

WILDGUARD:

Community Conservation Application Project Proposal

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1. Project Definition (200-300 words)

Conservation efforts are increasingly critical as endangered species face mounting threats from habitat loss, poaching, and climate change. While platforms like iNaturalist and eBird are effective at tracking broad biodiversity, they lack a specialized focus on endangered species and the specific conservation needs they require. This project seeks to address this gap by developing a collaborative web application that allows researchers and citizens to track and analyze data on endangered species. The platform will facilitate real-time reporting, provide predictive analytics on species population trends, and ensure secure data management tailored to conservation priorities. To achieve this, the project will utilize modern web technologies, secure user authentication, and advanced machine learning techniques. The system will feature a role-based access control system to differentiate between researchers and conservationists, a robust database for storing sightings and species data, and an interactive map for visualizing real-time data. Machine learning models will be integrated to predict population trends and identify critical conservation hotspots, enabling more effective allocation of resources and targeted conservation efforts.

2. Project Requirements Analysis (from the users' perspective, what they need)

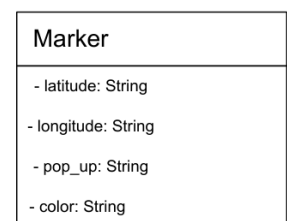
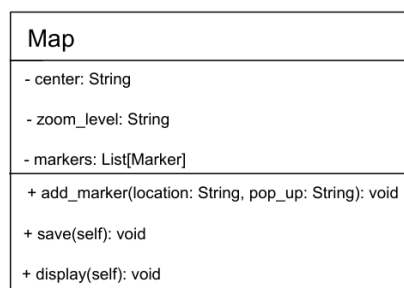
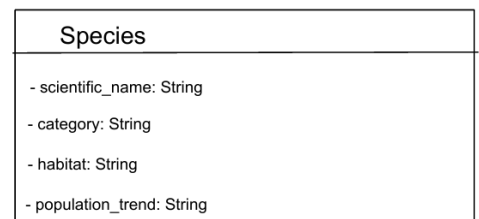
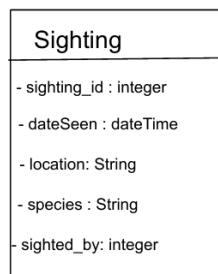
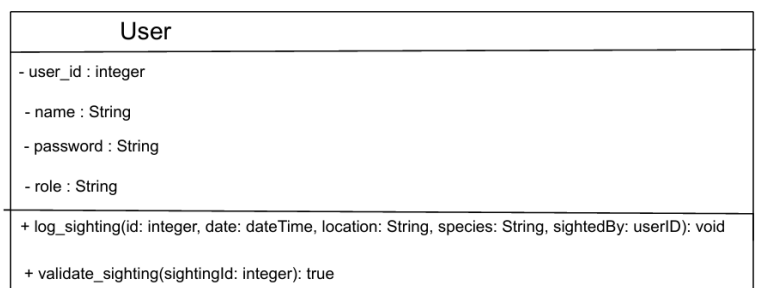
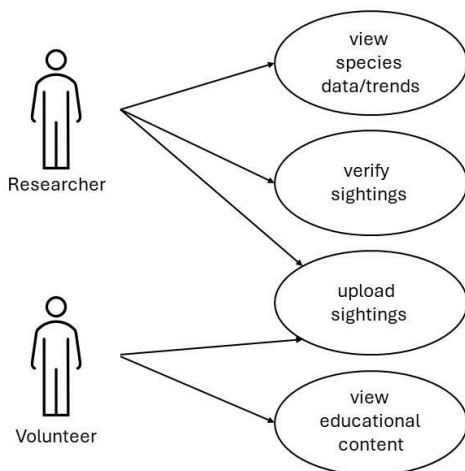
- Functional
 - *Role-based access for researchers and volunteers.*
 - *Machine learning integration for predictive analytics.*
 - *Access to educational materials and information.*
 - *Ability to list and view sightings on a geospatial map and predictive analytics based on role access.*
- Usability
 - *User-friendly, minimalist design for simple and understandable interface interaction.*
 - *Interactive map for data visualization.*
 - *Forms for data entry with validation.*
- System
 - Hardware
 - *Can be run on any computer capable of accessing the internet, and will stay local to the team's computers during development.*
 - Software
 - *Frontend: React.js*
 - *Backend: Django*
 - *Database: MySQL || AzureSQL*
 - *ML: Python, Pandas, Matplotlib, Tensorflow, Keras*
 - Database
 - *Relational database for storing species sightings and other related userdata.*
 - *An additional database for storing generated data for ML model creation and training.*
- Security
 - *Secure authentication with encrypted user credentials*
 - *Role-based access control to ensure data integrity and security*

3. Project Specification

- Focus / Domain / Area
 - *Endangered species conservation, data collection, and analysis.*
- Libraries / Frameworks / Development Environment
 - *Frontend: React.js, Bootstrap*
 - *Backend: Django*
 - *Database: MySQL || AzureSQL*
 - *ML: Python, Pandas, Matplotlib*
 - *IDE: VSCode, Pycharm, Webstorm, JupyterLab*
- Platform (Mobile, Desktop, Gaming, Etc)
 - *Web-based desktop application*
- Genre (Game, Application, etc)
 - *Conservation-focused application.*

4. System Design

- Overall System Architecture
 - *The system will consist of a frontend interface for users, a backend server to handle requests and manage the database, and a machine learning component integrated into the backend for predictive analytics.*
 - *The application will follow the MVC architecture model.*
- Identify subsystems
 - Illustrate with class, use-case, UML, sequence diagrams
 - *Use Case Diagram for User Types and Functionalities, and a UML Diagram:*



- Teamwork Division
 - **Meghan:** *Frontend and backend development of the web application and user interface.*
 - **Alex:** *Quality assurance testing, frontend and backend development.*
 - **Billy:** *Database creation and management, and implementation of machine learning techniques.*
 - **Derek:** *Data wrangling, visualization, and the training and validation of machine learning models to predict wildlife populations.*