MetaKicks

Virtual LG Styler ShoeCase with real-time price tracking

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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. So LG has launched the LG Styler ShoeCase, which not only optimizes shoe management but also increases the value of collection and 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 this project. NFT sneakers that exist only virtually are collected as if it were stored in a LG Styler ShoeCase with MetaKicks project. 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. and 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

The user login operate by linking Firebase and React. If the login is successful the user can use their shoecase page.

B. Main Page

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

1) Trending Now
2) Search Shoes
3) My ShoeCase
4) Finding Other User

C. Trending Now

This part shows some of the trending shoes. If the user clicks on a photo of the products that are on screen, a "Pop-Up" with product details appears.

1) "Trending now" shows the names and photos of the products currently popular on Stockx, which is the shoes trading site.
2) When the user clicks the image in "Trending now", a pop-up page appears. The pop-up contains the price of shoes and detailed information about shoes.

D. Search Shoes

This part shows the results of the search shoes. Shoes that match the search word are displayed. If the user clicks on a photo of the products that are on screen, a "Pop-Up" with product details appears.

1) When the user enters a search word, shoes including the search word are displayed on the screen.
2) When the user clicks the image in "Search Shoes", a pop-up page appears. The pop-up contains the price of shoes and detailed information about shoes. And in this

pop-up, the user can add shoes to their shoecase.

E. My ShoeCase

My ShoeCase page visualizes LG Styler ShoeCase on the LG thinQ app. When the user add shoes in Search Shoes, then a virtual ShoeCases will be created according to the number of rooms and size of the ShoeCase.

1) Register Shoes : The user can add shoes in Search Shoes page. First, the user search shoes, and if the user finds the right shoes, clicks the image and add to my shoecase. Then that shoes add to the user's shoecase.

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 Kick: Those who have seen user's ShoeCase and like it press the Kick. Total number of Kicks is displayed.

F. Finding Other User

Other people's ShoeCase is listed only for those allowed to reveal their ShoeCase. The list displays the user's name. 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 name and view the published ShoeCase.

2) View Shoecase: Like my Shoecase, the user can see the other's shoecase. And when the user clicks the image of shoes, can see the detail of shoes.

G. Favorite ShoeCase

There is no ShoeCases in the first entry. If you click the Kick 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

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

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	React is a Javascript library. React can be used to develop a single page application or a mobile application. React also uses Javascript as a programming language, so it has good versatility. With React, It can be extended to react native.

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.

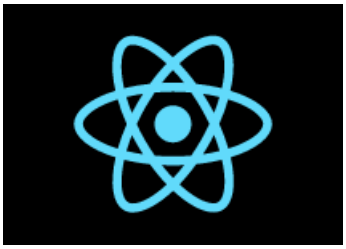
4) GitHub

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



React is an open-source UI Javascript library created by Meta Platforms, Inc. React uses Dirty checking and Virtual DOM to find the DOM element that needs to be updated and only updates that part, so it is possible to perform extremely fast on dynamic modern webs with frequent re-rendering. We adopted reactive 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 We thought React 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.

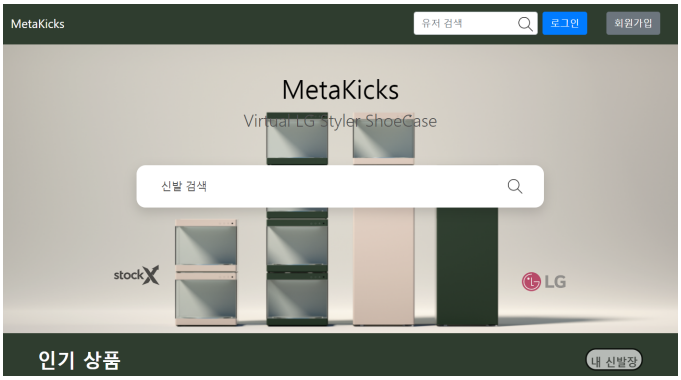
C. Cost estimation

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

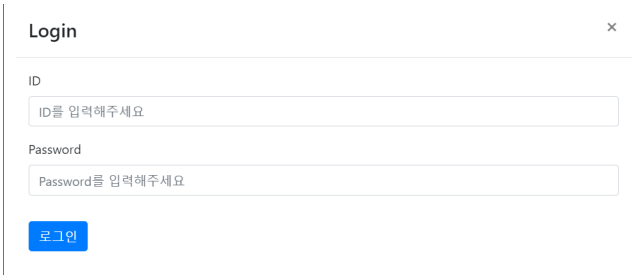
IV. SPECIFICATION

A. Main Page



If you go to the Metakicks homepage, the main page appears. At the center of the main page, there is the name of the Metakicks and at the bottom there is the search bar. On the main page, there is ”Trending Now” block, which shows the current trendy products based on the stockx site. When a user presses the shoe image, a detailed description of the shoe is provided. In the upper right corner of ”Trending Now”, there is a button to ”My ShoeCase”, and when you click the button, it shows the user’s shoecase. The Searchbar in the center of the page allows you to search for other shoes based on stockx data, and when you want to add the shoes to your shoecase, you can use the searchbar to find shoes and add them to your shoecase. The navigation bar at the top of the main page has buttons to login, register, search bar to search other user.

1) Login



When the user presses the login button at the top of the main page, the login pop-up page appears. When the user enters the user’s email and password, the login is successful.

2) Login failure

If the user failed to login, 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.

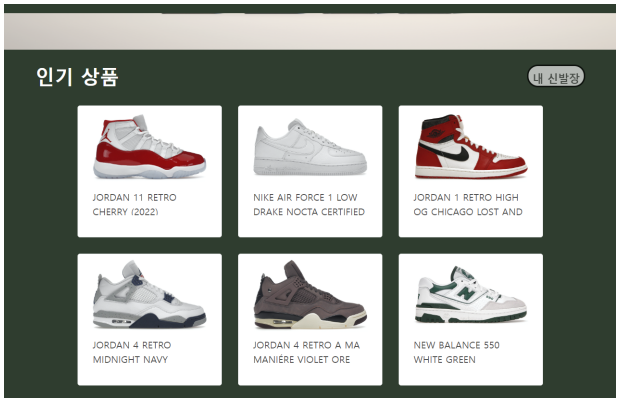
3) User Register

To sign up for the membership, Metakicks requires the user’s name, email address, password and verifing password.

- The name must be entered in 8 characters or less.
- The e-mail will be exposed to the phrase asking you in follow the e-mail format and enter it.
- The password should be the combination of english and numbers with over 8 characters.

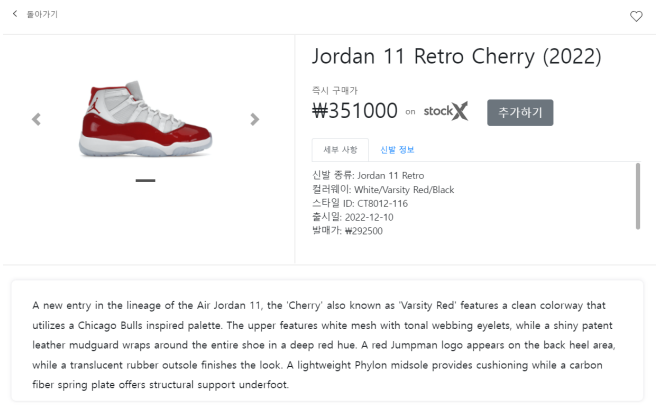
- In the password verification, the same character should be typed in this sector. If the user types the different character, registration will be denyed.

4) Trending Now



”Trending now” is organized at the bottom of the main page. ”Trending now” shows the names and photos of the products currently popular on Stockx, which is the shoes trading site. If you click on a photo of the products that are on screen, a ”Pop-Up” with product details appears.

5) Trending Shoes Pop-Up

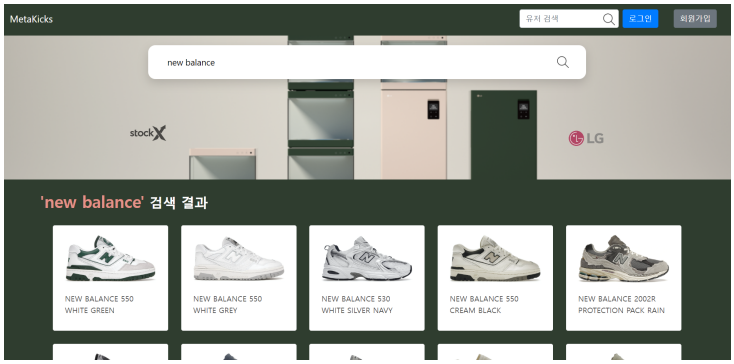


When the user clicks the image in ”Trending now”, a pop-up page appears. The pop-up contains the price of shoes and detailed information about shoes.

6) Search Bar

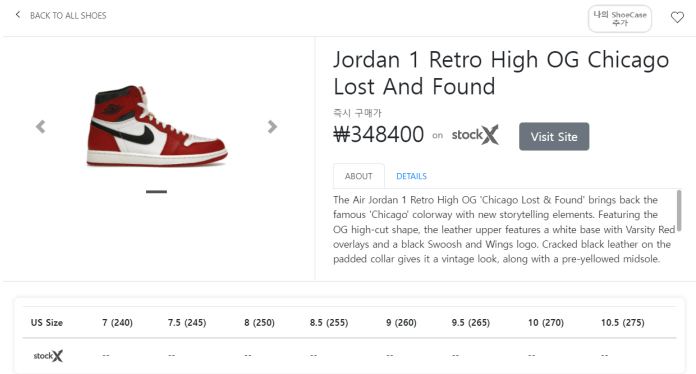
In the middle of the main page, there is a search bar. This search bar allows you to search for shoes based on stockx data. When the user enters a search word, shoes including the search word are displayed on the screen. Like ”Trending Now” page, when the user clicks on an image of a shoes, a pop-up page appears with prices and details about the shoes.

7) Search Shoes



When the user types the search word on Search Bar, the shoes corresponding to the search word are appear.

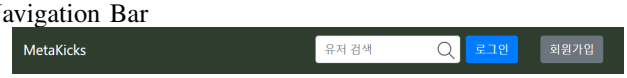
8) Search Shoes Pop-Up



When the user clicks the image of the shoes in the search result, a pop-up window appears. The pop-up contains the price of shoes and information about shoes. Also, unlike the pop-up of ”My ShoeCase,” the user can

add the shoes to the user's shoecase on this pop-up page.

9) Navigation Bar



- Login Button

  If the user clicks this "Login" button,login pop-up appears.

- Register Button

  If the user clicks this "Register" button, registration pop-up appears.

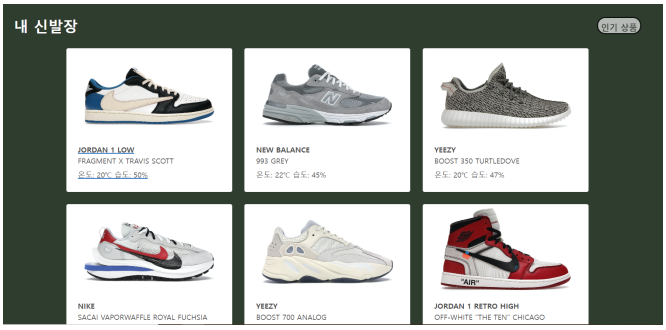
- Home Button

  If the user clicks this "Metakicks" button, it goes to the first page of main page.

- Finding User Search Bar

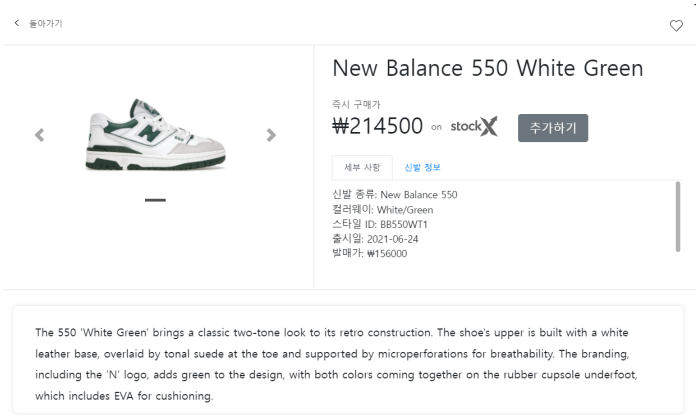
  If the user type the name of the other user, it goes to the finding other user page.

B. My ShoeCase



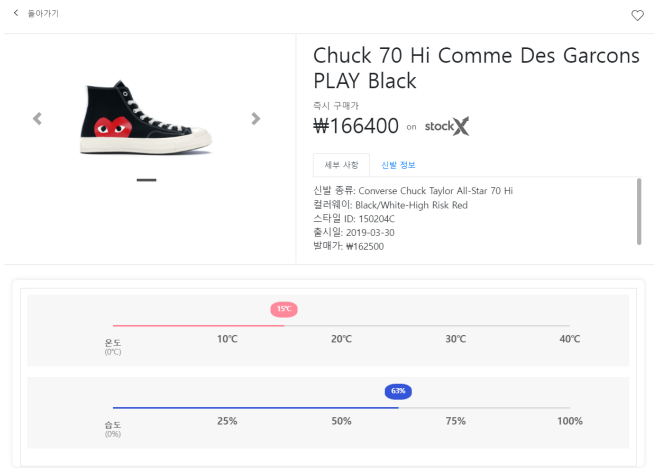
When the user presses the "My Shocase" button on the upper right of "Trending Now" on the main page, it switches to its own Shocase screen. Users can add shoes searched on the Search bar to My shoecase, and the added shoes are displayed on this screen. In My Shocase, you can check the price of registered shoes and check the environment for shoe management, such as the temperature and humidity of the shoecase where the shoes are stored.

1) Register Shoes



To register your shoes in the ShoeCase, you need to use the search bar to search shoes. If the user finds the shoes that the user want to register, the user can register the shoes through click the "Add to my ShoeCase" button in search shoes pop-up. My Shoecase page display the registered shoes.

2) Shoes Information in My ShoeCase



In "My ShoeCase", registered shoes items can be clicked to display shoe information and real-time resell prices. The shoes information appears with the pop-up page and the temperature and humid of the Shoecase displayed in the bottom of the pop-up. The information and price of shoes are implemented to be obtained through the Stockx data . The shoes registered by the user can be shared with others.

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 Kick

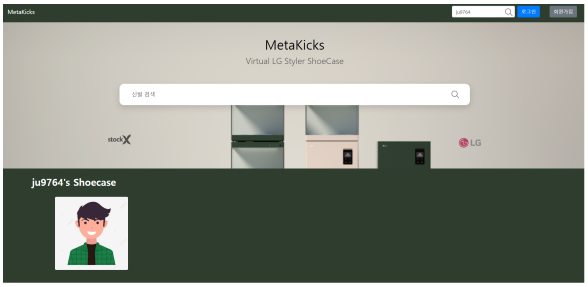
Each person's shoes have the ability to press Kick icon. If you press the icon, you can register that user's ShoeCase as a favorite. The number of Kick is also calculated, so you can see how many people like it.

C. Finding Other User

1) Search other user

When the user type the name of other user on the top of the website, the result of the other user list appears.

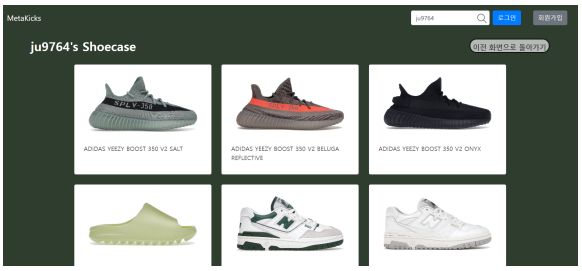
2) Search other user list



The other user lists on the screen. If the user clicks the other user's name on the screen, the user can see the other user's shoecase.

D. Other user's ShoeCase

1) Main ShoeCase Page



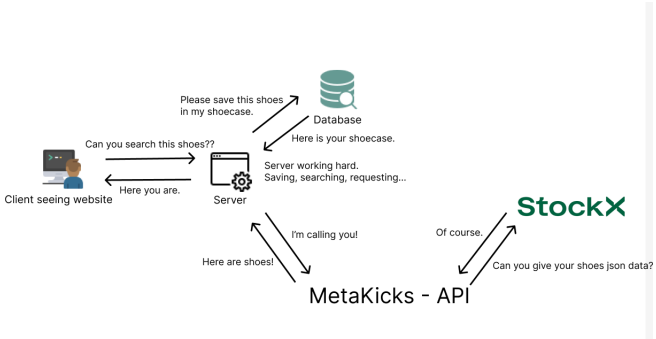
When the user clicks the other user's name searched in "Finding other user", it goes to the user's Shoecase page. Like the "My ShoeCase" page, the user can see the shoes registered by other user.

2) Detailed ShoeCase Page

If the user click on the shoes the user want to see the information of the shoes, the pop-up page that has the information of shoes appears. The informations about shoes are the name of the shoes, the real-time present price of shoes from Stockx data.

V. Arcitecture Design and Implementation

A. Overall Architecture



Our MetaKicks site consists of frontend, backend, API, and DB. First, the user registers the shoes in the virtual shoe rack on the frontend page. In this process, users can easily find many kinds of shoes registered on the stockX homepage through API calls through name or style code search. Once you have found the shoes, press the heart button to complete the registration in the database.
The front end uses ReactJS to naturally switch the web screen using state. We used Express.js to facilitate the connection with MongoDB, the database we use, and applied stockX API to build a project that calls API when the client requests it from the server.

B. Directory Organization

C. Module 1 : Front End

1) Purpose

TABLE V
DIRECTORY OF METAKICKS

Directory	*File Name*	*Repository*
MetaKicks_Frontend/	package.json package-lock.json README.md	MetaKicks_Frontend
MetaKicks_Frontend/ src/	App.css App.js index.css index.js serviceWorker.js setupTests.js	MetaKicks_Frontend
MetaKicks_Frontend/ src/components/	BrandIcons.js FindUserModal.js ImgCarousel.js MiniCard.js NavBar.js PriceTable.js ProductCard.js Products.js SearchBar.js SignInModal.js SignUpModal.js Trending.js	MetaKicks_Frontend
MetaKicks_Document/	MetaKicks.pdf MetaKicks.tex README.md	MetaKicks_Document
MetaKicks_Backend/	index.js package.json package-lock.json README.md	MeatKicks_Backend
MetaKicks_Backend/ scrapers/	flightclub- scrape.js goat-scraper.js stadiumgoods- scraper.js stockx-scraper.js	MetaKicks_Backend
MetaKicks_Backend/ routes/	routes.js	MetaKicks_Backend
MetaKicks_Backend/ models	Metakicks.js	MetaKicks_Backend
MetaKicks_Backend/ controllers	Metakicks.controllers.js	MetaKicks_Backend

To develop Metakicks, a platform where the user can see the uesr's and the other's shoecase on the web, we used React, a web framework developed through Javascript language. Since Metakciks is powered on the web, it can be accessed by url without a separate installation. React uses Dirty checking and Virtual DOM to find the DOM element that needs to be updated and only updates that part, so it is possible to perform fast on dynamic webs with frequent re-rendering. Metakicks used React because it is a web that renders only the part without changing the entire page when changing the screen. Also, there is the other advantage. Since React uses javascripts such as node.js and express.js, it has the advantage of using javascript for front-end and back-end development. If the developer knows Javascript, the developer can develop front-end and back-end. Therefore React was adopted as a front-end development environment to enhance the efficiency and develop more efficiently.

2) Functionality

Metakicks's front-end made with React requests existing JSON file in the database via the backend server to show the users their own shoecase and the other's shoecase. And the information received from the user is delivered to the back-end server and database. With front-end of Metakicks, the user can give their information to the back-end/database and the user can see the data from database with graphic rendering as well as the LG ShoeCase system. Users can get a better experience for Metakicks and LG from innovative idea of Metakicks.

3) Location of Source Code
: MetaKicks_Frontend/

4) Class Components

- src/App.js

  This is the main frame of the main page. This routes to trending now and search result.

- src/Trending.js

  Trending screen show the list of products to the screen.Trending screen gets stockX data by requesting to the back-end.

- src/Products.js

  Products screen show the list of products of seach result. Products screen gets stockX data by requesting to the back-end.

- src/Minicard.js

  Minicard.js turns the list of products into graphic product card.

- src/ProductCard.js

Product Card screen show the detail information and price of shoes.Product Card screen gets stockX data by requesting to the back-end.

5) Where it's taken from

JavaScript is an object-based script programming language. This language is mainly used within a web browser and has the ability to access embedded objects from other applications. Microsoft visual studio code is distributed free of charge. Therefore, it can be easily downloaded and updated. In Visual Studio Code, the user can write html, css, javacript code. Visual studio Code supports IDE(Various integrated development environments) and text editor. In addition, many modules with javascript can be easily installed through node.js. Installing node.js also easy. Node.js is also free program, so can be easily installed and updated. React is a javascript library, therefore with node.js, React program can be started.

6) How and Why We Used It

React is one of the JavaScript libraries used to create a user interface. React uses Dirty checking and Virtual DOM to find the DOM element that needs to be updated and only updates that part, so it is possible to perform fast on dynamic webs with frequent re-rendering. Metakicks' web renders only the part to be replaced on the main page without switching the screen so It is efficient to utilize React optimized for dynamic webs. React also use the Javacript as the programming language, so there is less pressure to study another programming language. The fact that the front-end programming language and the back-end programming language are the same gives developers great convenience. So Metakicks has unified front-end and back-end programming language to Javascript by using React.

D. Module 2 : Back End

1) Purpose

Node.js is a platform that combines Chrome V8, an open-source JavaScript engine, with libuv, an asynchronous event processing library. In other words, Node.js is a runtime environment that allows JavaScript to execute code, such as building a server outside a browser. With Node.js, the user can easily set the HTTP web server. In Node.js, a package manager called npm is available. The Node Package Manager (npm) is a package manager for JavaScript programming languages. With using npm, this makes it easy to install numerous packages. 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. Metakicks use Express.js as a server framework since Metakicks use Node.js as back-end environment. In addition, through node.js and express.js, mongodb can be the database of Metakicks because it supports the Node.js.

2) Functionality

Node.js includes a built-in HTTP server library, which allows the web server to operate without separate software such as Apache, allowing more control over the behavior of the web server. So we run the server through Node.js. The web framework was constructed light and flexible using express.js. In addition,mongoose are used to connect express.js and mongodb. Although Mongodb is a Nosql, database, schema can perform the same role as the sql's table through schema settings in mongoose. The shape of the data can set using the schema.

3) Location of Source Code
: MetaKicks_Backend/

4) Class Components

- routes/routes.js

  route.js is a frame that defines the form for each url of the web.

- models/Metakicks.js

  Metakicks.js is the schema of the data. This set the schema of the mongodb data using mongoose.

- controllers/Metakicks.controllers.js

  Metakicks.controllers.js controlls the data of shoes from shoes site.

- scrapers/*

  This files scrape the data of shoes from other

sites. The data are obtained in Json file format.

5) Where it's taken from

Javascript is available through the installation of visual studio code. Microsoft visual studio code is distributed free of charge, making it easy to access. Like visual studio code, node.js are also distributed free of charge. Node.js installation can be confirmed through the terminal of the visual studio code or from the command prompt, and if node.js installation is completed, express.js can be installed through npm. In addition, a javascript library called mongoose is required to connect express.js and mongodb. Mongoose can also be installed at npm of node.js.

6) How and Why We Used It

In the case of Node.js, since it is Javascript-based which is the most popular web programming language, many open-source modules and apis are available. Express.js is the web framework based on Node.js core modules. It has a great advantage on routing the web. With using express.js, we can easily controll the routing of web and organize web frameworks light and flexible. The middleware of various functions written in JavaScript code can be used in combination with Express by the developer selecting only what is needed. Javascript is the most famous web programming language and node.js and express.js use javascript so there are many community used by experts and senior programmers. We could take the advantage of strong community of popular programming language. Both front-end and back-end tools used the same programming language (javascript), so it was useful to communicate with each other. In addition, Metakicks took stockX's API because it had to get details such as shoe information and price from stockX, an external site.

E. Module 3 : Database

1) Purpose

MongoDB is an open-source, document-oriented cross-platform database written in C++, with outstanding scalability and performance. It also maintains the top recognition among existing NoSQL databases. Metakicks used mongodb because it had data on personal shoecase for each user and had to be easy to expand the data. MongoDB also facilitates the use of json files because it uses dynamic schema-type documents in the form of JSON instead of a fixed structure with a schema such as MySQL's table. MongoDB Atlas is a cloud database that manages everything created by the architects of MongoDB. AWS, Azure, and GCP provide integrated management of everything related to deployment. With Mongodb Atlas, we can distribute the database easily. MongoDB Atlas also has a free version that can read and modify data in real time because it is a cloud system.

2) Functionality

MongoDB is Nosql, but schema can be set using Mongoose. Shema serves as a table for sql. We set the schema with mongoose and back-end request Json file of the user's shoecase, and import the user's showcase information from the mongodb database in Json file. By using the Mongodb Atlas, real-time communication between the front-end, back-end and database can be possible. By using free version, it allows users to give their information such as adding shoes in their shoecase and back-end server can receive those data. So user finally can see the rendered graphics of their shoecase.

3) Location of Source Code
: MetaKicks_Backend/

4) Class Components

5) Where it's taken from

MongoDB is a cross-platform document-oriented database system classified as NoSQL announced in 2009. Mongodb is being used in places such as Washington Post and Kakao Talk, which have a lot of data expansion and transformation. It is not a traditional table-relationship-based RDBMS like MySQL and does not use SQL. Mongodb uses a dynamic schema-type document in the form of JSON instead of a fixed schema-like structure, such as a table in MySQL. Mongodb can be downloaded free of charge from the Internet. Apart from installing mongodb, in order to use mongodb in node.js, the mongodb module must be installed using npm. Mongodb Atlas is a multi-cloud database service by the same people building MongoDB. Atlas simplifies database deployment and management while providing the diversity needed to deploy resilient, high-performance global applications from selected cloud providers. Originally, other programs are needed for distribution, but data management and distribution

can be easily solved through mongodb atlas.

6) How and Why We Used It

There are SQL and NoSQL in the database, and choosing between them was not an easy decision. However, by using React as the front-end and node.js as the back-end, we decided to use Mongodb, which is easy to access as node.js as the database. Mongodb can be managed by Javascript through express.js and mongoose, which was in line with our intention to develop the front-end and back-end as javascript. Mongodb is Nosql, but metakicks has a fixed data format called shoecase for each user. Therefore, data with a format was stored through a schema that determines the form, such as the table of sql, through mongoose. We was worried about the distribution of the database, but fortunately, Mongodbatlas in Mongodb was a cloud that distributed, enabling real-time database management.

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VI. USE CASES

A. How to use

MetaKicks is a shoe search and data virtualization site for shoe collectors. To use the function, you need to know the style code or name of the shoes. For the style code of the shoes, you can use the code printed on the inside of the shoes or the name on the web at the time of delivery. Since it's getting data from StockX, the style code or shoe name is usually almost common. And each user must be given their own shoecase, so membership registration is required. You can easily sign up and log in from the top bar of the main page.

B. Entering the website

When you first access MetaKicks, you first see the main page with LG Shoe Styler in the background. The main page consists of a top bar, a search window, and mini cards that show what is currently trendy.

- Top bar
  The top bar includes Home buttons to return to the main page, buttons to log in and sign up, and a search bar to search for other users.

- Search bar
  The search bar allows you to enter a name or style code for your shoes. When you search, you will list the shoes you have searched under the search window based on the shoes on the StockX site. When you click on each shoes, you'll see the details of the shoes and the price information by size. You can also click the Add button to add it to your shoecase.

- Mini cards
  The mini card has the image, price information, and product name of the shoes. You can see simple information on the mini card, and when you click on the mini card, you will see detailed information on shoes and price information by size. All information will appear on a StockX basis because it receives data from StockX. In addition, the mini-card pop-up window will have an additional button that will allow you to add shoes to your own Shoecase.

C. Login & Sign-up

- Login When you click the login button, you will see a pop-up window where you enter your email address and password. When you log in, the My Shocase button is activated to view your shoecase. To use this feature, you must be a member of MetaKicks.

- Sign-up Press the Sign-up button to enter the email address and password you want to use. Membership registration is necessary to create a unique shoecase. If you enter the information necessary for membership registration, the information will be sent to MetaKicks' database to complete the registration.

D. Searching by name & Style code

As you can see in the picture above, the style code for each shoe can be found in the shoe information printed inside the shoe. This picture is Nike's AQ3366-601 model. Alternatively, if you know the name of the shoe, you can search for shoes with keywords by searching in the search box.

E. Shoes detail information

If you search for shoes or look at the latest trendy items on the main menu, brief information about shoes will be displayed on the mini-card. The mini card has pictures of shoes and simple price information. These items are clickable and can interact with the user at the front end.

F. Trending

When you see the main menu for the first time, a window called Trending Now appears. In that window, you can get the product information of the shoes from StockX that we use and search for it, and you can see many mini cards. Just like this, users can interact with shoe products, and the information that appears when you click on this window is the same. If you have any shoes you like here, you can add them to your own Shoecase.

G. My Shoecase

In the My Shocase menu, you can look at the items of shoes you have registered. The shoes registered through the Add button on the mini card will appear by item. You can also search for other people's ShoCase, or you can search for My ShoCase.

H. Finding Other User

If the user want to see the other user's shoecase, the user can type the other user's name on the top of website. The result user list will be appear on the web. To see the user's shoecase, the user can clicks the other user's name and can see the shoecase.

I. Other user's shoecase

When the user clicks the other user's name on the Finding Other User page, the shoecase of the other user will appear.