HallyuGo: A Guide to Discover and Visit K-Culture Hotspots

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December 12, 2024

Abstract

South Korean pop culture has had a surge in popularity all around the world, becoming one of the main reasons foreign nationals visit the country. This phenomenon has been dubbed Hallyu, and people from all over the world have become interested in some aspect of Korean pop culture like K-pop, Korean dramas, movies, and novels. A popular activity amount Hallyu fans is visiting filming locations or other spots related to their favorite Korean movie or drama, K-pop group, etc. However, despite this, there is no platform where people who would like to visit these locations can find comprehensive information about them. This could be a significant frustration for visitors, and it also represents a market that is under explored. As such, in order to improve the experience of travelers and promote tourism in Korea, HallyuGo was created. A map-based app that allows users to find relevant and accurate information about these location. This paper will explain how HallyuGo was designed and implemented, and its features.

Keywords: Hallyu, Map, ProofShot, Stamp, Mobile-App

1 Introduction

1.1 General Statement

The Korean Wave, also known as Hallyu is a term that refers to the growing popularity of South Korean pop culture in world. In recent years, interest in Korean pop culture has been one of the main reasons people visit South Korea, and all around the world more Korean culture festivals are held every year, and Korean celebrities have become some of the most recognized faces in the world.

The Hallyu has been an important part of Korea's economy, and has increased South Korea's influence around the world. As such, it is important to seize this opportunity not only to keep this phenomenon growing, but also to reap its benefits. The idea for this project was to build an app that would improve the experience of those who travel to Korea to visit locations related to the Hallyu, but also offern information about these locations to Hallyu fans living in Korea, with the objective of growing the Hallyu fandom.

1.2 Motivation

As previously stated, the Hallyu has created many opportunities for South Korea, but it in some ways it has also remained an unexplored market. One example of this is that, in spite of the fact that visiting Hallyu related spots is a popular activity among fans, it is difficult to find accurate and detailed information about points of interest related to

South Korean pop culture. Moreover, sometimes when information is available it might be scattered around different websites around the Internet. Because of this, it can be difficult for those who seek to visit these places to make the most out of their trip or enjoy Hallyu culture. As such, this project sought to improve the experience of all who are interested in these locations by creating a platform where information is not only accessible, but also extensively compiled, by including information to locations pertaining to K-pop, Korean dramas, Korean movies and Korean novels instead of only one of these categories.

1.3 Proposal and Goal

Identifying the aforementioned issue led to the idea for this project. To improve the experience of those who seek Hallyu locations by providing the information they need. The idea of our project was to create a map-centered application where these locations are marked, and where users can find detailed related information about each one.

Our goal was to create one accessible platform where any Hallyu fan can find information about certain locations no matter what form of Korean pop media they enjoy.

1.4 Design and Implementation Overview

This project was developed through a 13 week period, that started with ideation and refinement of the goal and what features to include, as well as choosing a tech stack. Then, the UI was designed with Figma and the database was designed **with what?**, followed by a period of implementation of the frontend, with React, Next.js, Yarn, ShadcnUI, TailwindCSS, Zustand, Next-Auth and EC2 with NGINX, and the backend, utilizing **AWS?/Spring?/WHAT ELSE?**. Lastly, the development ended with the application testing and deployment phase. The collection of information and images related to these locations happened in tandem with all the other phases.

2 Design

2.1 Overall Architecture

2.1.1 Front-end

The front-end part was developed using Next.js and React. State management uses Zustand. To enhance the user experience, PWA technology is used to make applications behave like native apps. Tailwind CSS was used for CSS styling. Yarn is used as package management. NGINX was deployed on AWS EC2 instance and acts as a reverse proxy.

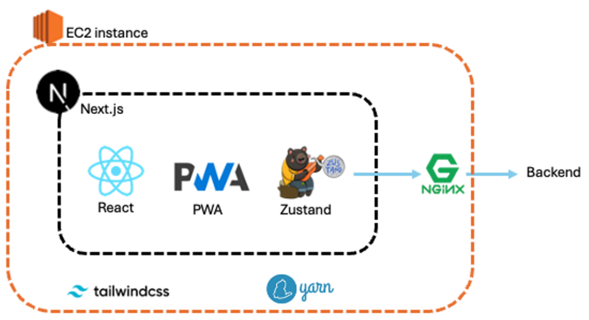


Figure 1: Front-end architecture

2.1.2 Back-end

The backend architecture of ”HallyuGo” is designed with a focus on scalability, efficiency, and reliability. The system begins with Route 53, which manages DNS routing for the domain hallyugo.com. The core of the backend is hosted on AWS EC2, where the Spring Boot application runs to handle the business logic and API requests.

To ensure secure user authentication and authorization, Spring Security is integrated with the application, while Redis is utilized for efficient session management and JWT token storage to optimize login processes. The application communicates with a database hosted on AWS RDS MySQL, which provides a managed relational database service for handling structured data.

For handling the large volume of image files associated with the service, AWS S3 is used to provide scalable and reliable object storage. The development process is streamlined using GitHub Actions for CI/CD pipelines, and Docker containers are employed for consistent application deployment. Together, these components create a robust and efficient backend infrastructure for the ”HallyuGo” service.

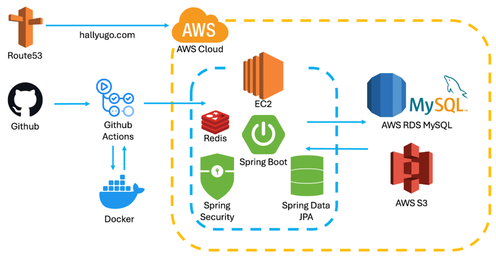


Figure 2: Back-end architecture

2.1.3 Database

2.2 Challenges and Solutions

2.2.1 Front-end

1. Naver Map API

   The initial plan was to use Kakao Map api. However, Kakao Map did not support English. Because our service targets foreigners, changing api was needed, so Naver Map api was chosen. Naver Map api is provided by Naver Cloud. The library called React-naver-maps has increased the convenience of development.

2. Prop Drilling

   As the number of components increased and they were stratified, a prop drilling issue occurred. For example, there was a case where the states used by the location card component of the Map page had to be passed to the components of the Detail Page. To handle this, ’Status Management’ tool has used. Zustand, a global state management tool, was used to manage the status in context format.

2.2.2 Back-end

1. Flyway DB

   As the Hallyugo service was further developed, new features were frequently added or existing ones modified, necessitating frequent updates to the database. To efficiently manage these database changes, we introduced Flyway DB for database version control.

   Using Flyway DB, we were able to track and manage changes across different versions of the database. This process helped us gain a deeper understanding of what

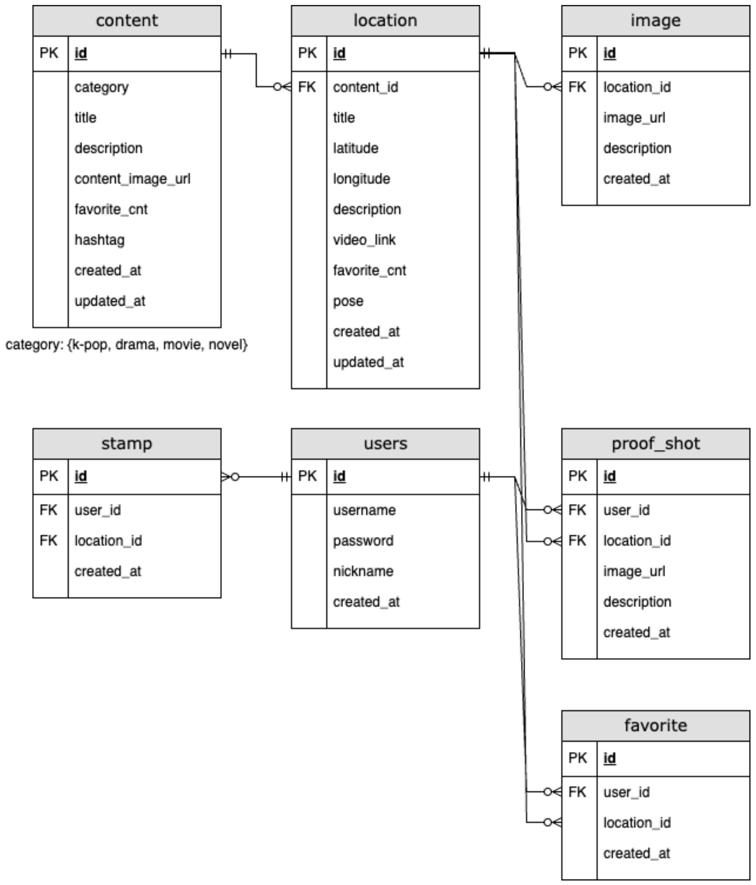


Figure 3: Database Design

modifications were made and what considerations are necessary to design a reliable database. Through this experience, we learned valuable lessons about maintaining database integrity and adaptability during development.

2.3 Design Choice

2.3.1 Front-end

1. PWA

   PWA is a progressive web-app. It combines the advantages of the web app and native app. It is also being adopted by global companies such as Starbucks and Twitter. PWA does not require installation in the app store. It can perform cross-platform functions. PWA works like a native app. Above all, it has a low running curve as it can be developed with Next.js, and SEO(Search Engine Optimization) friendly.

2. Zustand

   Zustand is a state management tool. It has a smaller bundle size compared to others. Zustand prevents unnecessary component re-branding. Because it is context-based, it does not require a provider and can be partially applied to the sections.

3. Yarn

   Yarn is a package manager. Yarn is fast and light compared to npm. Our project is not complicated and fast is important, so we adopted Yarn.

2.3.2 Back-end

1. Spring Security

   Spring Security provides a robust framework for authentication and authorization, making it an essential tool for securing applications. When integrated with login systems, it facilitates role-based access control, ensuring users can only access resources they are authorized for. Additionally, it seamlessly supports JWT (JSON Web Token) for stateless authentication, simplifying token validation and enhancing security by mitigating risks like session hijacking.

2. Redis

   Redis is a high-performance in-memory database that excels in caching and session management. In login systems, Redis can be utilized to store session data or JWT tokens temporarily, reducing database load and improving response times. For JWT management, Redis is particularly useful for implementing token blacklisting or expiration checks, allowing for secure and efficient handling of user authentication tokens. This approach enhances both security and performance, especially in high-traffic applications.

3. AWS S3

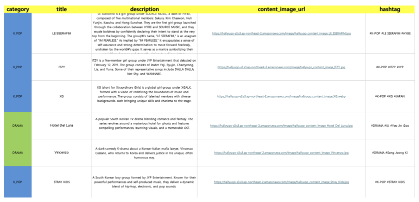
   AWS S3 offers a highly scalable and reliable solution for storing and managing data. It is particularly beneficial for handling static assets such as profile images, documents, or application resources.

   In our service, Hallyugo, we handle a large volume of image files, making AWS S3 the ideal choice. Its scalability ensures smooth handling of growing storage needs, while its reliability guarantees data durability and availability.

3 Implementation

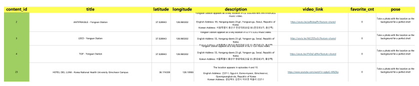
3.1 Dataset

Finally, we collected a total of 34 pieces of content, 38 locations, and 101 images.



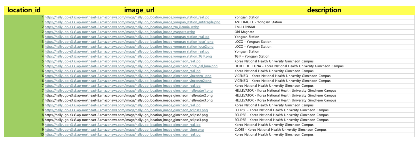
category	title	description	content_image_url	hashtag
K_POP	LE SSERAFIM	LE SSERAFIM is a girl group under SOURCE MUSIC, a label of HYBE, composed of five multinational members: Sakura, Kim Chaewon, Huh Yunjin, Kazuha, and Hong Eunchae. They are the first girl group launched through the collaboration between HYBE and SOURCE MUSIC, and they exude boldness by confidently declaring their intent to stand at the very top from the beginning. The group₩'s name, "LE SSERAFIM," is an anagram of "IM FEARLESS." As implied by "IM FEARLESS," it encapsulates a sense of self-assurance and strong determination to move forward fearlessly, unshaken by the world₩'s gaze. It serves as a mantra symbolizing their	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_LE_SSERAFIM.jpg	#K-POP #LE SSERAFIM #HYBE
K_POP	ITZY	ITZY is a five-member girl group under JYP Entertainment that debuted on February 12, 2019. The group consists of leader Yeji, Ryujin, Chaeryeong, Lia, and Yuna. Some of their representative songs include DALLA DALLA, Not Shy, and WANNABE.	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_ITZY.jpg	#K-POP #ITZY #JYP
K_POP	XG	XG (short for Xtraordinary Girls) is a global girl group under XGALX, formed with a vision of redefining the boundaries of music and performance. The group consists of talented members with diverse backgrounds, each bringing unique skills and charisma to the stage.	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_XG.webp	#K-POP #XG #JAPAN
DRAMA	Hotel Del Luna	A popular South Korean TV drama blending romance and fantasy. The series revolves around a mysterious hotel for ghosts and features compelling performances, stunning visuals, and a memorable OST.	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_Hotel_Del_Luna.jpg	#DRAMA #IU #Yeo Jin Goo
DRAMA	Vincenzo	A dark-comedy K-drama about a Korean-Italian mafia lawyer, Vincenzo Cassano, who returns to Korea and delivers justice in his unique, often humorous way.	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_Vincenzo.jpg	#DRAMA #Song Joong Ki
K_POP	STRAY KIDS	A South Korean boy group formed by JYP Entertainment. Known for their powerful performances and self-produced music, they deliver a dynamic blend of hip-hop, electronic, and pop sounds.	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_content_image_Stray_Kids.jpg	#K-POP #STRAY KIDS

Figure 4: Content data and more



content_id	title	latitude	longitude	description	video_link	favorite_cnt	pose
2	ANTIFRAGILE - Yongsan Station	37.528943	126.965302	Yongsan Station appears as a key location in LE SSERAFIM's ANTIFRAGILE music video. English Address: 55, Hangang-daero 23-gil, Yongsan-gu, Seoul, Republic of Korea Korean Address: 서울특별시 용산구 한강대로23길 55 (한강로3가, 용산역)	https://youtu.be/[illegible]?feature=shared	0	Take a photo with the location as the background for a perfect shot!
3	LOCO - Yongsan Station	37.528943	126.965302	Yongsan Station appears as a key location in ITZY's LOCO music video. English Address: 55, Hangang-daero 23-gil, Yongsan-gu, Seoul, Republic of Korea Korean Address: [illegible]	https://youtu.be/[illegible]?feature=shared	0	Take a photo with the location as the background for a perfect shot!
4	TGIF - Yongsan Station	37.528943	126.965302	Yongsan Station appears as a key location in XG's TGIF music video. English Address: 55, Hangang-daero 23-gil, Yongsan-gu, Seoul, Republic of Korea Korean Address: 서울특별시 용산구 한강대로23길 55 (한강로3가, 용산역)	https://youtu.be/[illegible]?feature=shared	0	Take a photo with the location as the background for a perfect shot!
23	HOTEL DEL LUNA - Korea National Health University Gimcheon Campus	36.174339	128.10985	The location appears in episodes 4 and 10. English Address: 산27-1, Ojgul-ri, Eomo-myeon, Gimcheon-si, Gyeongsangbuk-do, Republic of Korea Korean Address: 경상북도 김천시 어모면 옥율리 산27-1	https://www.youtube.com/watch?v=[illegible]	0	Take a photo with the location as the background for a perfect shot!

Figure 5: Location data and more



location_id	image_url	description
1	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_real.jpg	Yongsan Station
1	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_antifragile.png	ANTIFRAGILE - Yongsan Station
2	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_zm_illennial.webp	ZM-ILLENNIAL
2	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_magnate.webp	Old Magnate
3	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_real.jpg	Yongsan Station
3	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_loco1.png	LOCO - Yongsan Station
3	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_loco2.png	LOCO - Yongsan Station
4	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_real.jpg	Yongsan Station
4	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_yongsan_station_TGIF.png	TGIF - Yongsan Station
5	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus
5	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_hotel_del_luna.png	HOTEL DEL LUNA - Korea National Health University Gimcheon Campus
6	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus
6	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_vincenzo1.png	VICENZO - Korea National Health University Gimcheon Campus
6	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_vincenzo2.png	VICENZO - Korea National Health University Gimcheon Campus
7	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus
7	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_hellevator1.png	HELLEVATOR - Korea National Health University Gimcheon Campus
7	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_hellevator2.png	HELLEVATOR - Korea National Health University Gimcheon Campus
7	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_hellevator3.png	HELLEVATOR - Korea National Health University Gimcheon Campus
8	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus
8	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_eclipse1.png	ECLIPSE - Korea National Health University Gimcheon Campus
8	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_eclipse2.png	ECLIPSE - Korea National Health University Gimcheon Campus
8	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_eclipse3.png	ECLIPSE - Korea National Health University Gimcheon Campus
9	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus
9	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimchoen_close.png	CLOSE - Korea National Health University Gimcheon Campus
10	https://hallyugo-s3.s3.ap-northeast-2.amazonaws.com/image/hallyugo_location_image_gimcheon_real.jpg	Korea National Health University Gimcheon Campus

Figure 6: Image data and more

3.2 UI/UX

3.2.1 Logo and Icons

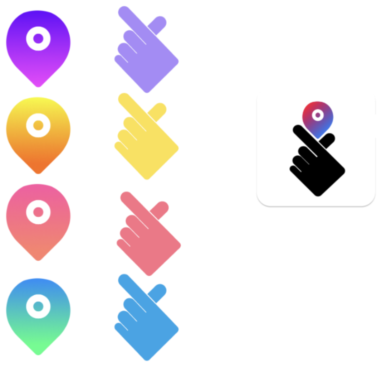


Figure 7: Logo and Icons

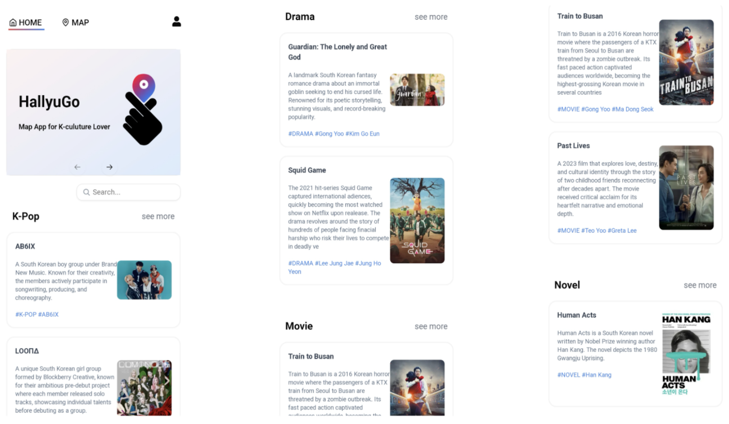
Hallyugo's icons combine location and k-heart icons. K-pop uses purple, Drama uses yellow, Movie uses blue, and Novel uses pink. These icons and colors are used as markers on Map Page and My Page uses them to show classifications by category.

3.2.2 Sign In / Sign Up Page

It supports the custom Sign in and Sign up. Users can go with their username and password.

3.2.3 Main Page

Main page consists of carousel, search bar, and content boxes by category. Carousel is used for advertisements or content recommendations. Use the search bar to search for the desired contents. The categories can be divided into four categories: K-POP, drama, movie, and novel. Main page has two pieces of content randomly available, and user can view all the lists by pressing the 'See More' button.



K-Pop see more

AB6IX

A South Korean boy group under Brand New Music. Known for their creativity, the members actively participate in songwriting, producing, and choreography.

#K-POP #AB6IX

LOOΠΔ

A unique South Korean girl group formed by Blockberry Creative, known for their ambitious pre-debut project where each member released solo tracks, showcasing individual talents before debuting as a group.

Drama see more

Guardian: The Lonely and Great God

A landmark South Korean fantasy romance drama about an immortal goblin seeking to end his cursed life. Renowned for its poetic storytelling, stunning visuals, and record-breaking popularity.

#DRAMA #Gong Yoo #Kim Go Eun

Squid Game

The 2021 hit-series Squid Game captured international adiences, quickly becoming the most watched show on Netflix upon realease. The drama revolves around the story of hundreds of people facing finacial harship who risk their lives to compete in deadly ve

#DRAMA #Lee Jung Jae #Jung Ho Yeon

Movie see more

Train to Busan

Train to Busan is a 2016 Korean horror movie where the passengers of a KTX train from Seoul to Busan are threatned by a zombie outbreak. Its fast paced action captivated

Train to Busan

Train to Busan is a 2016 Korean horror movie where the passengers of a KTX train from Seoul to Busan are threatned by a zombie outbreak. Its fast paced action captivated audiences worldwide, becoming the highest-grossing Korean movie in several countries

#MOVIE #Gong Yoo #Ma Dong Seok

Past Lives

A 2023 film that explores love, destiny, and cultural identity through the story of two childhood friends reconnecting after decades apart. The movie received critical acclaim for its heartfelt narrative and emotional depth.

#MOVIE #Teo Yoo #Greta Lee

Novel see more

Human Acts

Human Acts is a South Korean novel written by Nobel Prize winning author Han Kang. The novel depicts the 1980 Gwangju Uprising.

#NOVEL #Han Kang

Figure 8: Main Page UI

3.2.4 Map Page

Map Page can be accessed in two ways: Access via header, Access by pressing Content Card. For header access, a drop-down menu appears in the upper left corner, allowing users to view locations by category. If the user scrolls up the drawer below, the user can see all the lists. Press the heart icon next to each location card and it will be saved as 'favorite location'. Press the marker on the map to zoom in to that location.

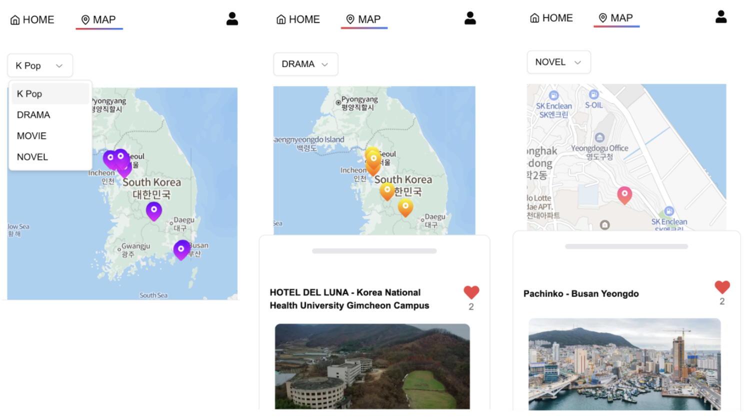
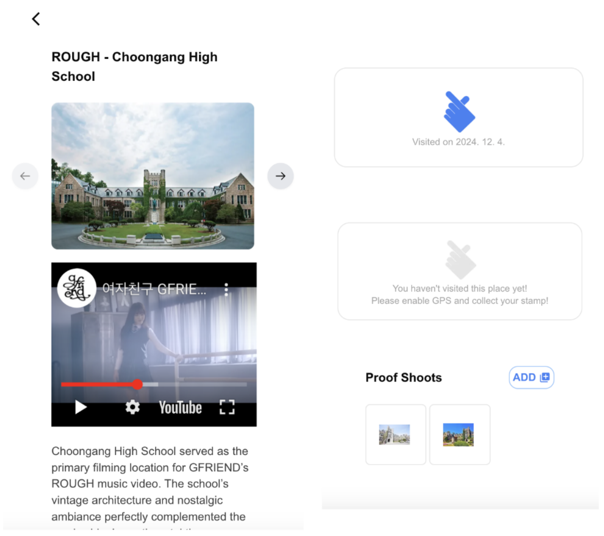


Figure 9: Map Page UI

3.2.5 Detail Page

On the Detail Page, user can check photos, descriptions, and videos of the location. There are 'stamp' and 'prof shot' functions, which are the core functions of the Detail Page. The 'stamp' function is activated when approaching within a 1km radius of the location. The date is saved when user take the 'stamp'. The 'prof shot' function can be shared with other users. User can also check the 'stamp and prof shot' on my page.


ROUGH - Choongang High School

Choongang High School served as the primary filming location for GFRIEND's ROUGH music video. The school's vintage architecture and nostalgic ambiance perfectly complemented the

여자친구 GFRIE...
YouTube
Visited on 2024. 12. 4.
You haven't visited this place yet!
Please enable GPS and collect your stamp!
Proof Shoots
ADD

Figure 10: Detail Page UI

3.2.6 My Page

There are four key functions of my page: my list, my proof shots, my stamps, and my stats. In my page, the user can check all the activities saved in the previous map page and detail page. Only signed-in users can access this page and if a user who is not signed-in accesses, modal will be appear to ask to sign in.

3.3 Frontend

3.3.1 UI Implementation

The initial UI design was created using Figma. For development, Next.js 14 was used, which supports the App Router, simplifying the routing. And we Adopted Shadcn UI component library was providing modern and headless UI components.

3.3.2 API Connection

For API integration, the `ky` library was used for its simplicity and support for custom hook functions. To manage authentication, `next-auth` was implemented, allowing automated handling of access and refresh tokens. Naver Map API was used to visualize the maps on the Map page. Marker options were configured to provide interactivity, such as panning to the selected marker location. Additionally, marker images were customized based on categories.

3.3.3 Deployment

The application was deployed using an AWS EC2 instance configured with an `t2.micro` instance type. NGINX was set up to serve the front-end and act as a reverse proxy, enabling communication with the back-end server.

3.4 Backend

3.4.1 APIs for Authentication

- `POST /api/v1/auth/signin`
  - **Description**: Sign in for new user.
  - **Status Codes**:
    - 200 Success
    - 400 Bad Request: Duplicate user registration.
- `POST /api/v1/auth/login`
  - **Description**: Log in → Issue access token, refresh token.
  - **Status Codes**:
    - 200 Success
  - **Implementation Details**:
    - Save refresh token in redis database.
- `POST /api/v1/auth/logout`
  - **Description**: Log out → Delete refresh token.
  - **Status Codes**:
    - 200 Success
    - 401 Unauthorized: Invalid refresh token.
  - **Implementation Details**:
    - Delete refresh token in redis database.

- `POST /api/v1/auth/reissue`
  - **Description**: Reissue the token.
  - **Status Codes**:
    - 200 Success
    - 400 Bad Request: Logged out user OR Mismatched refresh token.
    - 401 Unauthorized: Invalid refresh token.
  - **Implementation Details**:
    - Reissue the token. If the refresh token expired, then redirect to login page.

3.4.2 APIs for Main Page

- `GET /api/v1/content/initial`
  - **Description**: Get two random contents for all categories.
  - **Status Codes**:
    - 200 Success
  - **Implementation Details**:
    - Two random contents are fetched by pagination.
- `GET /api/v1/content?category={category}`
  - **Description**: Get all contents for a given category.
  - **Status Codes**:
    - 200 Success
- `GET /api/v1/content?keyword={keyword}`
  - **Description**: Get the contents containing a given keyword in the title.
  - **Status Codes**:
    - 200 Success
  - **Implementation Details**:
    - Search results are not case sensitive.

3.4.3 APIs for Map Page

- `POST /api/v1/user/favorite/on?location_id={location_id}`
  - **Description**: Increase favorite count by 1 for given location.
  - **Status Codes**:
    - 200 Success
    - 404 Not Found: Invalid location ID.
  - **Implementation Details**:
    - Transaction handling is ensured while processing this request.
- `DELETE /api/v1/user/favorite/off?location_id={location_id}`
  - **Description**: Decrease favorite count by 1 for given location.
  - **Status Codes**:
    - 200 Success
    - 404 Not Found: Invalid location ID.
  - **Implementation Details**:
    - Transaction handling is ensured while processing this request.

- `GET /api/v1/user/favorite?location_id={location_id}`
  - **Description**: Check if the user has clicked favorite button for given location.
  - **Status Codes**:
    - 200 Success
- `GET /api/v1/location?content_id={content_id}`
  - **Description**: Get locations and their images for given content.
  - **Status Codes**:
    - 200 Success
    - 404 Not Found: Invalid content ID.
- `GET /api/v1/location?category={category}`
  - **Description**: Get all locations and their images for given category.
  - **Status Codes**:
    - 200 Success

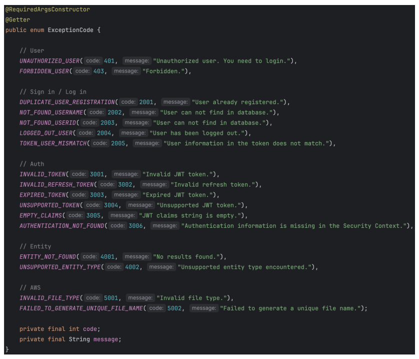
3.4.4 APIs for Detail Page

- `GET /api/v1/user/stamp/location?location_id={location_id}`
  - **Description**: Get stamp for given location.
  - **Status Codes**:
    - 200 Success
- `POST /api/v1/user/stamp/location?location_id={location_id}`
  - **Description**: Register stamp for given location.
  - **Status Codes**:
    - 200 Success
    - 404 Not Found: Invalid location ID.
  - **Implementation Details**:
    - Transaction handling is ensured while processing this request.
- `POST /api/v1/user/proof-shot/upload`
  - **Description**: Upload proof shot for given location.
  - **Status Codes**:
    - 200 Success
    - 400 Bad Request: Invalid file type.
    - 404 Not Found: Invalid location ID.
- `DELETE /api/v1/user/proof-shot/delete/{proofshot_id}`
  - **Description**: Delete proof shot.
  - **Status Codes**:
    - 200 Success
    - 404 Not Found: Invalid proofshot ID.

3.4.5 APIs for My Page

- `GET /api/v1/user/favorite?limit=2`
  - **Description**: Get My List. Basically top 2 contents, If user click 'Show All' then show more.
  - **Status Codes**:
    - 200 Success
- `GET /api/v1/user/proof-shot?limit=9`
  - **Description**:Get proof shot list. Basically top 9 contents, If user click 'Show All' then show more.
  - **Status Codes**:
    - 200 Success
- `GET /api/v1/user/stamp?limit=9`
  - **Description**:Get stamp list. Basically top 9 contents, If user click 'Show All' then show more
  - **Status Codes**:
    - 200 Success

3.4.6 Custom Exception Code



```java
@RequiredArgsConstructor
@Getter
public enum ExceptionCode {

    // User
    UNAUTHORIZED_USER(code: 401, message: "Unauthorized user. You need to login."),
    FORBIDDEN_USER(code: 403, message: "Forbidden."),

    // Sign in / Log in
    DUPLICATE_USER_REGISTRATION(code: 2001, message: "User already registered."),
    NOT_FOUND_USERNAME(code: 2002, message: "User can not find in database."),
    NOT_FOUND_USERID(code: 2003, message: "User can not find in database."),
    LOGGED_OUT_USER(code: 2004, message: "User has been logged out."),
    TOKEN_USER_MISMATCH(code: 2005, message: "User information in the token does not match."),

    // Auth
    INVALID_TOKEN(code: 3001, message: "Invalid JWT token."),
    INVALID_REFRESH_TOKEN(code: 3002, message: "Invalid refresh token."),
    EXPIRED_TOKEN(code: 3003, message: "Expired JWT token."),
    UNSUPPORTED_TOKEN(code: 3004, message: "Unsupported JWT token."),
    EMPTY_CLAIMS(code: 3005, message: "JWT claims string is empty."),
    AUTHENTICATION_NOT_FOUND(code: 3006, message: "Authentication information is missing in the Security Context."),

    // Entity
    ENTITY_NOT_FOUND(code: 4001, message: "No results found."),
    UNSUPPORTED_ENTITY_TYPE(code: 4002, message: "Unsupported entity type encountered."),

    // AWS
    INVALID_FILE_TYPE(code: 5001, message: "Invalid file type."),
    FAILED_TO_GENERATE_UNIQUE_FILE_NAME(code: 5002, message: "Failed to generate a unique file name.");

    private final int code;
    private final String message;
}
```

Figure 11: Custom Exception Code

4 Limitations and Discussions

4.1 Assumptions

- External API Dependency: This application utilizes the Naver Map API to process location information. It assumes that the Naver Map API will be available for displaying location-based data.
- External Services Dependencies: The application assumes that AWS RDS MySQL will be used reliably for storing data, and AWS S3 will properly store images.
- User Requirements: This application assumes that users will have a stable internet connection while using.

4.2 Constraints and Limitations

- Technical Constraints: This application was developed primarily using Next.js for frontend and Spring Boot, Spring Security, and Spring Data JPA for backend.
- Time Constraints: Due to the 15-week time constraint, we focused on prioritizing the implementation of core features. As a result, some features and testing were simplified.
- Mobile-Optimized Design: This application is specifically optimized for mobile devices rather than desktops or larger screens. Non-mobile devices can provide a poorly scaled or ill-optimized user experience.
- HTTP Protocol: This application has a security vulnerability because it uses the HTTP protocol instead of HTTPS.
- Scalability and High Traffic Handling: This application is not yet fully optimized for handling large-scale traffic and high concurrency.

5 Related work

5.1 Anitabi

Anitabi[1] is a Chinese website with a map that provides users with location and other information related mostly to Japanese animated shows and movies. This website was the main reference of this project, as it provides features similar to those planned for HallyuGo.

The biggest difference between HallyuGo and Anitabi is the type of media related to locations and their geographical distribution. Anitabi provides information about locations all over the world but mostly focuses on Japanese animation or other media with a similar style, such as Korean animated movies or Japanese-style visual novels from China. On the other hand, HallyuGo focuses exclusively on locations in South Korea and related to Korean Pop Culture within the K-pop, drama, movie, and novel categories. At the moment, none of the locations that can be found on HallyuGo are featured on Anitabi. Moreover, Anitabi is a platform exclusively available in Mandarin, while HallyuGo uses English, making each platform's target audience substantially different.

5.2 Creatrip

Creatrip[2] is a platform that helps visitors plan their trip to Korea. Users can make bookings and reservations for accommodation, beauty treatments, activities, etc. This platform also has a section where articles are published with information mostly related to current trends in the country, including k-pop and other media trends. However, Creatrip is mostly an e-commerce platform, and their main goal is to sell tours or experiences, like dance classes to users. As such, they do not provide detailed information about many specific locations related to K-media like filming locations, which is the main focus of our platform.

6 Conclusion

The HallyuGo project had the goal of addressing a lack of information issue that fans of Korean pop culture faced when traveling to visit locations related to their favorite type of media. With this in mind, HallyuGo app was designed to prioritize access to information about these locations, especially accurate location information through our built-in map. Other features like ProofShots and Stamps where added with the intent of enhancing the experience of those visiting these places by allowing users to store their memories in the HallyuGo platform.

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