A Ilica 242, HR-10000 Zagreb
T (01) 2222 182
E student@algebra.hr
www.algebra.hr

ALGEBRA

Wildlife Activity Tracking and Monitoring System

Functionality specification

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A Ilica 242, HR-10000 Zagreb
T (01) 2222 182
E student@algebra.hr
www.algebra.hr

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Version history

Version	Date	Author	Comment
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Document certification

Name	Role	Company	Date	Signature

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Content

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Introduction

Improving wildlife tracking by developing program Wildlife Activity Tracking and Monitoring System by implementing web application for administrative management, a mobile application for field researchers and an IoT application for collecting real time data.

Scope of the project

Field researchers will use mobile application to record real time observation of wildlife. So if a wildlife is sighted, they can use an application on their mobile phone to record if animal is hurt or if it's behaving abnormally. When animal is healthy they can just use it to collect the data with a photo or a video that is geotagged. To monitor animal movement and habitat usage in real time, researchers can also access data from IoT devices, including GPS animal collars and motion sensors. Mobile application also supports offline data entry, which syncs with the central server, once connection is restored.

Concepts

WATMS - Wildlife Activity Tracking and Monitoring System
IoT device - hardware that have a wireless network connection and are integrated into equipment or other devices, so they can receive and share data. Examples of IoT devices include sensors, actuators, appliances and gadgets.
GPS enabled animal collars and motion sensor - Global positioning system which uses collar that is put on an animal, to track their movement. The motion sensors are used to track animal in the location that is triggered by the motion.

Role description

Reservation workers will rely on the system to manage tasks such as deploying and maintaining IoT devices, monitoring animal activity alerts, and scheduling patrols. The application can also be used to report on environmental changes, such as habitat degradation or presence of poachers. The information will be synchronized with other reports in the central database for analysis and response planning. While the web application will serve as hub for the administrative users, allowing them to analyze collected data, generate detailed reports, and visualize animal movement patterns through dynamic heatmaps. To manage user access, configure system settings, and oversee IoT devices deployment and maintenance schedule, administrator can do it.

Requirements related to functionality

App allows user to upload geotagged photos

Application allows users to upload geotagged photos, so the phone is using the location of the user to determine where he is positioned in the world and sends information to the central server.

Can access data from IoT devices, GPS collars, and motion sensors.

Researchers can access data from IoT devices, GPS collars, and motion sensors, to track animals more precise in the field. So in using this information they can pin point where the animal is in the moment.

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Mobile app supports offline data entry

Because mobile application supports offline data entry, the information wont be lost in a case of lost connection to the central server. The application will automatically sync information from time that the connection was not met to the central server.

Web app will serve as hub

Web application will be used by administrative users to allow them to analyze collected data, generate detailed reports and visualize animal movement patterns through dynamic heatmaps.

Administrator

Administrators can also configure system settings, manage user acces and oversee IoT device deployment, and maintenance schedules.

Requirements related to characteristics

Because the application is supposed to run smoothly, the response time must meet sub 500ms response time, for data access and data visualisation. Application must also support multiple languages, such as English, French, Spanish, and Swahili, while the web application will offer only support for Enlish and French. Furthermore, all communication between IoT devices, mobile/web application and central server must use end-to-end encryption to protect sensitive data and ensure system integrity.