MetaKicks
- Virtual Price Tracking LG Styler ShoeCase

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Abstract*—As the culture of collecting expensive designer, luxury and limited-edition sneakers grows among the MZ generation – Millennials and Gen Z – LG's internal research found that these 'sneakerheads' would benefit greatly from a solution that not only made their cherished shoes stand out more, but also provided them with the optimal care. and LG provides LG ThinQ applications to connect its home appliances and consumers and provide consumers with a better experience. So our team thought that it would be good to virtualize the ShoeCase and manage it on the ThinQ app. By storing nft sneakers in a MetaKicks, nft, which exists only virtually, is collected as if it were stored in a LG Styler ShoeCase. In addition, the limited edition of the shoe resell market has grown a lot, and we decided to create this service to check the resale market price of shoes in real time. Finally, we thought that the culture of collecting shoes could be further activated by taking out the shoe case that was only in my room on the web and creating a culture to share each other's shoes collections.

TABLE I
ROLE ASSIGNMENTS

Roles	Name	Task description and etc.
User Customer	Kwon Jihyun	User/Customer contemplates what functions should be added from the perspective of users or customers. For example, the 'MetaKicks' has a function of realtime price tracking in addition to simply adding shoes in virtual ShoeCase. Consumers also have the need to remotely use these specific functions through the 'LG ThinQ' application. and This app provides the ability to share each other's collections.
Product Designer	Kim Younghwan	A product designer is a person with user-centered thinking ability to sympathize with and understand the user's experiences and plays a role in creating an overall framework for product and services. It performs smooth collaboration with other team members with excellent communication skills. It focuses on the usability of products and services and performs designs to provide better results.
Software Developer	Jeong Youngho	A software developer refers to a person who makes software. This includes discovering a meaningful service and accurately grasping the needs of a user who wants to use the service. In addition, there is a need for the ability to design and code these services and user needs in software. Furthermore, the software developer tests the created program.
Development manager	Lee Jiyun	Development Manager manages the overall part of the project, such as the schedule/planning of the project and the quality of products and services. It also manages/supervises the entire software engineering process of designing, developing, and testing software from accurately grasping user requirements. In addition, in this process, Development Manager helps project participants communicate smoothly.

I. INTRODUCTION

A. Motivation

Shoe cases so far are made of plastic and can only function as storage and display shoes. But The LG Styler ShoeCase creates the ideal environment for storing shoes by protecting against humidity and fabric-discoloring UV light, the Styler ShoeCase represents a great way for shoe enthusiasts to show-off their favorite pairs, offering interior features such as a 360-degree rotating turntable to increase the value as a collection rather than just shoes. Nft shoes are stored online, and real shoes are stored only in the ShoeCase and managed separately. By using this, these two collections are managed by one app. We thought it would be good to share the collection, including nft shoes, with various people to further boost the shoe collection culture. So we make this service by paying attention to the value of the collection. It check the fluctuating resell market price in real time using Kream or StockX's API,

Korea and USA's leading sneakers trade site, and sharing each other's collections through this service.

B. problem statement

- In The case of limited-edition shoes, prices fluctuate significantly over time or depending on events, so collectors who own several shoes find it difficult to know the value of the collections at once.
- The shoe case so far is just a plastic drawer. There is only a storage function and the function of the exhibition is inferior. There are many people who want to manage it like a proper collection.
- NFT shoes can only be stored online or on a hard disk, and real shoes are in ShoeCase, so there is no means to manage both at once
- It is very useful to use a LG Styler ShoeCase to manage sneakers. but there is no means to check the shoes stored at home outside.
- You can't see other people's sneakers collection unless you go their home. In order for the shoe collection community to grow further, it is necessary to have the ability to see collections of many people

C. Research of any relative software

Kream

It is a transaction brokerage platform that connects sellers and buyers anonymously. Similar to trading methods such as stocks and cryptocurrencies, it consists of presenting the price the seller wants to sell and accepting the price. Due to the nature of the asking price transaction, used goods are not handled because the premise that all items are the same is necessary. The main trading items are limited edition products such as clothing and fashion miscellaneous goods, and can be seen as a commonly referred to as a resale trading platform. Unlike general direct transaction platforms, products are traded through the KREAM inspection center. When the seller sends the product to the KREAM inspection center, the KREAM inspects it and sends it to the buyer.

StockX

It serves as an online marketplace, facilitating auctions between sellers and buyers, then collecting transaction and payment fees. Sellers send purchased items to StockX facilities for inspection and verification, then authenticated products are shipped to buyers. StockX features a "stock market-like" variable pricing framework and discloses price histories for specific items. StockX is most known for sneakers and streetwear but also carries other clothing and accessories such as handbags and watches.

LG ThinQ

A representative home appliance management app that provides smart home services based on AI. With this application, you can control not only home appliances, but also all parts of the house, as well as check product status and malfunctions anytime, anywhere. In a situation in which the market environment is rapidly changing from 'supplier-centered' to 'consumer-centered, LG is providing these services, believing that the role of AI technology has grown.

II. Requirement Analysis

A. Login

It supports Google login and Apple login by linking Firebase and React. If the login is successful, you will be taken to the main page.

B. Main Page

Users can check the functions in the app at once on the main page.

1) My ShoeCase

2) Finding Other User

3) Favorite ShoeCase

C. My ShoeCase

My ShoeCase page visualizes LG Styler ShoeCase on the web. There is no Shoes in the first entry. There is a pop-up page that writes the name or serial number of the ShoeCase product, then a virtual ShoeCases will be created according to the number of rooms and size of the ShoeCase. A user can nickname the user's ShoeCase.

1) Register Shoes by Style Code: There is a button for registering shoes in each section of the ShoeCase. When the user clicks the button, a pop-up window appears, and the user can search style code on the shoes site and register the shoes. For NFT shoes, there is an NFT shoe registration button. When you click the button, a pop-up window appears, and if you enter NFT information for the shoes, you will be registered in the virtual shoe closet like normal shoes.

2) Registered Shoes Information: The name and real-time resell price of the shoes displayed on the virtual ShoeCase. When the user clicks the shoes, The product's site will appear to show the information of shoes linking with the shoes site.

3) Public/Private Setting: There is a checkbox to determine to show the user's ShoeCase

4) The number of heart: Those who have seen user's ShoeCase and like it press the heart. Total number of hearts is displayed.

D. Finding Other User

Other people's ShoeCase is listed only for those allowed to reveal their ShoeCase. The list displays the user's name and the nickname of the ShoeCase. When the user clicks the name of the person the user wants to see, the page switches to the that person's ShoeCase page.

1) Search Someone's ShoeCase: You can search the user's nickname and view the published ShoeCase.

2) Recommendation: List ShoeCase by number of hearts.

E. Favorite ShoeCase

There is no ShoeCases in the first entry. If you click the heart button on your favorite ShoeCase among other people's ShoeCase. The ShoeCases are registered in my favorites. And Click the ShoeCase button to go to the user's ShoeCase. Sends a notification whenever new shoes are added to your favorite ShoeCase.

1) Favorite ShoeCase lists: List your favorite ShoeCases.

2) Visit Someone's ShoeCase: If you click the ShoeCase's nickname on the list, app shows that user's ShoeCase Page.

III. DEVELOPMENT ENVIRONMENT

A. Software development platform

The development environment we chose is Windows and Mac. We developed it according to the operating system of each laptop, and built and operated the source code using the terminal functions of Windows and Mac. The front-end framework chose react-native and nodejs as the back-end development language. React-native is a cross-platform framework that can be developed simultaneously on Android and iOS operating systems, and it is the most popular front-end framework, so I chose it in the hope that it will be studied while working on the project. Nodejs is a run-time environment that allows you to run code that builds servers outside your browser based on JavaScript language, making it easy to expand servers and highly compatible with react-native, so we chose it as a back-end development language.

TABLE II
DEVELOP ENVIRONMENT

Name	Development Environment
Kwon Jihyun	Windows10 21H2, VScode 1.72.2, node.js 18.12.0
Kim Younghwan	Windows10 21H2, VScode 1.72.2, node.js 18.12.0
Lee Jiyun	Windows10 21H2, VScode 1.72.2, node.js 18.12.0
Jeong Youngho	MacOS Monterey 12.6, VScode 1.72.2, node.js 18.12.0

TABLE III
PLATFORM, PROGRAMMING LANGUAGE, DATABASE

Tools and Language	Reason
Javascript	JavaScript is one of the most popular web development programming languages. It is one of the components of the web today, along with HTML and CSS. Javascript can handle not only the front-end but also the back-end. Javascript is the basic programming language for React and Node.js. With one programming language, we can care for each other and review. Javascript is easy and fast to manage posts posted in real time.
MongoDB	MongoDB is a NoSQL database that stores data as JSON-like documents. MongoDB enables us to build applications faster than sql, handle highly diverse data types, and manage applications more efficiently at scale. MongoDB is also easy to process vast amounts of data. Metakicks will handle the data of many user's shoecase, handling a large amount of data is required.
Node.js	Node.js is a software platform used to develop scalable network applications. Node.js utilizes JavaScript as the writing language and has high processing performance through non-blocking I/O and single thread event loops. Node.js has the ease of server expansion and can even write back-end in the required front-end language of JavaScript. Also Node.js has a strong point in services that require processing a huge amount of input output data.
React-Native	React native is a framework for developing Android and iOS apps using React's grammar. React native also uses Javascript as a programming language, so it has good versatility. Hot Reload and Live Reload of React native allows us to immediately apply the correction and confirm the correction immediately.

B. Software in use

1) KREAM

It is a transaction brokerage platform that connects sellers and buyers anonymously. Similar to trading methods such as stocks and cryptocurrencies, it consists of presenting the price the seller wants to sell and accepting the price. Due to the nature of the asking price transaction, used goods are not handled because the premise that all items are the same is necessary. The main trading items are limited edition products such as clothing and fashion miscellaneous goods, and can be seen as a commonly referred to as a resale trading platform. Unlike general direct transaction platforms, products are traded through the KREAM inspection center. When the seller sends the product to the KREAM inspection center, the KREAM inspects it and sends it to the buyer.

2) StockX

StockX serves as an online marketplace, facilitating auctions between sellers and buyers, then collecting transaction and payment fees. Sellers send purchased items to StockX facilities for inspection and verification, then authenticated products are shipped to buyers. StockX features a ”stock market-like” variable pricing framework and discloses price histories for specific items. StockX is most known for sneakers and streetwear but also carries other clothing and accessories such as handbags and watches.

3) LG ThinQ

A representative home appliance management app that provides smart home services based on AI. With this application, you can control not only home appliances, but also all parts of the house, as well as check product status and malfunctions anytime, anywhere. In a situation in which the market environment is rapidly changing from ’supplier-centered’ to ’consumer-centered, LG is providing these services, believing that the role of AI technology has grown.

4) GitHub

It is a representative free git platform, and a small platform between teams. In Mark-down language, you can create the above key in Mark-down language, and highlight the important content. Through all documents and functions of the project, it improved work ability to share all documents and functionality. We will also use the branch function to complete the coding of each part and combine it if there is no problem.We will use github to share works with each other and proceed with development gradually. Development documents are also periodically attached in latex file format.

5) node.js

Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on a JavaScript Engine (i.e. V8 engine) and executes JavaScript code outside a web browser, which was designed to build scalable network applications. Node.js lets developers use JavaScript to write command line tools and for server-side scripting—running scripts server-side to produce dynamic web page content before the page is sent to the user’s web browser.We adopted Node.js as a backend system for developing applications. As for the front end, Node.js was considered suitable because React Native was selected in consideration of the interworking of JavaScript instead of flutter.

6) React-Native

React Native is an open-source UI software framework created by Meta Platforms, Inc. It is used to develop applications for Android, Android TV, iOS, macOS,

tvOS, Web, Windows and UWP by enabling developers to use the React framework along with native platform capabilities. We adopted reactive native as a front-end system for developing applications. As for the backend, Node.js was selected instead of flask in consideration of the interworking of JavaScript, so I thought react native would be suitable.

7) VScode

Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux, and macOS. It can be used with various programming languages such as Java, JavaScript, Go, Node.js, Python, C++, C, Rust, and Fortran.Features include debugging, syntax emphasis, intelligent code completion, snippet, code refactoring, and embedded Git support. Users can install extensions that change themes, keyboard shortcuts, preferences, and add additional features. VScode can utilize various languages, and we chose to take advantage of these VScode advantages.

8) Firebase

Firebase is a back-end service that provides essential functions for the web and mobile development environment, and plays a variety of roles, including authentication functions that make Google account functions easy and Firestore functions that enable database functions. In this project, we mainly used the authentication function to facilitate the implementation of the Google login function.

9) mongoDB

MongoDB supports field, range query, and regular-expression searches. Queries can return specific fields of documents and also include user-defined JavaScript functions. Queries can also be configured to return a random sample of results of a given size. We will link the backend system Node.js with MongoDB. Among Nosql DBs, which can be said to be efficient when used with node.js, we intend to use Mongo DB, which is the most widely known.

10) Express.js

Express.js is a web framework based on the core modules of Node.js, http and Connect components. Express.js helps developers quickly and easily develop with Node.js. Middleware with various functions written in JavaScript code can be used by combining Express with only what developers need. We use express.js as a standard server framework. With express.js, we connect mongoDB and handle the database.

C. Cost estimation

TABLE IV
PRICE OF TOOLS

Tools	Price
LG gram 17	2,019,000 * 3 = 6,057,000 won
MacBook M2	2,090,000 won
AWS server	10,000 won
Total	8,157,000 won

IV. SPECIFICATION

A. Login

When the user run the application, the login page appears first. Metakicks can log in through the Google account or Apple account.

1) Login from screen

When the user run the application, there are two buttons for login. One is Google account, the other is Apple account. When the user clicks the button, login page for Google or Apple will appear.

2) Login failure

If the user failed to login Google/Apple or get error, a pop-up will appear to user. The message of the pop-up is “Error occurred while you log in. Please log in again.”. When the user clicks “confirm button”, pop-up disappear and back to login page.

3) How to implement

B. Main Page

When the login is completed, the splash screen will appear before the main page. Splash screen disappear in one second. There are three buttons to connect page of My ShoeCase, Finding Other User, Favorite ShoeCase. The user can manage his/her shoes in the ShoeCase with this application and visit the other's ShoeCase. If the user presses the heart button on the other's ShoeCase, that ShoeCase will be added to the Favorite ShoeCase list.

1) Splash Screen

   When the user log in, this splash screen will appear. This screen lasts in 2 seconds not to show an empty page during the app's data loading time.

2) Menu Page

   Menu page shows this app's statement and the button of three functions.

   - Showing Metakick's statement.
   - This button goes to the My ShoeCase page. The icon of this button is set to the first shoes in the user's ShoeCase. If there are no shoes in ShoeCase, the icon is replaced with the default shoes icon.
   - This button goes to the Finding Other User page.
   - This button goes to the Favorite ShoeCase page

3) Navigation bar

   For user's convenience, there is a navigation bar on the bottom. This consists of Home, My ShoeCase, Other User and Favorites. No matter which page it is, when the user presses the icon of navigation, it switches to the page selected by the user.

4) How to implement

C. My ShoeCase

1) Register Shoes by Style Code

   a) To register your shoes in the ShoeCase, you need to use the registration function of the app. If you press the 'Register' button, a pop-up window will appear, and the registration will be completed by entering the style code of the shoes. Registered shoes can be found in the "Registered Shoes" window.

   b) To register NFT shoes, you must use the "Register NFT Shoes" page. Click the NFT Register button and a window will appear asking you to enter the information for your shoes. In the window, you must enter the unique number of the cryptocurrency exchanged to buy the token. If you register by entering your unique number, the design of NFT shoes will be registered and displayed as a picture for viewing in the ShoeCase.

2) Registered Shoes Information

   In "Registered Shoes", registered shoes items can be clicked to display shoe information and real-time resell prices. The information and price of shoes are implemented to be obtained through the KREAM API from the app. Through this, you can create an environment where you can share and brag about information with people who visit the ShoeCase.

3) Public/Private Setting

   Each item property has a check box where you can set public/private. If the checkbox is marked, it will be disclosed. If it is checked, it will be closed.

4) The number of heart

   Each person's shoes have the ability to press hearts. If you press hearts, you can visit the ShoeCase of the person who pressed it. The number of hearts is also calculated, so you can see how many people like it.

D. Finding Other User

1) Search Window

   Clicking on the magnifying glass icon pops up a search window. The search window consists of a search box and a keyboard.

2) Other user's ShoeCase list

   If you write down another user's email address or nickname in the search box, the query results will be

listed Clicking on an individual item in the list takes you to the user's individual ShoeCase page depending on whether that is disclosed or not.

E. Other user's ShoeCase

1) Main ShoeCase Page

Similar to my ShoeCase page, virtualize other user's ShoeCase. The shoes of another person's ShoeCase found by searching by id are displayed on the screen frame by frame or list. And just below the user id in the upper center, there is a mark indicating the number of kicks and a clicks button that can be pressed. Kicks is a recommended button that you can press when you like someone else's ShoeCase. (similar to a heart on Instagram). The higher the recommended button, the more popular the person's ShoeCase is. And the other person appears in order of the most attached shoes, and the three shoes in order are marked with 1st 2nd 3rd.

2) Detailed ShoeCase Page

If you click on the shoes you want to see the price change in detail, you can check the information about the shoes. The information about shoes is the name of the shoes, the real-time present price of shoes from the shoe company (ex Nike or Adidas), stockx api, manufacturing year and so on. It has a heart icon for favorites and displays the total number of hearts for that user next to it.