Clyde's Cougar Excursion Documentation

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Contents

1 Logs

Version	Updates	Date	Notes
Vers. 1.0	Inception documentation	Sept. 13, 2024	Beginning development of vision, use-case, domain model, supplemental specs, glossary.
Vers. 1.1	Elaboration artifacts implementation	Sept. 30, 2024	Implementation of sequence diagrams and operation contracts for Vers. 1.0 artifacts with updates.
Vers. 1.2	Construction of system	Oct. 7, 2024	Implementation of Vers. 1.1 with inclusion of any updates to design.
Vers. 1.3	Implementation of design and reconfiguration of use cases, domain model and activity diagrams	Oct. 18, 2024	Continue of code implementation of team's system design and diagrams, with reconstruction to initial use case, domain model and activity diagrams designs that have been implemented further into the documentation.

2 Introduction

2.1 Vision

We envision a real-time interactive AR scavenger hunt game application, with the opportunity for incoming students to delve into exploring the college's and city of Charleston's buildings and history with the use of rankings, collection of photographic references to such locations and integration with updates via the college's updates and third-party supporting systems.

2.2 Business Case

The College of Charleston has many new students that arrive at the college every Fall and Spring semester. With an increase of incoming students growing every semester, the college has only so many sources to be able to provide students with necessary information at a given time, for instance live tours that highlight only the well-known locations of the college and most necessary. With this in mind, this leaves many other places of the college and historical locations of the city of Charleston to not be known to students and remain void of their knowledge through their years and for understanding of the rich narrative that the college and city maintain.

3 Use Cases

3.1 Registration for User

Scope: AR Application

Level: user-goal

Primary Actor: Freshman College Student

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-conditions:

- Student has been accepted to the college and has a functioning student email in the college's domain.

- Student does not have an account for the application.

Success Guarantee (Post-Conditions):
Student downloads application. Information from student entered at registration is verified. System registers College of Charleston account. Account is registered. Credentials are re-entered into Login screen. System verifies account with credentials. Home screen is presented to user.

Main Success Scenario (Basic Flow):

1. Student downloads *Clyde's Cougar Excursion* application from appropriate app store.

2. Student opens the app and is greeted with *Home* screen.

3. Student selects *"Register"* button indicator to navigate to Registration screen.

4. Student enters their name, College of Charleston email address and create a custom password and confirmation password .

5. Registration is successful they will then press *"Register account"*, and be returned to the Login page.

6. Student enters their College of Charleston email address and the password.

7. Student interacts with *Login* screen to login into application.

8. System identifies account and verifies credentials.

9. Student is presented with homepage.

Extensions (Alternate Flows):
*a. At any time, Student has forgotten their credentials to existing account:

1. Student selects *"Forgot password." Student completes steps 4-5*

   1a. System detects account isn't registered:

      1. System signals error of non-existing account to user.

*b At any time, Administrator requires access to application:

Complete steps 1-9, with step 9 redirecting administrator to "Management" screen.

5a. System notes of already existing account credentials:

1. System presents error message to user.

2. Student enters new credentials.

3. Student continues through rest of registration process.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Require to run on iOS and Android devices.

Frequency of Occurrence:

- Registration process occurs once.

- Login process occurs upon application opening.

Open Issues:

- Currently in-process of construction phase.

- Need of functionality to recognize student accounts from administrative alongside only allowing College of Charleston set email domains.

3.2 Login for User

Scope: AR Application

Level: user-goal

Primary Actor: Freshman College Student

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings, through their College of Charleston account.

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-Conditions:

- Student has been accepted to the college and has a functioning student email in the college's domain.

- Student has already completed the registration process and has an account already for the system.

Success Guarantee (Post-Conditions):
Student enters credentials. System verifies account with entered credentials. Home screen is presented to user. **Main Success Scenario (Basic Flow)**:

1. Student opens the app and is greet with *Home* screen.

2. Student enters their account credentials on *Login* screen.

3. System identifies account and verifies credentials

4. Student is presented with homepage.

Extensions (Alternate Flows):
*a. At any time, Student has forgotten their credentials to existing account:

1. Student selects *"Forgot password." Student completes steps 2-4*

   1a. System detects account isn't registered:

      1. System signals error of non-existing account to user.

*b At any time, Administrator requires access to application:

Complete steps 1-4, with step 4 redirecting administrator to "Management" screen.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Require to run on iOS and Android devices.

Frequency of Occurrence:

- Login process occurs upon application opening.

Open Issues:

- Currently in-process of construction phase.

- Need of functionality to recognize student accounts from administrative alongside only allowing College of Charleston set email domains.

3.3   Addition of Location Card

Scope: AR Application, Admin Card Management

Level: user-goal

Primary Actor: College of Charleston Administrator

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings through card displays

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts. Wants to maintain application upholding and addition of game-play for student players.

Pre-conditions:

- Location must exist.

- Information regarding location has been collected to fill in form.

- User works for the College of Charleston and has an email address with a College of Charleston's staff member's domain.

- Administrator has logged into account.

- Location card for location does not already exist.

Success Guarantee (Post-Conditions):
Card is created. Card is saved into card list. List accumulator adds number of total cards. Card list and scrapbook is updated. Successful card creation message presented. Card exists in Student and Administrator view; Student view hidden by default upon initial creation with hints only presented.

Main Success Scenario (Basic Flow):

1. Administrator interacts with Card Management page to create new Location Card.

2. Administrator enters information regarding location into *Creation Location Card Form*.

3. Administrator indicates completion of card.

4. System reviews entered address and name for duplication.

5. System indicates location is a new insertion.

6. System creates new Location Card with information entered.

7. Location Card is added to Card Manager list.

8. Location Card is added to non-visited locations for Student account(s).

9. Location Card is updated into Administrator Card Manager.

10. Location Card address and information is connected to address from form onto Digital Map.

11. System saves Location Card.

12. Administrator is presented with newly updated location addition.

13. Student Scrapbook is updated with new Card as hidden.

Extensions (Alternate Flows):
*a. At any time, Administrator doesn't know if Location Card already exists:

1. Administrator interacts with search bar on Card Management page.

2. System presents results if found location regarding entered name.

   2a. System doesn't register entered input:
      1. System displays "No Found Location" message to Administrator.
      Administrator repeats till desired results.

12a. Administrator reviews all Location Cards created:

1. Administrator interacts with Card Management screen to review all and newly added Location Cards.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Require to run on iOS and Android devices.

- Updates to Location Card counter to maintain number of total cards.

- Update to Location Card dictionary list to maintain all items.

Frequency of Occurrence:

- Once for every interaction with Location Card Creation through Card Management handling.

Open Issues:

- In-progress status of administrative handling of card creations.

- Preserving created cards into system.

3.4 Modification of Location Card

Scope: AR Application, Admin Card Management

Level: subfunction

Primary Actor: College of Charleston Administrator

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-conditions:

- Location exists

- User works for College of Charleston and has an email address with college staff member's domain

- Administrator has logged into their account and navigated to the card to be modified

- Location Card for location already exists in system

Success Guarantee (Post-Conditions):
Administrator locates card through admin Card Management list. Administrator interacts with card to be edited. System receives request. System re-populates past entered information. Administrator updates field(s). System saves changes.

Main Success Scenario (Basic Flow):

1. Administrator navigates to card to be modified.

2. Administrator edits the desired elements and fields for location.

3. System updates Student Scrapbook and Administrator view of the Location Card.

Extensions (Alternate Flows):
*a. If at any time, Administrator wants to cancel modification to selected Location Card:

1. Administrator locates *"Cancel Edits"* indicator.

2. System presents confirmation from Administrator.

   2a. Administrator wants to continue edits:

      1 Administrator cancels cancellation
      Continue with Steps 2-3

3. System preserves previous data for Location Card.

2a. Location Card needs to be deleted:

1. Administrator locates Location Card

2. Administrator selects *"Delete Card"*

3. System asks for confirmation prior to deletion

      3a. Administrator wants to cancel deletion:
            i. Administrator cancels deletion of card with proper interaction
           ii. System preserves original state of Location Card.

4. Administrator confirms Card Deletion

5. System removes location's Location Card from Card List

6. System updates Card List count with updates.

7. System updates Student Scrapbook and Administrator Card Manager views to uphold changes.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Will need to run on both iOS and Android Devices.

- Data list for Card List will need to maintain status and updates of locations and variations of information if card has already been found by a student to maintain count for card if found already.

Frequency of Occurrence:

- Once, for every Location Card that needs to be edited/deleted

Open Issues:

- In-progress: implementation during construction of application

3.5 Search for Location

Scope: AR Application

Level: user-goal

Primary Actor: Freshman College Student

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-conditions:

- User is already registered with the application as a Student.

- User has navigated to the *Main Page/Digital Map* of the application.

- Location hasn't been discovered yet.

- User is within proximity of the location.

Success Guarantee (Post-Conditions):
User interacts with Location card via Scrapbook. Hidden Location Card presents hints. User has successfully moved to Location and unlocked a new event. Digital Map presents indicator of User proximity to Location.

Main Success Scenario (Basic Flow):

1. User navigates to Scrapbook.

2. User reviews hints for a Location Card.

3. User gets in proximity of location.

4. System updates Digital Map of User's proximity.

5. User looks at the Digital Map and sees a Sonar Animation.

6. Sonar Animation increases as User gets closer to location.

7. User reviews location marker on Digital Map.

8. System updates to make location interactive with *Capture of Image from Student* case.

Extensions (Alternate Flows):
1-2a. User finds location without hints:
  Proceed through steps 3-8

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Will need to run on both iOS and Android devices.

- Updates of locations that have been found and those that have not been.

- Connection with Location Cards to be updated upon status change.

Frequency of Occurrence:

- Multiple, in regards to the number of created Card Locations, will occur upon arriving at each undiscovered location.

Open Issues:

- Connecting locations with Card Locations.

3.6   Capture of Image from Student

Scope: AR Application

Level: user-goal

Primary Actor: Freshman College Student

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-conditions:

- Student has been accepted to the college and has a functioning student email in the college's domain.

- Student has created an account and is currently playing the game.

- Student is within the acceptable range of a location

Success Guarantee (Post-Conditions):
Student has successfully completed a location event and now has access to both a photo of Clyde the cougar and the corresponding location information.

Main Success Scenario (Basic Flow):

1. Student safely enters the acceptable range of a location event using the digital map.

2. Student receives a pop up notification that they have arrived and may take a photo.

3. Student enters the AR camera view and is greeted with a Clyde the Cougar model posing in front of the building.

4. Student presses the "Take Photo" button and may now view said photo in their scrapbook.

5. Student exits the AR mode.

6. System verifies Student image for Location Card.

7. System presents matching Location Card to Student.

8. Student reviews the photo and a detailed description of the building, its history, and what they can do there.

9. Student exits the card and sees that they now have access to the next location through their Scrapbook.

Extensions (Alternate Flows):
*a.   At any time, Student is located far from college's main campus versus other certain campus location (i.e., Harbor Walk):

1. Administrator applies hint regarding Student's access to free Carta bus.

3-4a. Student desires re-take of image while still in confirmation stage.

1. System re-opens camera for photo.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Require to run on iOS and Android devices.

Frequency of Occurrence:

- Once for every Location Event in game is approached by player

Open Issues:

- Incorporation of camera access to take image.

- Adding Clyde AR object to sizing of image and location.

3.7 Navigating through Scrapbook for Location Card

Scope: AR Application, Scrapbook

Level: user-goal

Primary Actor: College of Charleston Administrator

Stakeholders and Interests:

- Student: Wants to explore their new college and learn about all the important buildings

- College: Wants to ensure incoming students are well educated on college matters and history.

- College Administrative: Wants to manage accounts from students from administrative and versa to provide necessary access for only College of Charleston accounts.

Pre-conditions:

- Student has been accepted to the college and has a functioning student email in the college's domain.

- Student has successfully logged into account.

- Student has navigated to Scrapbook.

Success Guarantee (Post-Conditions):
Student navigates to Scrapbook via icon. System presents card list with hidden and found Card Locations. Student searches for specifically found location. Student clicks on card. System registers if card has been found or not. System notes card has been found. Student is presented with Card Location and its details.

Main Success Scenario (Basic Flow):

1. Student opens Scrapbook screen.

2. Student scrolls through card list to view location overviews.

3. System preserves found and not-found location cards in respectful formats.

4. Student clicks on found card.

5. Location Card is extended with all information regarding found location.

Extensions (Alternate Flows):
*a. At any time, Student knows the name of specific location:

1. Student uses search bar on Scrapbook screen.

2. System populates name of searched location.

    2a. System detects Card Location not found.

        1. System presents no Card Location.

4a. Student clicks on not-found card.

1. System detects Card Location not-found.

2. System presents hints correlated to location.

Special Requirements:

- A touch screen UI

- Account authorization (most likely with a unity or app-store database TBD).

- A smartphone with a touchscreen

- A smartphone device with camera accessibility

- A new-generation to current-generation smartphone that can handle AR items

- Plug-gable domain values for college emails (for example the college has switched from Gmail to Outlook in recent years, the app should be able to accept both types in the future without issue)

- A WiFi connection such as CofC-guest, Eduroam, or some form of data

Technology and Data Variations List:

- Will need to run on both iOS and Android devices.

Frequency of Occurrence:

- Every occurrence with Scrapbook screen.

- Once with every location of a new location.

Open Issues:

- In-progress of connection with Card Management System with re-population of cards into list.
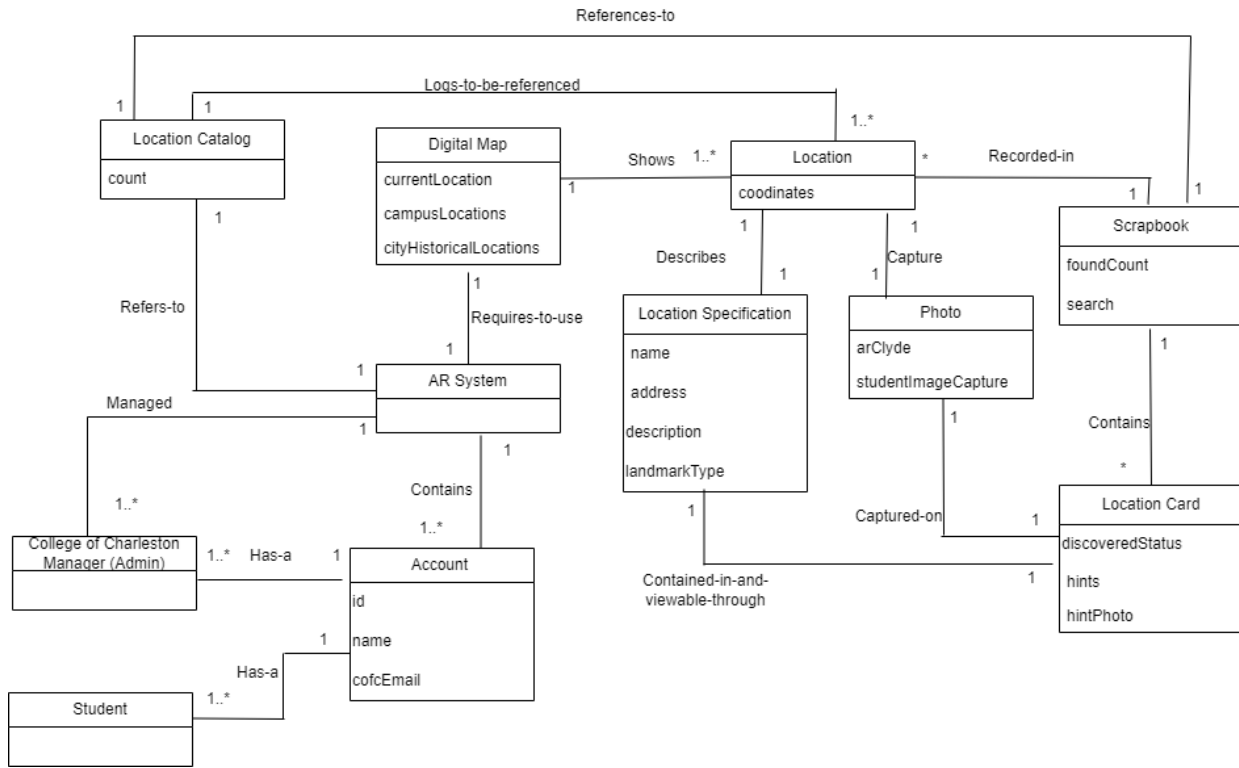
4 Domain Model

Figure 1: Domain model of Clyde's Cougar Excursion with displays of attributes for classes and objects.

5 Activity Diagrams

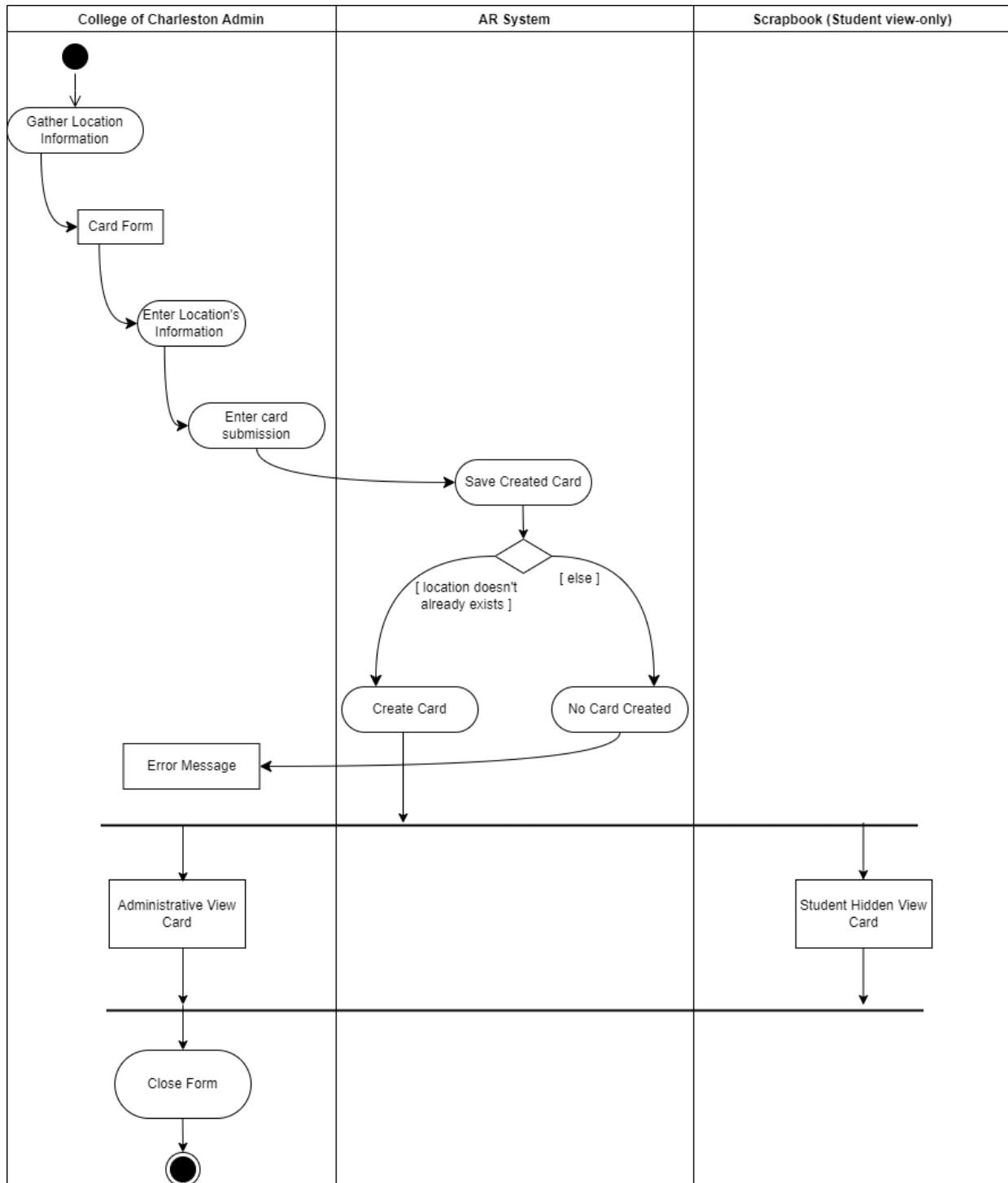## 5.1 Add/Creation of Location Card

Figure 2: Activity diagram in relation to use-case *Addition of Location Cards*
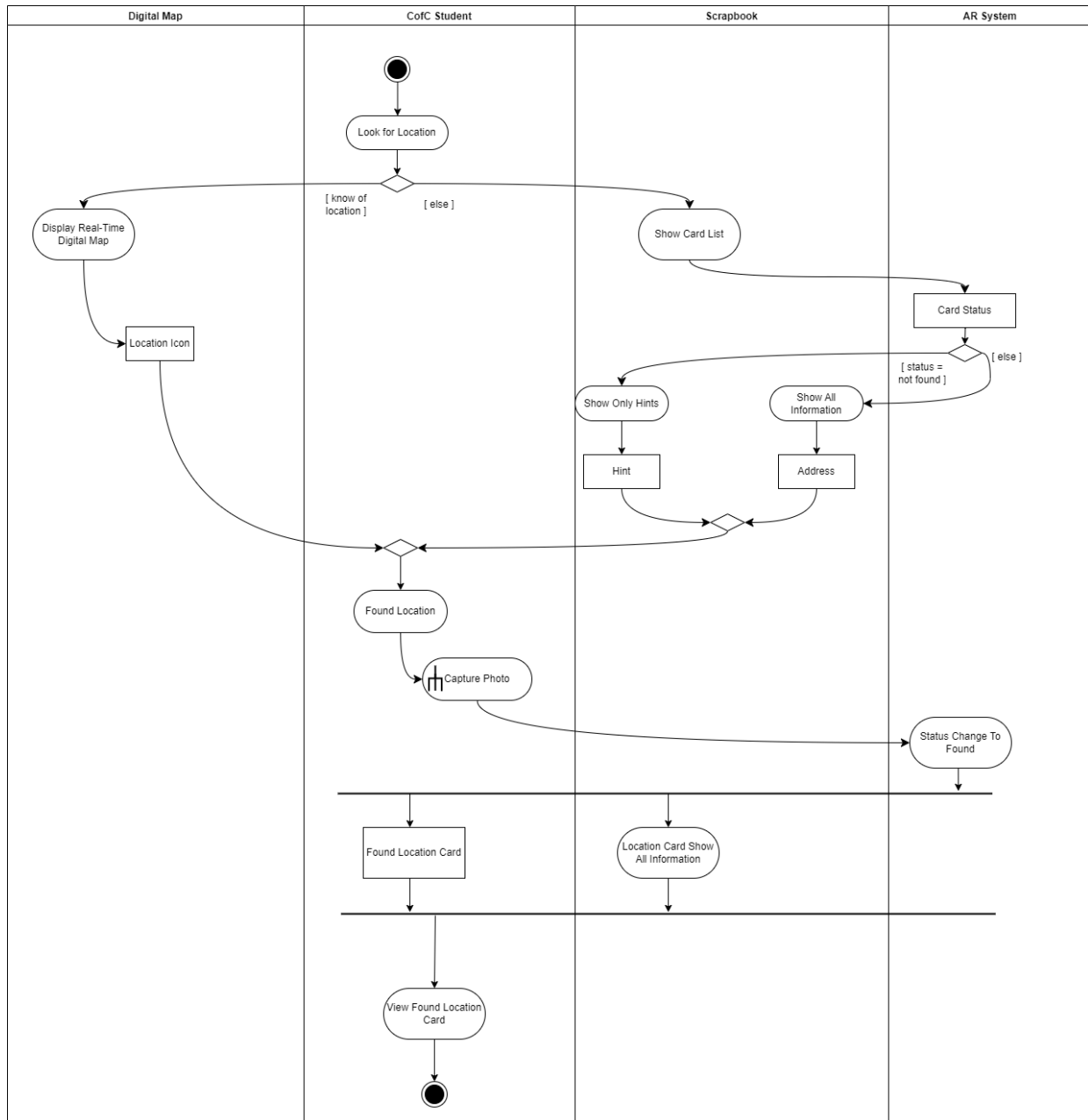
5.2 Student Finding Location

Figure 3: Activity diagram in relation to use-case *Search for Location*.

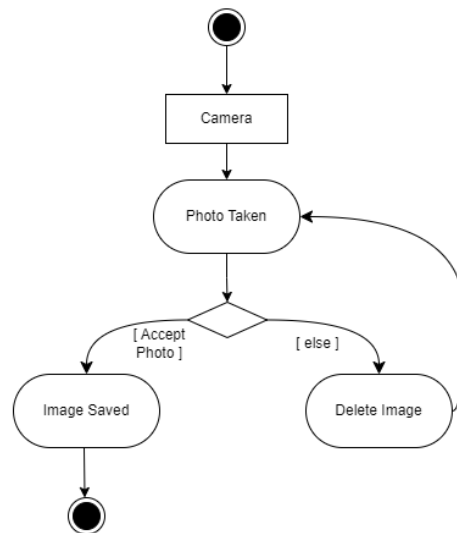## 5.3   Image Capture

Figure 4: Activity diagram in relation to use-case *Capture of Image from Student*.

6 Glossary

Term	Definition	Format	Aliases
AR	Acronym for Augmented Reality.	A function of the game where animated or digital objects are displayed on top of a camera's output.	Augmented Reality
Card or Location Card	Information cards that contain information regarding a location's details. These items are interactive to present information and any additional content for a particular location.	Squared interactive items through the scrapbook and administrative management.	
Clyde	The College of Charleston's Mascot, a Bipedal Cougar that wears the school's basketball uniform.	In the scope of this project, Clyde will be a 3D model.	Cougar Clyde
College of Charleston	The organization and stakeholders for the project.	Stakeholders	College of Charleston; CofC
Game	Reference to application and project as a whole	A mobile application with AR allowance.	App; Clyde's Cougar Excursion
Location or Location Event	Buildings, historical alongside buildings related to the college campus. These are hidden until discovered by the student, these are the main activity progression throughout the application.	In the scope of this project, these locations are divided between college and general college buildings.	
MapBox API	A free to use API that will update map data and generate images based on a user's location.	API that will be integrated into the core unity project.	MapBox
Scrapbook	A comprehensive list in the game that will show a user's previously visited locations, the photos that have been taken, and each corresponding location's information.	In the scope of this project, the scrapbook will be a special UI menu in the game.	
Unity	A free to use IDE that will be used to program the project. It will use the language C-sharp and has built in support for both AR and mobile development.	IDE	