is available to study the change in WVCs pattern near Raton Pass post NMDOT fencing

Background

- **Challenges in Monitoring Wildlife:** Traditional methods (manual surveys, GPS tracking) are resource-intensive, error-prone, and disrupt natural behavior
- **Camera Traps:** Efficient, non-invasive method to capture images of wildlife, but they generate large volumes of data
- **Object Detection Algorithms:** Applied to automate wildlife identification to address data challenges

In this work, the best models are selected with different ranges of datasets as shown in Figure 1

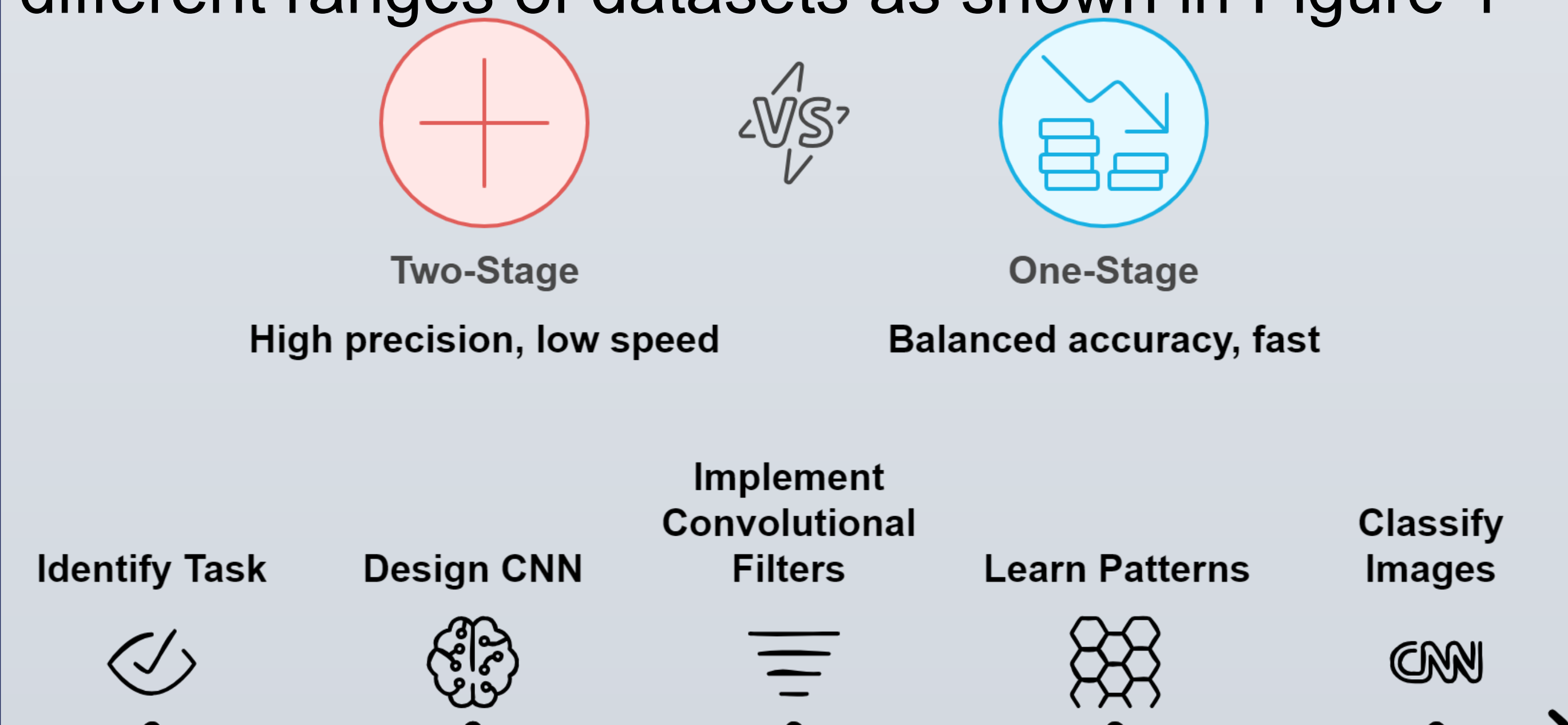


Figure 1. Steps to select a best fit model

Methodology

The AI model was trained using methodical approach shown in Figure 2

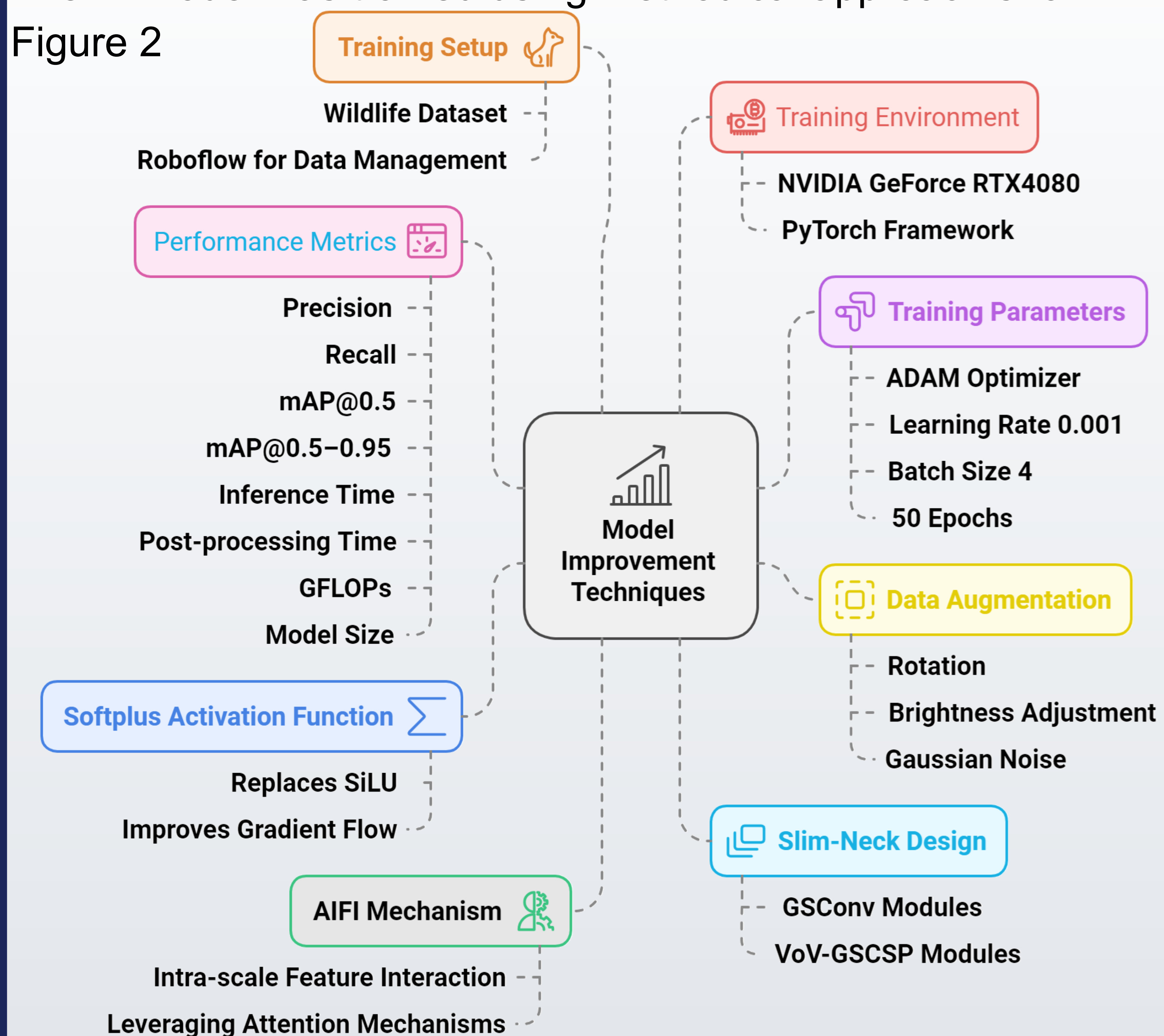


Figure 2. Methodology used in developing the AI model

Results

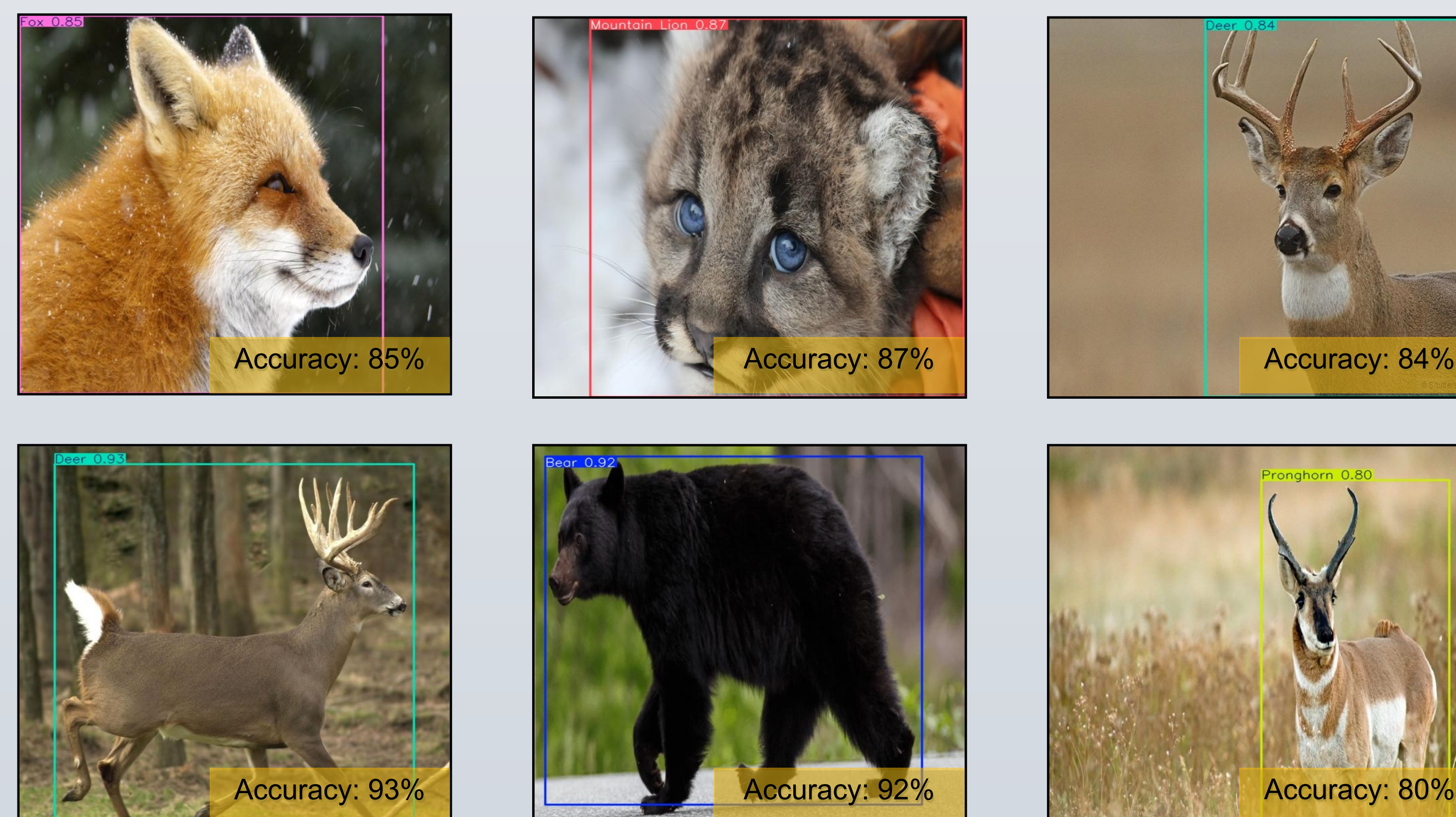


Figure 3. AI model performance and accuracy

Model Performance

The precision recall curve for a multiclass wildlife detection is shown in Figure 4

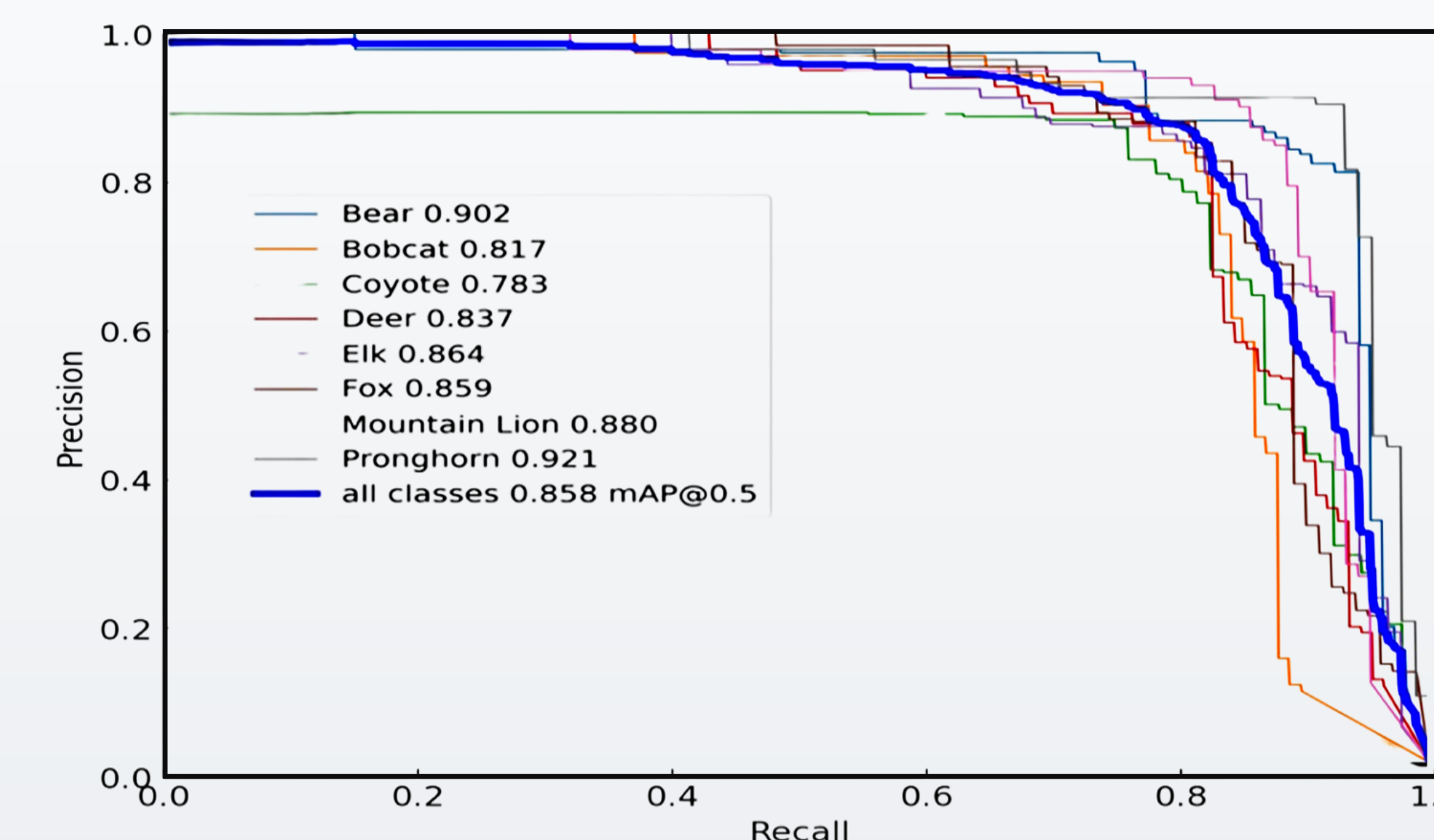


Figure 4. Comparison of Detection Performance Across Wildlife Classes with mAP@0.5

Conclusions and Future Work

- **Model Features:** Enhanced wildlife detection by the combination of Softplus activation, AIFI construction, and slim-neck design
- **Automation:** The AI model provides objective data, lessens human error, and allows for efficient, automated wildlife monitoring
- **Quick Response:** Delivers information on ecosystem health more quickly than manual surveys
- **Versatile Detection:** Identifies animals in a variety of diverse situations based on their size,

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