BeloveThaiAI: AI for Detecting Behavior and Location of Thailand's Unique Wildlife
AI Model Footprint for the Moodeng AI Challenge

1 Introduction

Thailand is home to a rich diversity of wildlife, many of which are endemic to the country. With the ongoing challenges of habitat loss and climate change, it is crucial to monitor and protect these species effectively. The **BeloveThaiAI** project aims to utilize advanced artificial intelligence (AI) techniques to track and analyze the behavior and locations of Thailand's unique wildlife. This system will rely on machine learning models with minimal computational footprints to ensure scalability and efficiency in wildlife monitoring.

2 AI Model Footprint in Wildlife Monitoring

AI models, particularly those used for monitoring animal behavior and locations, must be designed to handle large-scale datasets efficiently while minimizing resource consumption. The core components of the AI model in the **BeloveThaiAI** project involve:

- **Data Collection**: Using AI-driven camera traps and sensors to collect visual and environmental data of wildlife.

- **Model Training**: Training deep learning models (such as CNNs or Vision Transformers) on labeled wildlife data to classify species and detect behavioral patterns.

- **Location Tracking**: Integrating GPS-based tracking data with AI models to map the real-time locations of species.

- **Behavior Analysis**: Employing reinforcement learning (RL) models to analyze and predict behavioral patterns based on environmental interactions.

These models are specifically optimized for low-resource environments to ensure their footprint is minimal and suitable for deployment in remote locations.

3 Thailand's Unique Wildlife: Key Species

Understanding the behavior and locations of Thailand's endemic species is a central goal of the project. Below are some of the key species that will be monitored using the AI system:

3.1   Endemic Mammals (8 Species)

- Kitti's Hog-nosed Bat (*Craseonycteris thonglongyai*)
- Marshall's Leaf-nosed Bat (*Rhinolophus marshalli*)
- Giant Leaf-nosed Bat (*Hipposideros halophyllus*)
- Saratthani Brown Water Bat (*Eptesicus demissus*)
- Limestone Rat (*Niviventer hinpoon*)
- Bangkachak Rat (*Bandicota bangchakensis*)
- Cave Rat (*Leopoldamys neilli*)
- Schomburgk's Deer (*Cervus schomburgki*)

3.2   Endemic Birds (2 Species)

- Sirindhorn's White-eyed River-Martin (*Pseudochelidon sirintarae*)
- Deignan's Babbler (*Stachyris rodolphei*)

3.3   Endemic Reptiles (31 Species) and Amphibians (13 Species)

A total of 44 species of reptiles and amphibians that are unique to Thailand will also be monitored by the AI model.

4   AI Model Footprint Considerations

To effectively detect and track wildlife, the AI models need to operate in environments with limited computational resources. This includes:

- **Model Optimization**: The AI models are designed to be lightweight, with a focus on efficiency and minimal resource usage. Techniques like pruning, quantization, and knowledge distillation are employed to reduce the computational burden.

- **Edge Computing**: Data processing is performed on edge devices (e.g., remote sensors, wildlife cameras) to reduce latency and reliance on cloud computing.

- **Scalability**: The model can be deployed across different geographical areas with varying computational resources, ensuring that it can scale to monitor a wide range of wildlife across Thailand.

- **Energy Efficiency**: Since monitoring takes place in remote locations, energy-efficient models are essential. Low-power models using frameworks like TensorFlow Lite and PyTorch Mobile are considered for deployment.

5   Conclusion

The **BeloveThaiAI** project leverages AI technology to track and understand the behavior and location of Thailand's unique wildlife. By optimizing the AI models for efficiency and minimizing their computational footprint, this project ensures that wildlife conservation efforts are not only effective but also scalable and sustainable. As we advance in monitoring these species, the data gathered will contribute significantly to their protection and conservation.