Conservatory Catch

Project Development Report for Conservatory Catch

Prepared by
Marcos
Echevarria,
Christian Garcia,
and Nick Tryba
CS 440 at the
University of Illinois Chicago

Table of Contents

I Project Description

Conservatory Catch is a mobile application that uses augmented reality to create an educational game promoting interest in the Garfield Park Conservatory and its nonprofit organization, the Garfield Park Conservatory Alliance (GPCA). The game is played while at the conservatory, which promotes increased visits, new visitors, and more donations.

1 Project Overview

In Conservatory Catch, players will be able to walk around the conservatory in real time alongside their character and have random chances of different species appearing. When a species appears, the player has the ability to catch it by playing a minigame, thus building their collection. Players can view their collection to view information on all of their collected species. The end goal of the game is to complete your collection.

2 The Purpose of the Project

The Garfield Park Conservatory programming does not extend into the world of mobile applications. With Conservatory Catch, the GPCA would be able to offer a fresh new way of educating visitors on the different plant species found in the conservatory. The hope is that the game will lead to an increased number of visitors, and an increased number of donations. Donations to the conservatory will greatly contribute to the different programs that the GPCA runs, as well as accessibility (i.e., free programs) to those programs for the youth.

2a The User Business or Background of the Project Effort

The clients of this project are the GPCA, people who like to learn about plants, and gamers. Much of what goes on at the Garfield Park Conservatory runs through the GPCA. This includes education programming, events, and creating resources for visitors. For gamers and people who like to learn, the project serves an exciting new medium for learning about plant species.

2b Goals of the Project

This project serves as a way to enhance and broaden the operations of the GPCA through encouraging donations and visits. While the game is free to play, we hope many players enjoy the game enough to where they feel the conservatory is worthy of a donation. For gamers and those learning about plant species, we want to provide a fun and accessible way of combining augmented reality gaming with learning.

2c Measurement

We will be measuring the increase in donations on a particular cycle, such as week to week. Increase in donations means two different particular measurements. One being

the total amount of money donated to the conservatory, and the other being the frequency of donations regardless of the amount. These two measurements will allow us to gauge changes in donations starting from before the app's launch, to well after.

Players will be able to measure their own success via their collection level. Each new species collected will increase their collection level by one point. We will also track feedback through user surveys, where we can also inquire about the game's accessibility

3 The Scope of the Work

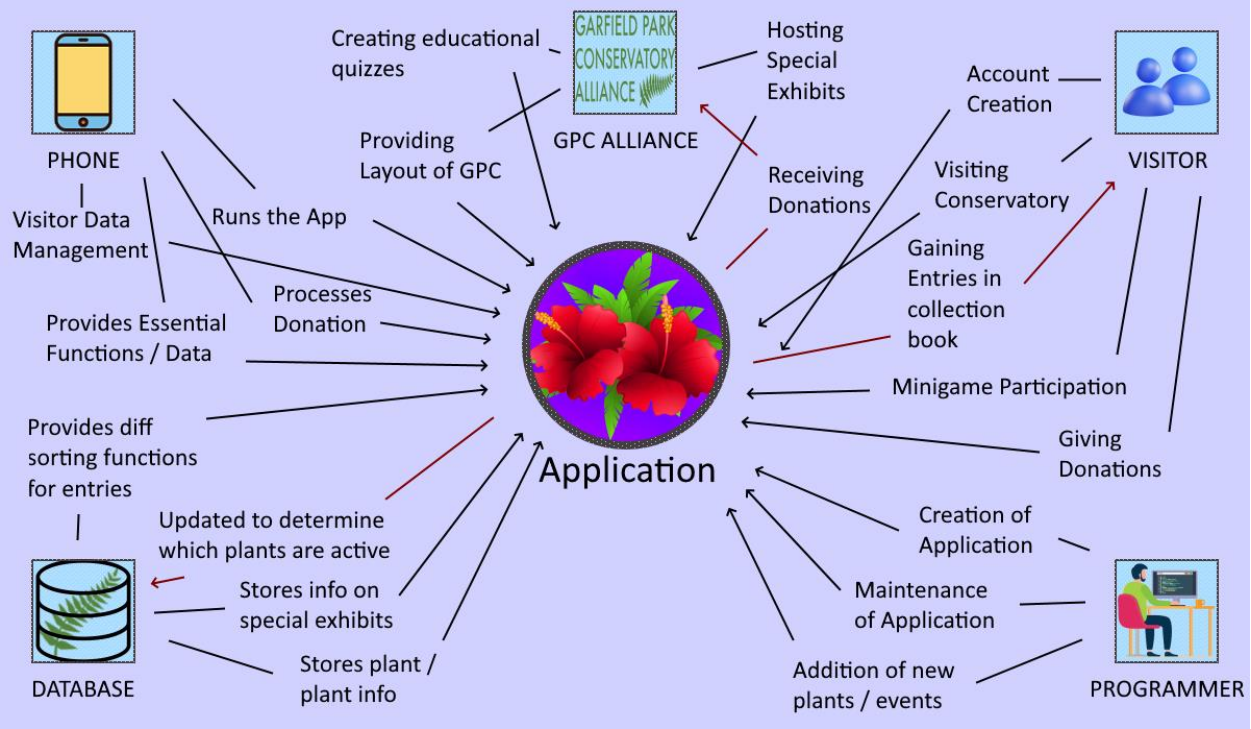
This product will work inside the work's business, that being the GPCA's vision and mission, that being wanting to change people's lives through the power of nature, and that they hope to achieve this by showing them the importance of nature. They use the GPC as their main work, and provide educational programming, events, and resources in order to further achieve their goal.

3a The Current Situation

Garfield Park Conservatory Alliance goes about achieving their goal by providing educational programming, events, and resources to GPC visitors. These programs can vary, taking place at different, specific times, as well as location, and some of them are available for free, while some of them require a fee on the participator's end. Schools are also able to take their class on field trips to the conservatory for free.

The application will serve as another way to further achieve their goal, providing a means to extend the education to every tourist coming to GPC in a fun, interactive manner for free, and at any time in the GPC. It will also help fund future events through donations.

3b The Context of the Work



3c Work Partitioning

Business Event List

Event Name	Input and Output	Summary
<u>GPC Alliance</u>		
1. GPC Alliance creates educational quizzes	Creating Education Quizzes (in)	Quizzes will be implemented by programmers in minigames
2. GPC Alliance gives the layout of the conservatory	Providing Layout of GPC (in)	Layout of conservatory used by programmers in creatin app
3. GPC Alliance plans and hosts special exhibits	Hosting Special Exhibits (in)	Special exhibits tied to special events in the application
4. GPC Alliance receives donations from visitors	Receiving Donations (out)	Donations to GPCA received by visitors through the app
<u>Visitor</u>		
1. Future visitor of GPC create an account on the application	Account Creation (in)	Creation of account by visitor allows access to app functions
2. Said visitor goes and visits the GPC with account created	Visiting Conservatory (in)	Visitor visits conservatory to use app and gain entries
3. Visitor participates in the minigames on application	Minigame Participation (in)	Minigames are how visitors gain entries in collection book

4. Visitor gains entries in their collection book on application 5. Visitor gives a donation through the app to the GPCA	Gaining Entries in Collection Book (out) Giving Donations (in)	Entries can show visitor more info on plant caught +fill book Donation given because either enjoy app or + cosmetic item
<u>Programmer</u> 1. Programmer works on creating the application 2. Programmer maintains the application after completion 3. Programmer adds new content to application	 Creation of Application (in) Maintenance of Application (in) Addition of New Plants / Events (in)	 Creation of application core to being able to use its functions Will need to handle visitor data, ties to the database Addition through new plants and special exhibits, new data
<u>Database</u> 1. Database stores info on GPC's plants 2. Database also stores info on GPC's special exhibits 3. Database gets updated for active plants in conservatory 4. Database provides different sorting functions for entries in collection	 Stores Plant / Plant Info (in) Stores Info on Special Exhibits (in) Updated to Determine Which Plants are Active (out) Provides Different Sorting Functions for Entries (in)	 Keeps info on GPC plants + can add future ones Info such as runtime, when they happen, special plants, et. Some plants may be seasonal, and some may be added Uses database functions and params to sort the plants, be it by time, if special, other info
<u>Phone</u> 1. Phone manages the visitor's data 2. Phone provides essential functions, such as GPS and camera 3. Phone has the necessary software to run the app 4. Phone uses the visitor's inputs to process and send donation	 Visitor Data Management (in) Provides Essential Functions / Data (in) Runs the App (in) Processes Donations (in)	 Phone deals with data such as social profile and entries GPS and camera are vital for making the application work Software required to run the app Donation given to GPCA if they like the game or just want an extra cosmetic for profile

3d Competing Products

Competing products do exist, such as the ones listed below, but they do not combine fun, interactions, and availability into one.

- Books on plants
- GPC's events
- Courses on plants

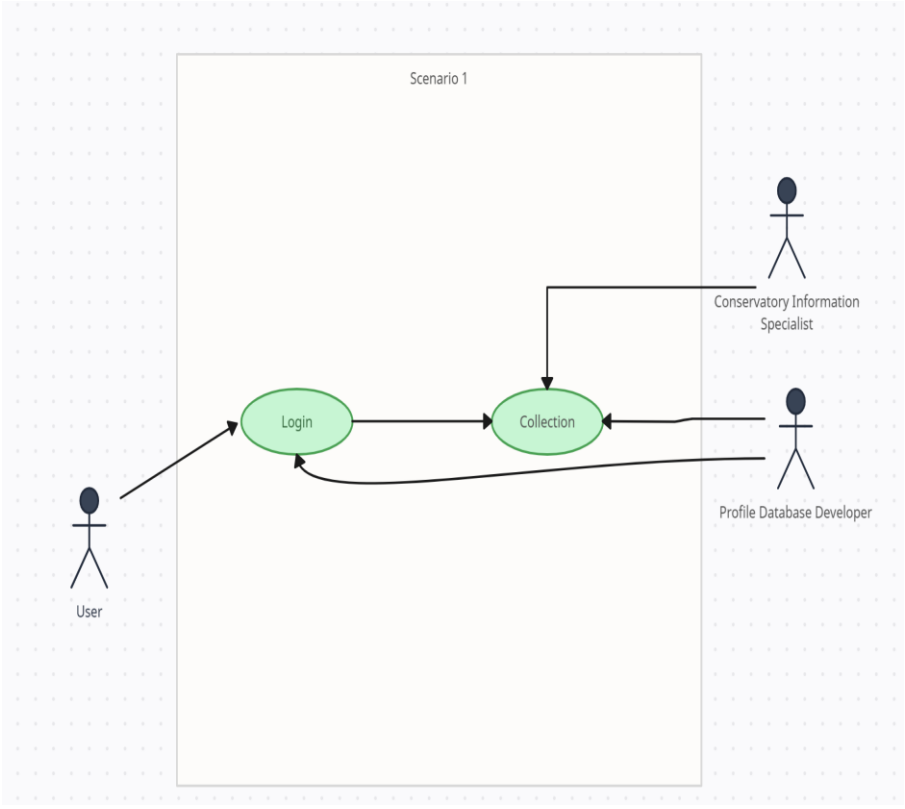
4 The Scope of the Product

This project will allow the following actions to be performed by users:

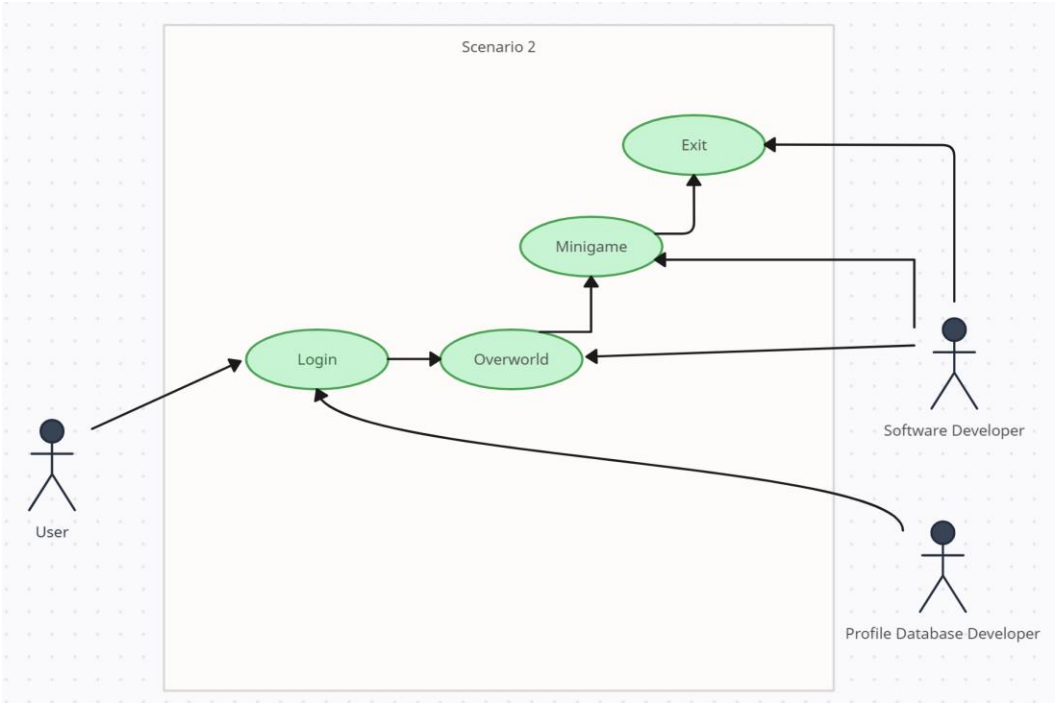
1. “Login” – allows new players to create accounts and returning players to login to their respective accounts in order to retain all previously earned rewards.
2. “Overworld” – allows players to physically walk through a one-to-one mapping of their environment, using their location data provided by their smart devices, and complete different reoccurring events and challenges in the form of minigames.
3. “Minigames” – allows users to perform specific tasks in order to complete a variety of events spawned in from the overworld, their reward being a new addition to their growing collection of rewards.
4. “Collection” – allows the user to access any rewards gained from the minigames completed in the overworld and retains all completions specific to the currently logged in user.
5. “Exit” – allows the user at anytime to exit the app without losing important data

4a Scenario Diagram(s)

Scenario 1 (User logs in and checks their current collection):



Scenario 2 (User logs in, finds an event in the overworld but exits before completing the game):



4b Product Scenario List

Scenario Names	Scenario Number	Next Scenario	External Actors
Overworld Scene	1	2	
Minigames Scene	2	3	Conservatory Specialist

Collection Scene	3	4	Conservatory Specialist
Login Scene	4	1	

4c Individual Product Scenarios

1. **Overworld Scene** – Our user, Ryan, enters the conservatory with the app up and running, his location is displayed to him in the form of his real life location casted over a digital map on his phone. He gets to walk around in real life and encounter random events that trigger minigames.
2. **Minigames Scene** – Ryan encounters a random event in the overworld, he taps it. A randomly generated minigame is displayed to Ryan for him to complete. Depending on the results, he may be rewarded with an item for his collection.
3. **Collection Scene** – Ryan, after successfully completing his minigame, enters his collection to view his newly acquired item.
4. **Login Scene** – Ryan, after seeing his newly acquired item, logs out for the day knowing that his data will be saved to his specific login so he may return and continue hunting for more rewards.

5 Stakeholders

5a The Client

- The Garfield Park Conservatory Alliance (GPCA) would be the main benefactor for this application, as this would allow for a different avenue for repeat visitors, leading to a higher potential for donations. A monetization shop can also be introduced down the line, leading to even more avenues for donations.

5b The Customer

Potential customers range from:

- Those who enjoy Augmented Reality style games
- Those who enjoy learning about exotic species
- Those who enjoy collectathon games

5c Hands-On Users of the Product

Hands-on Users of this product will most likely be:

- Conservatory visitors, ages range from children to elderly. It is necessary to have easy to understand UI elements and minigames that are widely accessible to all ages due to novice technology knowledge depending on the visitor.

- New and untrained Conservatory Employees. Assumption that this app can be used as training device as well, for employees to practice their trivia and learn new things they may not be learning on immediately. Assumption that if they are working for the conservatory then their technology prowess and intellect is at the bare minimum, high school level

5d Maintenance Users and Service Technicians

Maintenance users:

1. Debugging Maintenance Users
    i. These users will be tasked with debugging potential errors that may occur when updating the app with new content
2. New Content Users
    i. These users will take client feedback and provide updates for the app in terms of new content (new minigames, different versions of displaying the overworld), and quality of life updates (easier to understand UI design)

5e Other Stakeholders

Potential Stakeholders may include:

- Conservatory Workers: the workers themselves may be impacted both negatively and positively. This app as specified above, could be used to help train new employees, and also help guide guests through the conservatory with information they may not find out via the guides placed there. Yet, if the app does such a good job of guiding users, workers could be phased out entirely.
- Testers: With new content, there will need to be extensive testing concerning each and every new update. Testers would need to understand how to push the game to its limits in terms of not only minigames but also the overworld aspect of physically walking around the map. This would require not only extensive knowledge on programming to determine bugs in the UI/Minigames themselves, but also physical ability to walk around the area and mimic the true user experience.
- Technology Experts: The use of technology cannot be understated in this project. Not every person has the same phone. Technology Experts must be tasked with ensuring that the app will be made available for all devices, regardless of being on IOS or Android.
- Usability Experts: For an app to be truly available for all, usability experts will need to work hand in hand with programmers to determine different how to approach a much broader user experience that has the ability to be played by anyone no matter the physical disability/impairment.
- Exotic Species Experts: This app is meant to help teach users about exotic plant species located in the conservatory, and around the world. If the data isn't accurate,

it would fail to be a benefit to the conservatory and its guests. Exotic Species Experts must be on hand when creating rewards, trivia, and minigames in order to legitimize the content we wish to reward players with. Exotic Species Experts must also maintain a high degree of knowledge so that we ensure this knowledge is passed on to the user.

5f User Participation

Users we be expected to attend weekly meetings where they will update the team on the completion of weekly objectives that pertain to content updates and bug fixes. If potential app breaking bugs pop up, it is expected that all teams will work to fix these bugs immediately before anything else.

5g Priorities Assigned to Users

Key Users: Conservatory workers and the conservatory itself will take highest priority in terms of what is required. It will essentially become their tool to help visitors navigate exotic species, so they must have the highest priority in how that tool takes shape.

Secondary Users: The visitors themselves, specifically repeat visitors, will be the 2nd highest on the food chain, but since users may want things that exit the realm of what the product is meant to do, they cannot come before the key users.

Unimportant Users: Non-visitors that download the app to try will have no priority in terms of what becomes requirements for the app. The whole point of the app is to stimulate visitation, so users that can't meet that requirement won't have a say in any requirement.

6 Mandated Constraints

6a Solution Constraints

Constraint 1:

- Description: This product will be available on mobile devices
- Rationale: The augmented reality style of game we are aiming for will require easy transportation methods in order to convey the overworld style to the user. Mobile devices will allow users to walk around the map physically.
- Fit Criterion: The product will be easily accessible via mobile devices, allowing all users to effectively participate as opposed to being constrained by bulkier technology such as desktop computers.

Constraint 2:

- Description: This product will be available on a mobile platforms (IOS, Android, etc)
- Rationale: If all mobile devices is a goal that must be achieved, then it is imperative that all mobile development platforms contain a version of the application
- Fit Criterion: The product will be available for all devices, not gating off certain financial brackets that may not be able to afford the newest hardware from the most well-known brands.

6b Implementation Environment of the Current System

Conservatory Catch will be developed for mobile platforms using Flutter Framework, this will ensure development for both operating systems used in mobile platforms. Phones will be used to gather location data and project users onto the digital space within the app.

6c Partner or Collaborative Applications

Conservatory Catch, as stated in 6b, will be developed using Flutter Framework as it's primary coding software. Weekly meetings as explained in section 5f, will use Microsoft Office products to present data, such as Word for word documents, and PowerPoint for presentations.

6d Off-the-Shelf Software

Flutter Framework by Google will be an External COTS software used to develop the app.

6e Anticipated Workplace Environment

The product will be developed as a mobile app so the main environment will be a phone app, used in the conservatory.

The workplace can be noisy at times, depending on how many visitors show up on a given day, so audible based minigames may not work as well depending on the atmosphere that day.

The user will be navigating a potentially congested environment so there must be steps implemented to maintain ensure events don't spawn in specifics areas that are dangerous to enter or causes potential health concerns by multiple users piling up to access said event.

6f Schedule Constraints

Product development should expect to take 3 years, with rigorous testing and client feedback, this deadline would allow for time to ensure maximum device reach, allowing the client to encourage the maximum amount of visitor retention. Monetization aspects should be expected to be implemented 6 months after launch,

after a player base can be nurtured and donations for the client can begin to be collected digitally.

6g Budget Constraints

This product is expected to be rather low budget in terms of game development. Considering the fact that this is being made for a non-profit organization, it shouldn't be expected to have hundreds of millions of dollars at disposal. At most, the budget would be estimated to be around 4 million dollars, covering expenses of the development team, and required testing.

7 Naming Conventions and Definitions

7a Definitions of Key Terms

Game Mechanics Keywords

Overworld: This will be the digital representation of the users physical location in the real world. Here the user will be able to interact with other elements of the game

Events: randomly appearing events will populate the overworld, allowing users to initiate different minigames

Minigames: randomly generated sets of games, ranging from encounters to trivia

Minigame Keywords

Encounters: two types of encounters will be used within minigames, one being a battle encounter, the other being a capture encounter

Species: species will be the primary focus of all trivia and encounters. These will be exotic plant species that users can see/learn about at the conservatory.

Trivia: not just any trivia will be displayed in minigames. This trivia must pertain to the exotic species the player encounters in the overworld events.

7b UML and Other Notation Used in This Document

This document generally follows the Version 2.0 OMG UML standard, as described by Fowler in "UML Distilled, 3rd Edition". Any exceptions are noted where used.

7c Data Dictionary for Any Included Models

Species rewards from minigames will stored in a class structure known as the collection class, which will have a primary data member in the form of a map structure, where the key will be the species ID number, and the value will be the trivia/image associated with said species. This collection object will be paired with the player accounts player ID that will then be combined into another map object that will use the player ID as the key, and the collection object as the value. This will be used to store the required data used to identify player logins and accounts.

8 Relevant Facts and Assumptions

8a Facts

The application will be made for Android phones.

The application will be coded in Flutter.

The application will be up and running and maintained for about 2-4 years, depending on GPCA's willingness.

GPCA and the programmers maintaining the application will be communicating with each other at least once a day after the program has been created

8b Assumptions

Any and every visitor who plans on using the app is assumed to be able to read English at a middle-school grade level.

Every visitor who plans on using the app should have a phone that has the necessary components, such as GPS tracking, a touchscreen, and a camera, in order for the application to use to carry out some of its functions. This will also require permission from said visitor access to these functions so the application can utilize them.

Every visitor who plans on using the app should have a phone that is recent enough to have the necessary software to be able to run the app.

Every visitor who plans on using the app should have enough available storage space to download the app.

Every visitor needs to have the app running while they are at the conservatory, and should be able to hold their phone and utilize their touchscreen efficiently enough to properly use the application.

The Garfield Park Conservatory Alliance will provide to us the layout of the conservatory, so that we may use it for GPS purposes, plan out possible spots for users to engage with the application's minigames.

The Garfield Park Conservatory Alliance will provide to us educational quizzes for every plant that they want logged into the database, as well as information on special exhibits and information on special plants that will be logged into the database for that specific exhibit.

The database will be kept up and running, and it will be visitor's responsibility to remember their login information, such as their username and password.