AI & Edge Computing based Leopard Detection System with Mobile App

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Tender Specifications for AI & Edge Computing-Based Leopard Detection System

11 Technical Capabilities

- **AI & Machine Learning:**
    - The product must use AI/ML frameworks such as **TensorRT for AI based Edge computing**.
    - The product must provide evidence of **successful AI model deployment** in real-world applications, especially in **edge computing** environments, such as leopard detection images shown in dashboard on mobile app as well as real time alerts displayed on mobile. The detected image should be attached as a hardcopy for evidence purposes.
    - The product must have deep learning based leopard recognition with a minimum 85% confidence score for leopard. Necessary printouts to be attached.
    - AI inference on edge processors must be performed **locally** on the device, ensuring real-time response and no dependency on other factors like internet connectivity etc. Bidders should provide evidence of no internet connectivity and leopard detection during that time window to showcase edge computing facility. Necessary demo result printouts to be attached.
- **Edge Computing Capabilities:**
    - The bidder must have experience in the deployment of **edge computing devices** and related technologies, such as **IoT devices**, **5G/4G networks**, and **low-power computing platforms**.
    - The bidder should be proficient with leading Linux/RTOS based **edge computing platforms**
    - **Low Latency, Real-Time Detection:** Edge computing ensures instant detection and alert generation (latency < 1 second), which is critical for human-wildlife conflict mitigation. This would be judged by calculating overall latency from leopard detection to alert generation.

- **Offline Functionality:** The basic system functionality should work independently in remote areas with limited or no internet access. This would be judged by successful leopard detection with no internet connectivity
- **Edge device Monitoring:** The system must have capabilities to be managed or monitored remotely for troubleshooting any issue (if any).
- **Reduced Cloud Dependency & Cost Savings:** By processing video feeds locally, the system minimizes bandwidth usage and data transmission costs, making it ideal for large-scale deployment.

- **System Integration Expertise:**
  - The bidder must have experience in **integrating edge computing** with **cloud-based infrastructure** for hybrid system architectures.
  - The bidder must demonstrate expertise in building **scalable, fault-tolerant and secure AI solutions** with an emphasis on performance, energy efficiency, and low-latency data processing.
  - The bidder must have experience in building robust edge commuting devices considering different environmental conditions.
- **Security Expertise:**
  - The bidder must demonstrate the capability to implement **robust security mechanisms** (e.g., encryption, secure data transmission, identity management, etc.) for an AI and edge computing system.

Below is a checklist of basic requirements.

Index	Criteria	Remarks
11.1	Successful leopard detections using AI model deployment Success Criteria: Hardcopy of detected images to be attached	
11.2	Detection accuracy Success Criteria: Necessary printouts to be attached.	
11.3	AI object detection without network connectivity Success Criteria: Evidence to prove successful detection without network	

	connection.	
11.4	Overall Detection latency (< 1 sec) Success Criteria: Necessary logs to show overall latency.	
11.5	Integrated view of all hardware components like jetson orin, router, network components, cooling system etc	

12 Hardware Requirements

- **Edge AI Device:** Minimum NVIDIA Jetson Orin NX / Orin AGX or equivalent
- **Processing Power:** 6-core CPU, GPU with 1024 CUDA cores, 32 tensor cores, 8GB RAM, 128GB Storage
- **Camera Compatibility:** Minimum 2MP resolution, 25-30fps, night-vision enabled.
- **Weatherproof Enclosure**: Minimum IP65-rated for outdoor deployment.
- **Sound device for alerting mechanism.**
- **Industrial Grade Router for network connectivity.**

13 Connectivity & Communication

- **Wireless Connectivity:** 4G/5G, Wi-Fi, LoRaWAN support for remote monitoring.
- Integration with government systems for real-time tracking.
- Instant Alerts via Mobile App / SMS to farmers and forest officials.

Index	Criteria	Remarks
12.1	Edge AI Device Success Criteria: Provide Edge device specs.	
12.2	Camera Success Criteria: Provide camera specs.	
12.3	Alarm system Success Criteria: Produce min 120 db	
12.4	Industrial grade router Success Criteria: Router specs to provide seamless internet connectivity.	
13.1	Integration with government systems Success Criteria: Evidence to show detection data on govt website.	
13.2	Instant alert to forest officials/villages Success Criteria: Evidence to show alerting on mobile app	.

14 Eligibility Criteria (Mandatory Condition)

1. **Past Experience in AI & Edge Computing:**
    - The bidder must have successfully deployed at least five (5) AI (GPU based) leopard detection systems in operational environments.
    - The bidder must provide a certificate of successful operation from the concerned authority (e.g., Forest Department, Government Agency, or any Wildlife Conservation Authority)
    - The bidder must demonstrate real-time leopard detection capabilities with AI-driven alerts in at least one previously deployed project in the real world.

Index	Criteria	Remarks
14.1	Deployed at least five (5) AI (GPU based) leopard detection system	
14.2	Certificate of successful operation from concerned authority	
14.3	Demonstrate real-time leopard detection capabilities	

Format of Certificate for Successful Operation of AI-Based Leopard Detection System

[On Official Letterhead of the Concerned Authority]

Date: [DD/MM/YYYY]

To,

[Name of the Tender Issuing Authority]

[Organization Name]

[Address]

Subject: Certificate of Successful Deployment of AI & Edge Computing-Based Leopard Detection System

This is to certify that [Bidder's Company Name] has successfully installed and operationalized [Number] AI-based leopard detection systems using NVIDIA Orin GPU-based edge computing technology at [Location(s)].

The deployed system has been actively functioning since [Installation Date], providing real-time detection and alert mechanisms for leopard sightings. The system operates on

edge computing technology, enabling instant, on-device AI processing without requiring continuous internet connectivity.

This system has been instrumental in wildlife conflict prevention, allowing authorities to receive timely alerts and take necessary precautions. The concerned authority acknowledges the effectiveness and reliability of the installed solution and confirms its operational status as of [Current Date].

Authorized Signatory:

[Name]

[Designation]

[Department Name]

[Contact Information]

[Official Seal & Signature]