# Task 1 – Proposal

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## Activity A (ii)

### The Solution

### Software Requirements

### Programming Languages

### Permissions and Risks

### Legislation and Prevention

### Functional and Non-functional Requirements

### Key Performance Indicators (KPIs)

### User Acceptance Criteria (UACs)

### Agile Methodology

## Activity A (i) - Research

### Use of Hardware and Software in Zoology

#### Animal Tracking and Monitoring Devices

Hardware such as GPS collars, radio telemetry equipment, and camera traps can be used to gather crucial data on animal movements, behaviour, and population dynamics. This data would help with informing conservation strategies and understanding the ecology of the wildlife.

#### Features for visitors

Safari vehicles can be equipped with comfortable seating, open-air viewing platforms, and knowledgeable guides facilitate up-close encounters with wildlife. The design and functionality of these vehicles would be carefully considered to ensure the safety and enjoyment of visitors during their wildlife excursions.

#### Animal Enclosures and Infrastructure

The design and construction of animal enclosures should involve the use of durable fencing, secure gates, and strategically placed feeding and watering stations to create naturalistic habitats for the animals. Additionally, the infrastructure must adhere to the highest standards of animal welfare and safety.

#### Veterinary Equipment

A zoo’s veterinary team should use a range of hardware, including animal scales for monitoring weight, anaesthesia machines for medical procedures, surgical instruments, and diagnostic devices such as ultrasound machines and X-ray equipment to ensure the health and well-being of the animals.

#### Mapping Tools

Geographic Information System (GIS) software allows wildlife conservationists and zoo management to create detailed maps of the zoo's grounds, including the natural habitats of the animals. This enables better understanding of the spatial relationships between different species and their environments, aiding in habitat management and conservation planning.

#### Visitor Engagement

Customised mobile apps can be used for visitors to provide interactive maps, real-time animal sighting alerts, educational content, and conservation information. These apps would enhance the visitor experience by offering insights into the wildlife, conservation efforts, and the zoo's role in preserving biodiversity. Additionally, feedback and data collected through these apps can be used to tailor future experiences and improve visitor engagement.

#### Animal Management

Specialised software systems are used to track and manage the health, behaviour, and breeding of a zoo's animal population. These systems maintain comprehensive individual animal records, monitor breeding recommendations, and contribute to the overall welfare and sustainability of the zoo's animal collection.

#### Environment Monitoring

Weather stations, water quality meters, and soil analysis tools can be used to monitor environmental conditions within a zoo. This hardware helps in assessing the health of the ecosystem, understanding seasonal changes, and identifying any potential environmental stressors that may impact the wildlife and their habitats.

#### Photography

High-quality cameras, telephoto lenses, and video recording equipment can be used for capturing stunning images and footage of the wildlife within the zoo. These visuals not only serve as educational resources but also contribute to raising awareness about conservation efforts and the beauty of the natural world. They can also be used as a powerful marketing tool to show the great habitat and wildlife within the safari.

#### Communication

Two-way radios, public address speakers, and emergency communication devices play a crucial role in ensuring effective communication among zoo staff, especially during wildlife management activities, visitor guidance, and emergency situations.

#### Ticketing Systems

Software solutions enable efficient management of visitor bookings, ticket sales, and crowd control. Integrated with online platforms and mobile apps, these systems streamline the visitor experience and help in optimising the flow of guests through the zoo.

### Emerging Technologies in Zoology

#### Educational Interactive Displays

Software applications power interactive displays and virtual reality experiences that educate visitors about wildlife conservation, biodiversity, and the importance of protecting natural habitats. These exhibits offer engaging ways to learn about conservation challenges and solutions.

#### Training and Wildlife Management

VR is being used for training zoo staff in wildlife management, animal care, and emergency response scenarios. This technology allows employees to practice handling wildlife situations in a realistic and safe virtual environment, enhancing their skills.

#### Wildlife Monitoring and Behavioural Analysis

Camera systems and image recognition algorithms are used for wildlife monitoring and behavioural analysis. These technologies enable automated identification of individual animals, tracking population dynamics, and studying behavioural patterns without human intervention.

#### Predictive Analytics for Habitat Management

AI algorithms process environmental data to predict changes in wildlife habitats, water sources, and vegetation. This predictive capability aids in proactive habitat management, ensuring the well-being of wildlife and supporting conservation strategies.

#### Interactive Exhibits

Zoos are integrating AR (Augmented Reality) technology to offer interactive exhibits and guided tours. Visitors can use AR-enabled devices to view digital overlays of information, animations, and interactive elements superimposed on the real-world environment, enhancing their understanding and engagement.

#### Anti-Poaching and Security Measures

Drones are being used for anti-poaching patrols and security measures within wildlife reserves. Their ability to cover large areas and capture real-time footage aids in deterring illegal activities, protecting endangered species, and ensuring the safety of wildlife within the zoo.

### Industry-Specific Guidelines and Regulations

#### Wildlife Monitoring and Conservation Software Regulations

##### Wildlife Tracking and Monitoring Systems

The industry adheres to guidelines such as the "Ethical Guidelines for the Use of GPS and Radio Telemetry in Wildlife Research" to ensure the ethical and non-intrusive observation of wildlife. These guidelines emphasise the responsible use of software solutions for wildlife tracking and monitoring, focusing on data accuracy, animal welfare, and environmental impact.

##### Conservation Database Management

The industry follows regulations such as the "Wildlife Conservation and Management Act" that govern the development and maintenance of conservation database management software. These regulations emphasise data security, integrity, and accessibility to authorised personnel for conservation planning and decision-making.

#### Hardware Requirements for Wildlife Enclosures and Exhibits

##### Interactive Display and Information Kiosks

The industry complies with hardware requirements outlined in the "Zoo and Aquarium Safety Standards" to ensure the durability, weather resistance, and user interface accessibility of interactive display and information kiosks within wildlife enclosures and exhibits.

##### Environmental Monitoring Sensors and Devices

Regulations such as the "Wildlife Habitat Protection Act" govern the selection and installation of sensors and devices for environmental monitoring within wildlife enclosures. These guidelines emphasise compliance with industry standards for data accuracy, reliability, and environmental impact assessment.