

## **1. Project Title: BirdSpotter**

## **2. Project Summary: It should be a 1-2 paragraph description of what your project is.**

Our project is a bird check-in and sharing app that allows users to record and explore bird sightings. Users can upload bird photos, enter details such as time and location, and save their observations. The app provides descriptions and reference images for different bird species, helping users confirm their sightings. To improve accuracy, the app includes a feature that assists users in identifying the species before submission.

A key feature of the app is an interactive map where users can view all recorded bird sightings. The map allows filtering by bird species, time, and location, making it easy for users to explore past observations. This project aims to create a simple and engaging platform for birdwatchers of all levels, from beginners to experienced enthusiasts. By sharing their sightings, users can contribute to a growing community database, making bird-watching more interactive and enjoyable.

## **3. Description of an application of your choice. State as clearly as possible what you want to do. What problem do you want to solve, etc.?**

This app helps users document and share their bird sightings while keeping a personal record of their observations. Users can log sightings by uploading photos and adding details such as the species name, time, and location. The app provides reference information to help users confirm their identification. It also includes a feature that assists with species recognition, ensuring more accurate data entry.

The core feature of the app is an interactive map that displays all user-submitted bird sightings. Users can explore the map, filter sightings by species, time, and location, and view detailed information about each entry. This makes it easy to track bird activity in different regions and compare observations over time. Many existing platforms focus either on bird species identification or scientific data collection, but few combine both in an easy-to-use format. Our app bridges this gap by offering a simple, community-driven platform where birdwatchers can record, verify, and explore sightings. This makes it accessible for beginners while still useful for experienced bird enthusiasts.

Through this app, users can contribute to a shared database of bird sightings, making bird watching more interactive and educational.

## **4. What would be a good creative component that can improve the functionality of your application?**

There are a few components that could be good that can improve the functionality of our application. One good thing will be AI-Powered Bird Recognition & Similarity Matching machines. We could use some computer vision packages and construct a recognition system,

or we could use a deep learning model such as ResNet, EfficientNet, or YOLO to classify and match the uploaded animal images with your dataset, or we can use an online API to process the uploaded images. Primarily, BirdSpotter only provides functionality to help users identify the species. However, normal users might not have a wide knowledge of birds, an AI-based identifier will help these users to get started with their spotted birds. There are some challenges including Integrating a deep learning model into a web or mobile app, Preprocessing user-uploaded images for better classification accuracy, and the efficiency of the upload and identification process.

Another good thing would be an Augmented Reality (AR) for Bird Visualization. Currently, we only provide users with images to help them identify their birds. However, we can integrate ARKit or ARCore on mobile or A-Frame and AR.js on computers to show users a 3D model of the identified bird in their real-world environment. This feature can be educational, allowing users to interact with the bird in a virtual space and provide them with more detail to help the identification. There are some challenges for us to do this. The first one is how to transfer a large group of images to AR objects and how to handle the time and resources problems. Another challenge would be learning those libraries.

**5. Usefulness.** Explain as clearly as possible why your chosen application is useful. What are the basic functions of your web application? (What can users of this website do? Which simple and complex features are there?). Make sure to answer the following questions: Are there any similar websites/applications out there? If so, what are they, and how is yours different?

Our application is useful because it meets the growing demand for identifying and documenting bird encounters. It provides detailed bird information, helping users recognize bird species. Additionally, the app allows users to log their bird sightings with their photos, locations, and time, so that they can maintain a personal record of their birdwatching journey and share with others.

While there are existing websites and applications for bird identification and wildlife tracking, they often serve separate purposes. Some focus on species recognition, while others are primarily designed for scientific reporting. However, it seems that none of them integrate both functionalities. In particular, many platforms require prior birding knowledge, making it difficult for casual birdwatchers to record, track, and share their experiences effortlessly. Our application bridges this gap, making bird watching more accessible and engaging for everyone.

**6. Realness.** We want you to build a real application. So, make sure to locate real datasets. Describe your data sources (Where is the data from? In what format [csv, xls, txt,...], data size [cardinality and degree], what information does the data source capture?). It would be hard to satisfy stage 2 requirements with one dataset. Thus, we strongly recommend identifying at least two different data sources for your project.

We have 2 data sources. One for the bird information and photos. One for the user information and photos.

The bird data are from eBird website:

<https://ebird.org/science/use-ebird-data/download-ebird-data-products>.

The format of the dataset is txt file. The cardinality is 1400, and the degree is 35, though we may not use all the data.

The user data can also be gathered from eBird, or we may take bird photos and generate data by ourselves.

## **7. A detailed description of the functionality that your website offers.**

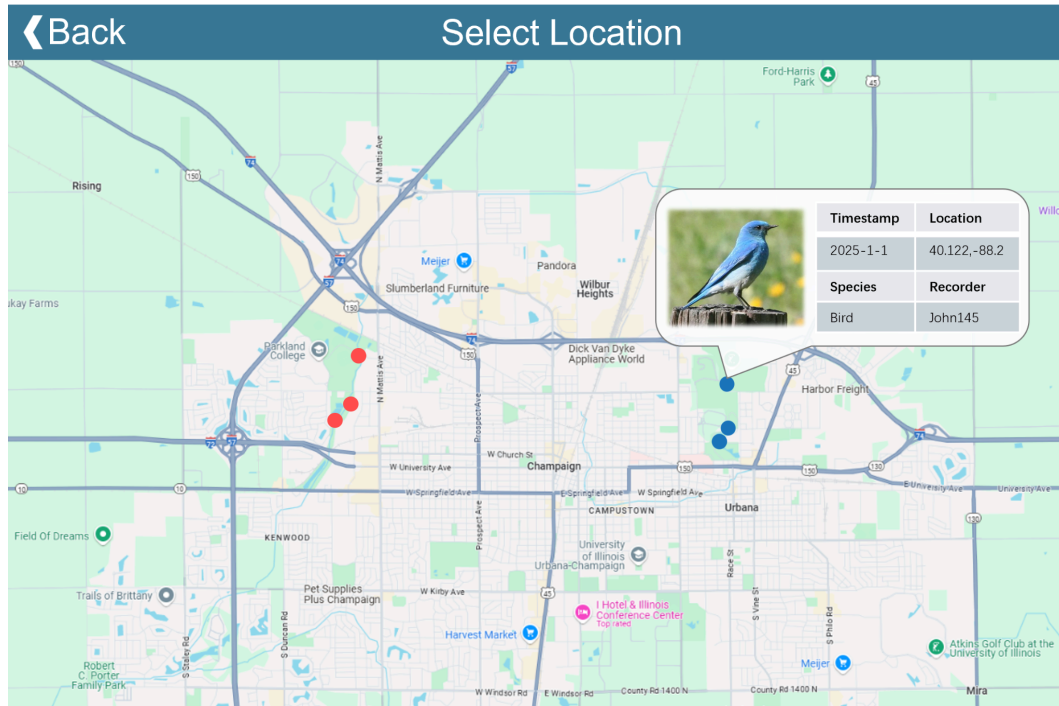
Our application is a simple, intuitive process for bird identification and sharing. Users begin by selecting the bird species they believe they have spotted, after which the system retrieves and displays relevant details from our database. If the match is confirmed, the app provides reference photos to further verify the identification. Conversely, if the user feels the species is incorrect, alternative suggestions are offered. Once the correct species is confirmed, users can complete the upload by adding location and time information, then share their observation on a public map where everyone can explore the submissions.

Beyond the core workflow, we plan to introduce interactive features that enhance user engagement. For instance, a photo rating system will enable community members to highlight exceptional or rare sightings. We also intend to incorporate robust search capabilities that allow users to filter observations by time period or custom parameters, catering to both casual birdwatchers and dedicated enthusiasts interested in analyzing trends. Additionally, we plan to integrate distribution visualizations—such as species-specific heatmaps—to show where certain birds are most frequently encountered, further enriching the overall user experience.

We are also considering the integration of AI-based bird recognition, which would analyze uploaded images and offer automated identification suggestions. This feature would be especially helpful for users with limited birding experience, streamlining the observation process and making the app more accessible.

In terms of design, our web interface will feature a clean, map-centric layout. Each user submission will appear as a marker that can be clicked or hovered over to reveal the corresponding bird photo, details, and user information. Navigation options—available via a header or sidebar—will allow users to upload new sightings, search existing records, and access additional features like heatmaps or user profiles. This design aims to balance clarity with functionality, making it easy for users to quickly record new sightings and explore others' observations in an engaging, visually appealing manner.

1. A low-fidelity UI mockup: What do you imagine your final application's interface might look like? A PowerPoint slide or a pencil sketch on a piece of paper works!



2. Project work distribution: Who will be responsible for each of the tasks or subtasks?  
 Explain how backend systems will be distributed across members. Be as specific as possible as this could be part of the final peer evaluation metrics.

Frontend: Haoran Li

Backend Functionalities:

User management - Jimin Yang

Manual identification & Upload - Yuhang Li

Map Display and Interaction - Haoran Li

Search and Filtering - Zhanwang Zhou

Data - All

Deployment & Testing - All