

The Engagement of Mobile-assisted Learning Activities for Korean Language Practice through Data Analysis

Lucas Wonjoon Jung

Seoul Scholars International, Republic of Korea

ABSTRACT

This paper aims to prove that proactive language learning can be achieved by developing education platforms with various functions for learning foreign languages. Besides, according to Nami, since the growing consensus on the potential of smartphones for supporting language learning has promoted the use of software apps ((Ahn & Lee, 2016; Moroz, 2013)), the features of language apps need to be fun, user-friendly, easy to use, and effective for acquiring desired outcomes, and anytime and anyplace accessible ((Nami, Fatemeh. "Towards More Effective App-Assisted Language Learning: The Essential Content and Design Features of Educational Applications." Issues in Language Teaching, vol. 9, no. 1, June 2020)). So, by analyzing various language learning apps with standard functions, we could determine the correlation between demand and motivation. By developing the new platform utilizing multiple technological features, including Interactive Dashboard, AI Chatbot, and data analysis, we could measure the effectiveness of the application, identify the impact of this innovation, and check the ease of usage. In addition to the development of a platform, through the research, this paper investigates the trend of K-wave, understanding the Korean language as well as K-culture in order to delve into the development of Korean learning language applications that can have potential for those who are eager to learn Korean language, and based on the potential motivations that lead people to learn Korean language, this paper provides the information of what kinds of K-waves drive people to be attracted to K-culture, resulting in learning Korean language with MyKstar.

Introduction

Learning a new culture that broadens one's perspective worldwide is one of the most fascinating facts people have always demanded. One of the most effective ways of understanding other countries' cultures is to learn their language. When it comes to learning a new language through various language platforms, we can not only learn the literal meanings of words but also comprehend and appreciate other cultural backgrounds. Thanks to technology development, learners can utilize various software and applications through their mobile devices, which has enhanced the convenience of learning a language. Many scholars and practitioners have attempted to define it and initial definitions were focused solely on devices and technologies or techno-centric (Crompton, 2013; Keskin and Kuzu, 2015). Most widely accepted mobile learning definition is "learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, 2013, p. 4). Among various options of languages available in the language application, users have recently expressed huge affinities towards learning Korean, with motivations encouraged by their interactions with attributes of Korean culture. To fill this gap, numerous data research has been conducted, proving that there is a significant need for a newly developed platform that functions not only for educational purposes but also for entertainment purposes that can apply to novice learners. Even though there are numerous online platforms, when it comes to learning a foreign language, especially Korean, most lack functions that significantly affect the learners in the illustration of learning progress. This deficiency has led those wanting to learn the Korean language to spend meaningless time searching for numerous mobile applications or websites that provide appropriate

learning curricula, resulting in a huge gap between English and Korean learners. In order to meet the demand for learning the Korean language, based on the data analysis with Google Trend Search and quantitative and qualitative studies, we hypothesized what if there is a new language-learning platform that provides effective and efficient learning methods, testing whether this innovative platform can impact on novice learners with the ease of use. To prove that it is effective, we have gathered feedback to better understand the process of language learning and correlate it with the research question. Not only that, by fulfilling the requirements that language learning platforms must-have, a various number of functions were applied to the system, analyzing the personal performances throughout the learning process.

Methodology

In this study, two significant methods should be used to determine how much the demand for learning the Korean language from those interested in Korean culture can be measured by the raw data from various web searches using qualitative research. Moreover, since examining other language learning platforms is essential to see if there is a lack of function or a gap to be filled, we have conducted a quantitative research method. We first decided to utilize Google Trend Search to identify what motivations have led potential learners to learn the Korean language, dividing into different sections of the research, including K-flim, clips on Youtube, the characteristics of Korean Alphabet and etc. Utilizing the Google Trend Search, the first step we did was to determine the demand for people to learn Korean and various motivations that have led them to learn Korean, and by using visualization, we could try to find out the frequencies and correlation between the learning process and entertainment motivation.

Motivation

Among plenty of unique features of Korean culture, the global popularity of Korean food, Mukbang, drama, and language has recently increased dramatically. To align with our focus on what has driven individuals toward learning Korean, we will draw correlations between the trend of the Korean language and other factors demonstrated in the following graph.

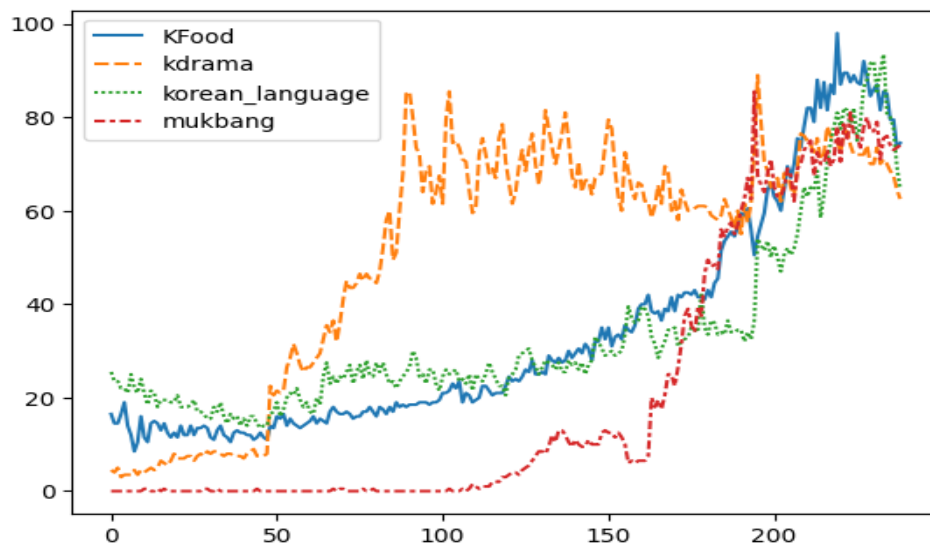


Figure1. The Trend for all search terms over the web search (KFood, Kdrama, korean_language, and mukbang).

According to Figure 1, all the variables show an upward trend, highlighting the vast and growing popularity Korea has gained throughout the world. Despite such popularities, our objective of graph analysis is to find correlations and learn how close the trend for K-food, K-drama, and mukbang is to that of the Korean language. Through a visual analysis, K-drama is generally unrelated to the Korean language. In contrast, the other two - K-food and Mukbang - are relatively aligned with the trend of the Korean language. This offers insight into the possibilities of K-food and Mukbang prompting numerous individuals to interact with the Korean language. However, more and more people rely on YouTube rather than web searches when it comes to online searching and activity. So, we have also incorporated YouTube searches to explore additional aspects and integrate them with the data from web searches.

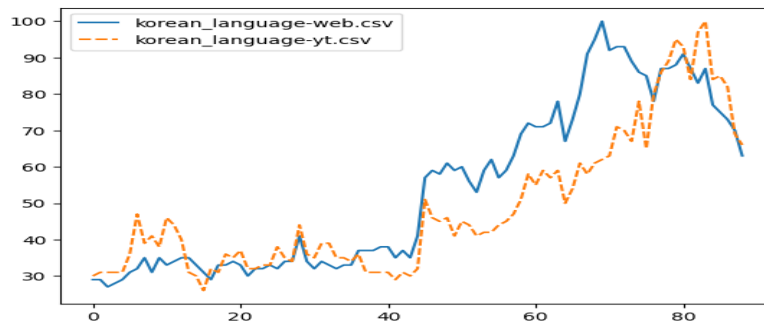


Figure 2. Comparison between the trend of Korean-language searches over Web Search vs YouTube

According to Figure 2, while web searches initially held greater popularity than YouTube searches until approximately 70 on the x-axis (time-period), YouTube searches then increased rapidly. Eventually, they exceeded the popularity of web searches in recent periods. This evidence underscores our greater reliance on YouTube and thus the greater accuracy through the data from YouTube searches compared to Web searches. Hence, we have focused more on collecting correlations from YouTube searches rather than Web searches. In addition to web searches, we incorporated YouTube searches of the same variables to find the correlations of the trend between them and the Korean language from both Web and Youtube searches.

Table 1. Spearman Correlation between Web and YouTube search for Korean Language and those of other factors.

	K-drama web	K-drama Youtube	K-Food Web	K-Food Youtube	Mukbang Web	Mukbang Youtube	Netflix web
Korean Language Web	-0.310	0.302	0.472	0.379	0.458	0.490	0.350
Korean Language YT	0.513	0.828	0.927	0.961	0.880	0.862	0.940

In the table 1 above, the categories are divided into two different search engines, Websites and Youtube, and the numbers highlighted in yellow represent two different correlations. High correlations, highlighting K-drama, food, and mukbang are all deeply related to the Korean language. This reflects the impacts of these factors on motivating people to go through learning Korean language

The concept of positive correlation is utilized to analyze the statistical data and identify the motivational factor most closely aligned with the trend of the Korean Language. A correlation value approaching 1 highlights the strong relationship or similarity between two certain entities - which in this case are the trend of the Korean Language and that of other motivational factors.

K-Films

At the peak of COVID-19 spread throughout the world, individuals are forced to spend most of their lives in their homes and thereby interact with online services. As a result, instead of indulging in outdoor activities - a common situation prior to its outbreak - they consumed more time on films. The achievement of the film industry is primarily impacted by Korean records of composing many films with international recognition and awards, such as *Parasite*, *Train to Busan*, etc. Consequently, to indulge in Korean films through a thorough comprehension of Korean content, foreigners have been more drawn to learn Korean language in order to enhance their understanding of Korean culture.

Korean Alphabet System - Hangul

Individuals' interest in particular cultures only sometimes matches with their enthusiasm for its language. Learners often need help dealing with the language, which can undermine their confidence and discourage them from further pursuing the language journey. By contrast, the Korean language, named Hangul in its native language, characterized by its simplicity, allows foreigners to face the level where they can accomplish goals without being overwhelmed. In terms of writing, Korean has 40 different characters, with 21 vowels and 19 consonants. The simplicity of Korean characters, along with their distinct appearances, provides a memorable impression on learners and enhances their comfort in both reading and writing. Moreover, when exploring the speaking aspect, Korean presents no difficulty, as each character has its unique sound and does not require the mastering of tones or accents. Consequentially, with the familiar environment provided by the Korean language with its simplicity, learners are primarily motivated to engage in Korean language courses. And, it will enable people to 'read the Korean alphabet letters A to Z and start sounding out Korean words anytime [learners] see them.' ((Gerocs, Joseph. "Korean Alphabet - Learn the Hangul Letters and Character Sounds." *90 Day Korean*, 28 Feb. 2024)) As a result, with an appropriate software or program, those willing to learn Korean can feel great comfort.'

Visits to Korea

Sometimes, people visit countries to release their stress and learn more about outside cultures, meaning that not all visitors to Korea are passionate about the Korean language. However, the impression of cultures in visited countries can be a driving force for revisits, contributing to individuals' interest in learning a foreign language. With many events featuring the unique and impressive environment, foreigners, regardless of their motivation towards learning the Korean language, will be attracted to the more profound spirits of Korea and thus put their eyes on learning Korean.

According to the survey conducted by the Ministry of Culture, Sports, and Tourism of Korea (2021), it was found that four out of ten foreigners, more than 60% of visitors who visited Korea, were willing to revisit Korea within three years of following their first visit, proving that they have higher interests toward Korean culture and tourism, and it also shows that the age range between in their 20s and 30s is highly interested in Korean culture. One of the highest percentages of tourists that want to revisit Korea is the Philippines, covering 80.4%, and other visitors from Singapore, Vietnam, Indonesia, Hongkong, Malesia, China, Arab Emirate, and Thailand responded that they want to come back to Korea sometime in the future, and it also shows that those who want to visit Korea again is mostly from the Middle East and Southeast Asia, where K-pop and K-dramas play a pivotal role in their countries. (2021) Based on the results provided, it clearly represents that a lot of special reasons have driven other foreigners to visit Korea, representing the importance of learning the Korean language appropriately.

Google Trends Search

To analyze the data regarding how foreigners can access learning the Korean language or culture, we have conducted research through Google Trends by putting the phrases, such as 'how to learn Korean, and Intro to Korean', resulting in various responses. When the keywords were put into Google Trends, the majority of results could be shown in Asian IP, covering the most percentages of results, which suggests the interest in learning Korean mostly comes from Asian people. On the other hand, Africa IP has the least amount of search data, which means that not a lot of people living in Africa have the internet to learn the Korean language. The result of Google Trends by putting the phrase, how to learn Korean, was 90-day Korean, one of the popular online Korean language courses people can take online. The following results were a PDF of a Korean textbook for beginners related to academic education. Furthermore, various findings related to platforms were made, including Hangul, K-pop, Korean Grammar in Use (textbook), and Talk to Me Korean. With a bunch of data, we could classify the words by themes: Crash courses, Platforms, etc. Based on the results from Google Trends, we have concluded that there is a huge demand for foreigners to learn Korean as well as culture. However, we have also found that there aren't enough online platforms and activities that foreigners can enjoy while learning Korean.

When the themes classify the results, we could derive five parts: crash courses, Hangul, Korean Textbook, Korean Grammar, and Korean spoken Language. Each of the words represents different results. First, when crash courses, an online learning course for people, popped up, the results of K-dramas or romance appeared. In addition, Hangul, the Korean alphabet, could represent K-pop. The next two things, Korean textbook and grammar, prove that there are a lot of demands for learning the Korean language. Lastly, these results were not expected since when the Korean spoken language was searched, PUBG, one of the most popular Steam games in Korea, came out, reflecting that a lot of Korean users play this game.

For academic purposes, the platforms also appeared in the results. As many people already know, Papago, a translator app, was the first-ranked program in Google as well. Even though there is already a Google translator, many people utilize Papago due to the accuracy of Korean translation. Furthermore, crash courses, including 90-day Korean on YouTube, and Udemy, illustrate that language learners only have those options when they want to learn Korean. Also, the textbooks regarding the Korean language were recommended: Korean Grammar in Use, and Talk to Me in Korean. Beginners in the Korean language can access 90-day Korean classes, Korean class 101, Coursera, and Duolingo. However, it is quite interesting to note that there are not a lot of mobile-assisted apps recommended in the Google Trends even if there is such a huge demand by foreigners who want to learn Korean culture. When they use YouTube or Lesson, of course, they can learn the academic background of Korean culture, but it lacks comprehensive features, which can prevent them from getting into the deeper level of learning. So, we have concluded that mobile-assisted apps must be introduced to those who want to kill two birds with one stone.

Crawling Data

Various methods could be utilized to crawl the data from the web, using GET vs POST requests and HTML parsing. Crawling refers to following the links on a page and continuing to find and follow new pages to other pages. We mainly use crawling in data science or machine learning to extract data from websites. For example, if we need "news" data, we can crawl a news website and gather articles from that website. Manually obtaining the data from online sources is not feasible, so we can write code to automate this process. To get information from a particular website, we first need to request that website. Although there are many types of requests, we learned about two important ones.

GET vs POST Requests

GET requests include all required data in the URL, while **POST** requests add additional data in the message body when making requests. The target website decides the type of request that needs to be used. Therefore, when making a request, we must first identify whether we need to make a **GET** or a **POST request**. After making a request, the data can be returned in various forms, such as HTML, JSON, XML, etc. The most common form is HTML. However, HTML contains tags, which we do not need when crawling for data. So, we need to parse the HTML code and extract the data we need. To do this, we used a Python library called BeautifulSoup to help us parse through the HTML code and target certain sections of the code holding our data.

The Figure 3 below is some example code of BeautifulSoup that extracts all quotes from the website:

```
from bs4 import BeautifulSoup

soup = BeautifulSoup(response.content, 'html5lib')
table = soup.find('div', attrs={'id': 'all_quotes'})

quotes = []
for row in table.findAll('div', attrs={'class': 'col-6 col-lg-4 text-center margin-30'}):
    quote = {}
    quote['theme'] = row.h5.text
    quote['url'] = row.a['href']
    quote['img'] = row.img['src']
    quote['inspirational_quote'] = row.img['alt'].split(' #')[0]
    quote['author'] = row.img['alt'].split(' #')[1]
    quotes.append(quote)
```

Figure 3. The Detailed Coding that Extracts all Quotes from the Website

Now, the data that we crawled can be converted into a Pandas DataFrame or exported into a CSV file so that it can be used for further data analysis of the research.

The Analysis of Current Language Applications

Along with the increasing interest in Korean, language applications are widely prevalent and easily accessible to language learners nowadays. Although their contributions to learners' language acquisition are undeniable, their conventional ways of education often prompt their learners to encounter difficulties in mastering specific languages. Many language applications attribute learners' struggles to a perceived lack of effort or capacity. Advertisements for these applications typically convey that dedicating sufficient time and commitment to pursuing and completing all provided courses will result in native-level fluency. However, despite the credibility of their arguments to some extent, the challenges faced by language learners are not related to time consumption or capacity; instead, they are more linked to the inflexibility of the education system employed by the majority.

Firstly, Duolingo - a widely utilized language learning application - poses a few drawbacks for individuals engaging in Korean language courses. While it incorporates practical features like game-like lessons to enhance learners' engagement, it fails to provide video lectures, led by Korean native speakers, enabling learners to grasp correct pronunciation. Indeed, this deficiency prompts setbacks in learners' language acquisition - such as mispronunciation, misinterpretations of expressions, and difficulties in understanding typical Korean communication. Another prominent online learning platform, Edx, poses different aspects of problems in language learning. When users input 'Korean Language Courses' in the AI chatbot, it consistently responds with "I'm sorry, but I couldn't find any specific information about Korean courses or programs in the Xpert knowledge base." Even when individuals search for "Korean tutor," it responds with, "Unfortunately, I don't have any information about Korean tutors." This fiasco to incorporate Korean language education indicates its negligence of Korean as a necessary language course for learners. Other

language learning platforms in the market - such as FluentU, Babbel, and Rosetta Stone - boast some significant features, including podcasts and progress visualization. However, their absence of placement tests and pursuit of repetitive lessons refrain learners from exploring the fundamental and core aspects of the Korean language and maintaining their interest in courses of the Korean Language. This inflexibility merely offers learners a superficial understanding of Korean aspects, limiting their capacity for Korean fluency and leading to boredom with the nature of the Korean language.

Features & Strengths to be Developed

Nami emphasizes that language apps should boast fun, user-friendly, easy-to-use, and effective features for acquiring desired outcomes. They should also be accessible anytime and anywhere ((Nami, Fatemeh. *"Towards More Effective App-Assisted Language Learning: The Essential Content and Design Features of Educational Applications."* *Issues in Language Teaching*, vol. 9, no. 1, June 2020)). To that end, most apps have standard functions, including games or comprehensive dictionaries for the Korean language. To fulfill all the demands that language learners have, we have begun to develop a language learning platform, named MyKstar, which can facilitate the learning process of each user through advanced features, including AI chatbot, Interactive Dashboard, and Karaoke feature. Each function has its own prominent advancement compared to current language platforms with a deficiency of content.

Striking Language Education

Unlike most languages, which pose difficulty with their conventional ways of teaching, MyKstar stands out by offering various striking features that effectively address the language difficulties learners face when learning through courses provided in those applications. The visualized graphs and precise data displayed on Mykstar's main page represent its strength in addressing the common problem, allowing learners to monitor their progress through their performances on daily tasks and quizzes and the representation of the weekly schedule. Such beneficial features of Mykstar enable learners to distinguish between their strengths and weaknesses, allowing for the explicit improvement in learners' language acquisition and thereby heightening their confidence.

AI-Powered Chatbot

learners an insight into their progress and guiding them through personal plans that accommodate learners' preferences regarding daily time consumption on the language app or the level of courses. For instance, an AI-powered chatbot presents learner progress data through appealing graphs and pie charts. Pie charts illustrate users' vocabulary quiz performance, while real-time graphs show the gradual improvement of their language learning. Using the word quiz, users can test their vocabulary with the audio recorded by native Koreans. Every time users finish their vocabulary quiz, the results are recorded in the system, and users can always check the status of their learning progress by using an interactive dashboard.

Interactive Dashboard

An Interactive dashboard, specialized in analyzing whole data of learning progress in a visual, can track the daily progress and continuously check users' status. It is one of the most essential features that users need to utilize since persistence is crucial for learning foreign languages. Also, this function grants users rewards based on their performance with regard to language capabilities, causing learners to be more satisfied when they reach each goal for every lesson, which can be a catalyst for learning Korean.

Karaoke Feature

Lastly, one of the most innovative tools that other language platforms don't have is the 'Karaoke' feature, which helps learners enjoy listening to K-pop and studying the meanings of lyrics simultaneously. Once clicking the 'learning' page, users can select the songs they like to listen to, and once a song is selected, it navigates the page with lyrics displayed on the screen line by line. According to the figure, while the song is being played, users can follow the pronunciation of lyrics and the meanings of the lyrics, enhancing a deeper understanding of the Korean language. This feature is widely used by those who want to learn the Korean language and understand K-culture at a different level compared to learning with other platforms.

To sum up, we have investigated the special strengths that MyKstar occupies. It might overcome a lot of current difficulties that learners might have when they dive into learning a new language. Due to its specialty, it not only helps users understand the literal meaning of words but also comprehends the background culture of Korea, which will broaden users' experiences of learning Korean. Therefore, these unique features which don't exist in other language learning platforms differentiate the ways of learning Korean since there have been no applications such as MyKstar.

Results

The Development of MyKstar

In addition to the data collected by Google Trends Search, we have used a more accurate approach, using data analysis techniques to see if the results can be drawn in the graphs. So, we have gathered all the data from the sources, such as websites as well as Youtube, and visualize them to see what kinds of comparisons can exist. The first comparison we have made is web searches and YouTube searches for K-drama since K-drama is the most popular thing foreigners have longed to watch during the outbreak of COVID-19. And, it clearly shows that the number of searches through web and Youtube search follows a similar pattern, which is an overall uptrend. Moreover, watching or searching for K-drama is taking over web research, resulting in similar patterns, while the K-drama for YouTube search has become much higher than web searches.

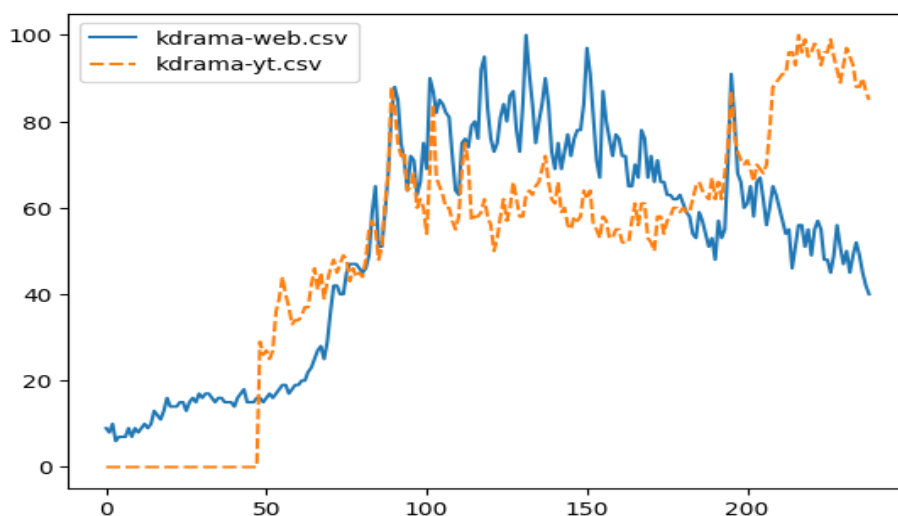


Figure 4. The comparison between web searches vs YouTube searches for KDrama.

We have conducted data analysis through the Web and YouTube to see what kinds of comparisons we can make in terms of Korean culture. So, starting with K-drama preference, the graph shows the two areas people are searching for in K-drama. The labels of graphs, X-axis and Y-axis, represent time period as well as popularity respectively, and the period is ranged from 0 to 250 where the range between 50 and 100 is in Covid Pandemic, which shows that the number of searches for K-drama in Youtube had significantly increased at the beginning of Covid19 Pandemic.

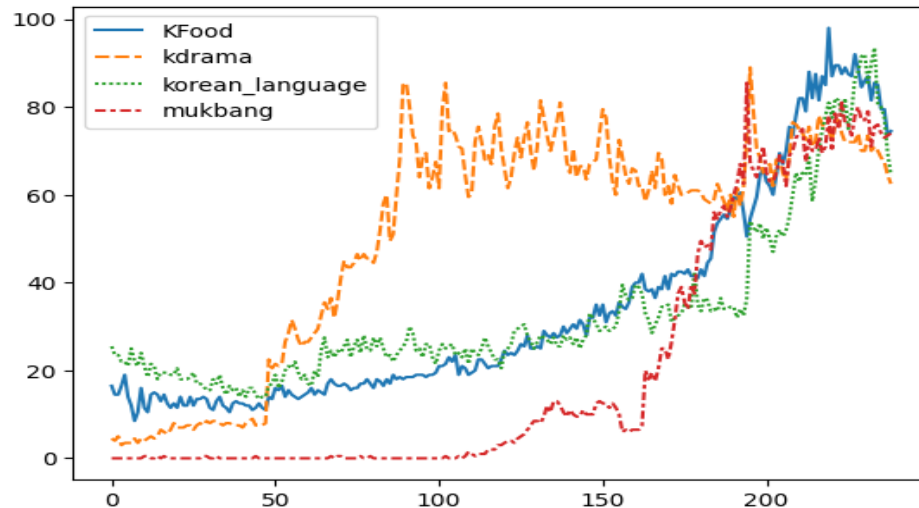


Figure 5. The Trend for all Search Terms over the Web Search (K-Food, K-drama, Korean_language, and Mukbang).

Figure 5 illustrates data analysis similar to the previous one except for adding more categories to the graph and expressing the research results through web pages. Obviously, K-drama covers most of the part and stables as period goes on, the amount of results regarding K-food, K-language, and Mukbang is shown a stable increase at the first period but jumps up rapidly, representing that overall interest of Korean content are generally rising up while the results of K-drama seems to stay the same, meaning that it covers a stable position among individuals.

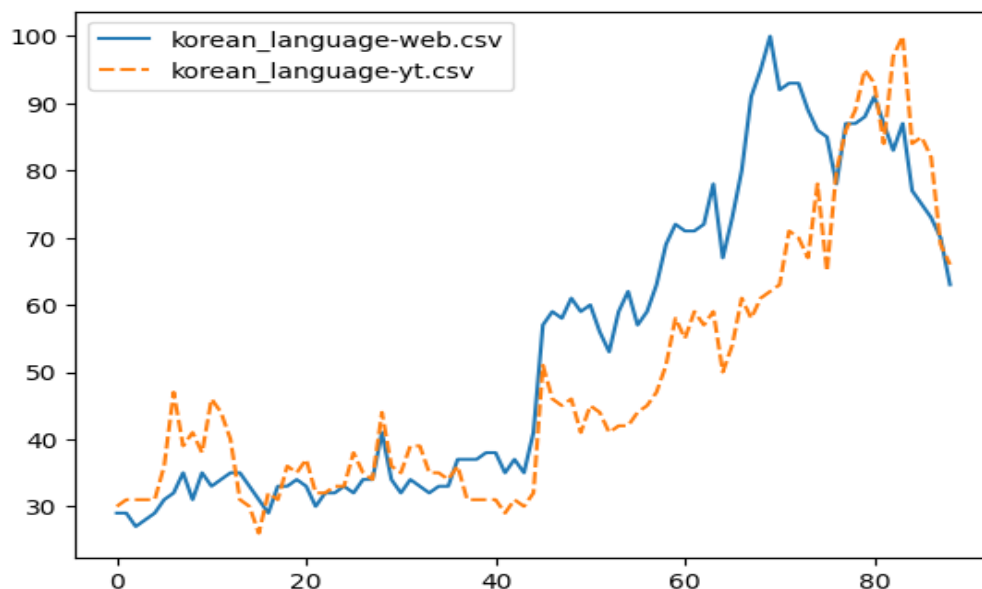


Figure 6. Comparison between korean_language searches over google vs youtube. We see that in recent years, there's a slight downtrend in both, but youtube has been more popular.

As the number of individuals interested in Korean content is increasing significantly, the number of searches regarding learning the Korean language has skyrocketed, as shown above. Since most people use Google and YouTube as search engines, it clearly indicates that if people are getting interested in K-drama, one of the highest coverages among groups, their interest in the Korean language has also increased.

We have also conducted correlation analysis, representing the percentages of frequencies in the range of lists.

Correlation Analysis

Korean language web search vs:

- kdrama-web.csv -0.3101608875324464
- kdrama-yt.csv 0.3015821561181191
- KFood-web.csv 0.47220028899273087
- mukbang-web.csv 0.45761548343287345
- mukbang-yt.csv 0.49012567456282696
- KFood-yt.csv 0.3791089237664155
- korean_language-yt.csv 0.40022717227007104
- netflix-web.csv 0.34985869015220283

Korean language yt search vs:

- kdrama-web.csv 0.5126648159514571
- kdrama-yt.csv 0.827602662982254
- KFood-web.csv 0.9271678901311415
- mukbang-web.csv 0.8795859963772202
- mukbang-yt.csv 0.8616225614137288
- korean_language-web.csv 0.40022717227007104
- KFood-yt.csv 0.9613800951810704
- netflix-web.csv 0.9399323380370472

The data above signifies the correlation with Korean language and search engines, including web searches and Youtube searches, illustrating that the most high correlative number is measured as 0.49, proving that Mukbang content highly affects learners' motivation in learning Korean language. Moreover, in the Youtube searches, it has shown that the most prominent correlative number is K-food, 0.96, which also means the content of K-food has the highest impact on experiencing Korean culture, leading them to start to learn Korean language, Hanguel.

Based on the data gathered through Google Trend Searches as well as Correlation Analysis, people looking for Korean content are moving towards video platforms more since there's an overall higher correlation between YouTube searches for Korean-related queries than web searches over the past five years. By looking into the details of what foreigners might face, we have utilized correlation analysis to illustrate the frequency of words drawn from the results for further research.

Data Analysis

The next thing we have conducted is the data analysis regarding Korean Language learning platforms that people might utilize when learning Korean. Although there are a various number of platforms that learners can choose from, the usage of applications or websites hasn't been visualized, so the data visualization was necessary.

Korean Grammar in Use

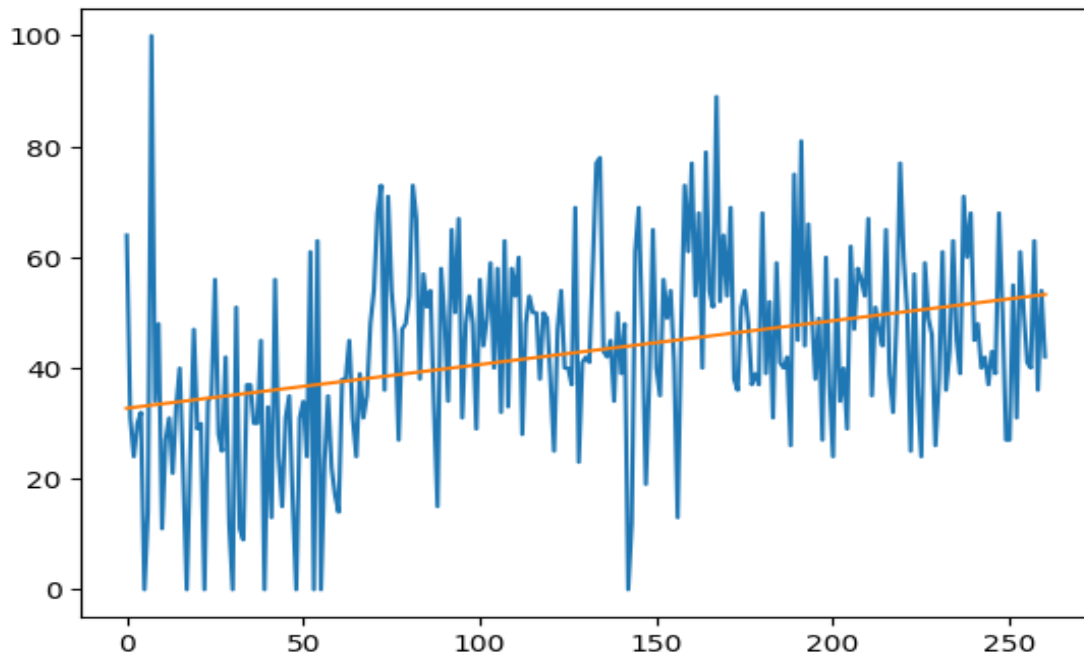


Figure 7. The Popularity of Korean Grammar in Use

To begin with, in the Figure 7, the label of Y-axis represents the value out of google trends. The assumption is that 100 represents the maximum number of queries for this term, and other numbers represent the percentage of that. Moreover, the X-axis represents weeks in the best 5 years. 0 represents 2018, Dec | 260 represents 2023, Dec

This plot shows the popularity of "Korean Grammar In Use" in terms of Google searches over the last five years. The blue line represents the popularity score given by google trends, and the yellow line represents the trend-line of the graph, obtained using linear regression. The insight we can draw from this plot is that it shows a general upward trend of interest, proving that the popularity of learning the Korean language increased gradually throughout the period.

Talk To Me in Korean (Textbook)

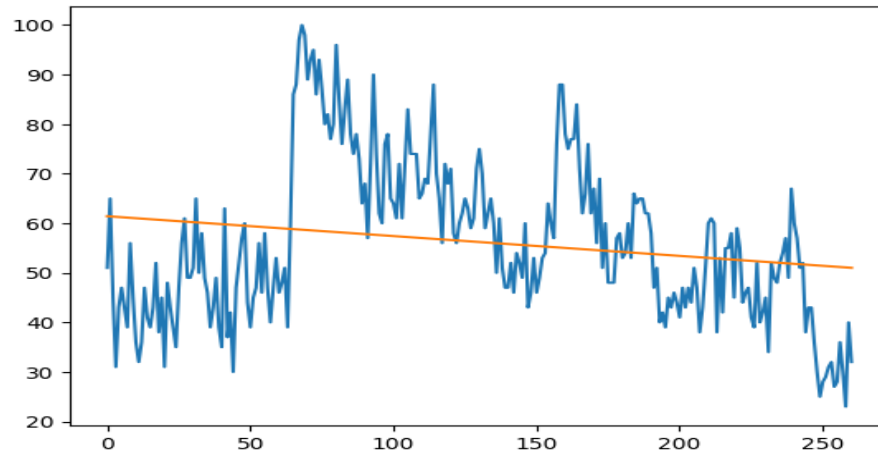


Figure 8. The Popularity of Talk to Me in Korean (Textbook)

Interestingly, there was a huge spike in demand with the start of the COVID-19 pandemic, but then it started to go downwards. One possible explanation is that there was high demand for Korean language learning during the COVID-19 pandemic, probably because Kpop or other K-cultures became more popular, but there's a limitation of textbook format for learning to talk Korean.

Duo Lingo

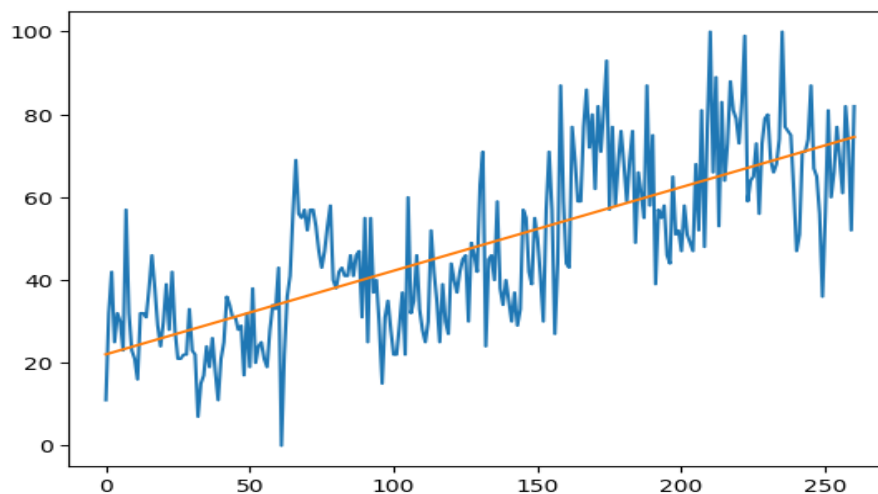


Figure 9. The Popularity of Duo Lingo in the Last Five Years

According to Figure 9, there has been a lot of marketing of this particular platform over the last five years, especially during the COVID-19 pandemic. Duo Lingo already had a reputation, but it's getting even more popular in the previous five years, suggesting they are doing something very well, which MyKstar should benchmark. The graph illustrates the popularity of Duo Lingo, one of the most-used online platforms for language learners, in the last five years. It clearly shows that the overall demand for Duo Lingo has increased gradually, showing a drastic increase during the COVID-19 pandemic.

Coursera

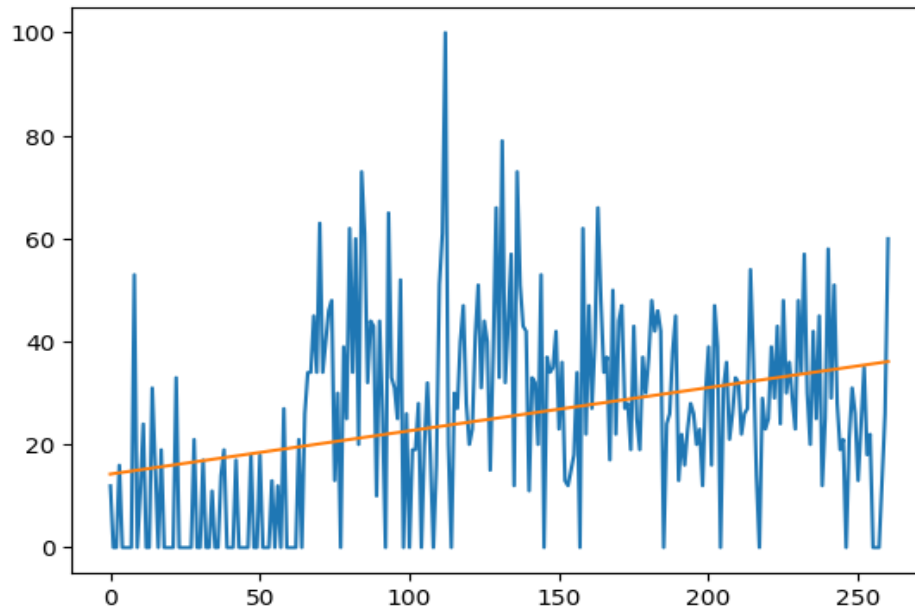


Figure 10. The Popularity of Coursera in the Last Five Years

In Figure 10, the graph shows a linear upward trend, but since its slope is gently upward, its presence as a language learning platform is relatively weaker than others. Coursera, providing a variety of Korean language courses, has been another option for those who want to learn Korean language. However, compared to other platforms, it showed relatively small amount of reputation, starting from around 18, even though there has been a steady increasing demand over the last five years, it seems there has been lots of fluctuations in terms of demand of learning Korean through Coursera.

Descriptive Score

We obtained slope and intercept values from the linear regression over the search terms. We then normalized the slope between the range of -1 & 1, and intercept to be between 0~1. Another critical piece of information is where the search term is the most popular. We assume that the demand for Korean language learning will be the highest in the regions where more travelers visit Korea. According to the government release data, most travelers have visited Korea from Asia in the past seven years, followed by America, Europe, Australia, and Africa. Based on this information, we set different weights for each search term, based on the importance of the region.

Procedure for scoring:

1. For each search term - look at top 5 regions
2. Give score based on region.
 - a. Asia = 3, America = 2, Europe = 1, Everywhere else = 0.5
3. We do a weighted sum of the scores.
 - a. E.g. If Top-5 was America=100, Canada=75, Singapore=63, $(100 * 2 + 75 * 2 + 63 * 3) = x$

After normalizing the scores, we did a sum over the score to obtain the final descriptive score for ranking these platforms. Based on the data analysis, we have found out that the most popular platform in learning Korean is Duo Lingo, and Coursera, even though the reputation was high, it was not that popular for Korean language learning.

In addition, although Talk to me in Korean is declining its popularity, it is still an important textbook because it is more popular in specific regions, such as Asia.

Deliverable

Front-End

When it comes to front-end, since MyKstar is a web learning program, all the interfaces that users will use are designed as simple as possible. So, the initial page, when a user enters the website, is a Sign-in page, Figure 11, in the below.

Figure 11. The Sign-in Page of MyKstar

The account creation process facilitates to store the personal information more effectively, leading the users to follow the detailed steps of learning Korean from the levels they are currently in. As all the information can be stored in one data set, MyKstar can analyze their levels and provide the appropriate solution that can be applied to the system, reflecting the users' language ability.



Figure 12. The Screenshot of an Interactive Dashboard

After signing up, as illustrated in Figure 12, the next stage that users will encounter is an interactive dashboard, which displays the 'Summary' of users' performance visualized by diverse visualization, such as pie charts and

graphs, not only showing their progress of learning Korean, but also keeping the learners at an appropriate level. This will result in summarizing the learning progress, and through these summaries, the users can figure out their levels easily, providing an effective learning agenda.

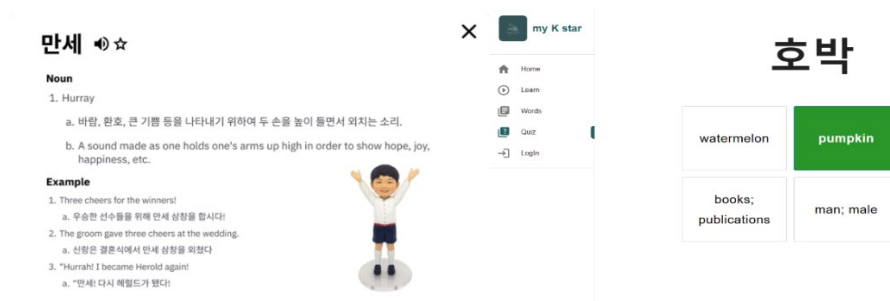


Figure 13. The Dictionary and Word Quiz Feature of MyKstar

The next feature shown in Figure 13 is a simple but essential function of MyKstar since if a user wants to expand their vocabulary, they can navigate to the ‘Words’ section, checking the meanings of each vocabulary as well as listen to the proper pronunciation. Also, as vocabulary needs to be tested to improve language proficiency, MyKstar included the feature of a word quiz whose goal is to correctly identify Korean words presented on the display.

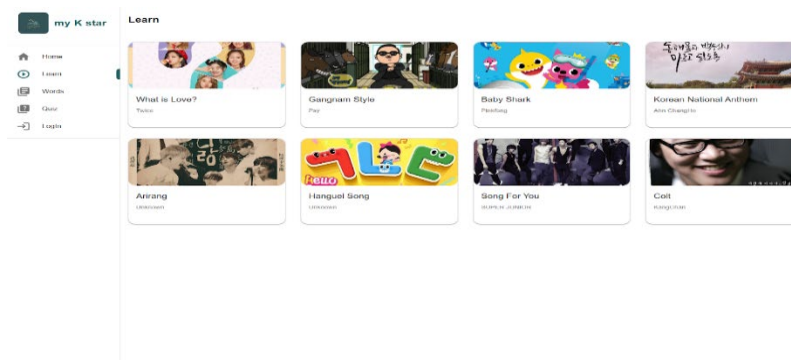


Figure 14. The Screenshot of Karaoke Feature

One of the most significant features that other platforms don’t have is a Karaoke Feature shown in Figure 14, providing K-pop lyrics to be played whenever users want to learn Korean with a song. By entering the section ‘Learn’, users can find a variety of songs that show all the lyrics to enhance the effectiveness of learning Korean language. Once a song is selected, users will be presented with lyrics displayed line by line, synchronized with the audio. Through this unique feature, users can experience different types of K-pop, improving their pronunciation and enjoy the time of learning process.

Back-End

For the technical part, one of the most sophisticated steps in developing the application, the first thing that we had to consider is to set up the connection of the application to the database. And, there are three different tools and techniques to develop the application: creating a server to create an admin Dashboard to register data, and applying data visualization. To visualize data to more effectively present information, we utilized npm (Node Package Manager) and Node.js to facilitate this process. NPM managed the packages necessary for our project's development, ensuring consistent code among team members. Node.js, a JavaScript runtime, enabled the execution of code on physical

machines. Visual Studio Code served as the environment for code editing and execution. This setup streamlined collaboration and development within the team.

In summary, this process involved connecting to a MySQL database, creating a server, developing an admin dashboard with HTML and CSS, utilizing Pug for data retrieval and presentation, and leveraging Node.js for collaborative development. These steps collectively contributed to the successful implementation of this project's database setup and data visualization components.

AI Chatbot

To develop a user-friendly chatbot in MyKstar, HyperText Markup Language (HTML) forms the foundation for structuring content, encompassing sections, paragraphs, and links within the chatbot. Cascading Style Sheets (CSS) enhance the visual presentation and layout, ensuring an appealing user experience across various media. Complementing this, according to Figure 15, JavaScript empowers the chatbot with interactivity, enabling real-time responses, user input handling, and dynamic features that collectively contribute to a user-friendly and engaging AI chatbot interface. The chatbot serves as the centerpiece of our project, offering a user-friendly interface for interacting with our technology stack. The chatbot's capabilities include analyzing user input, generating appropriate questions and responses based on sentiment analysis, and providing valuable information or assistance. Its ability to understand and respond to users mimics human-like interaction, enhancing user engagement and satisfaction.

It's important to note that the version of the chatbot displayed is a demo version, and ongoing training is being conducted to improve its capabilities further. The final developed version will be integrated into the client's corporate framework, enhancing their user experience and providing efficient interaction through the chatbot's advanced functionalities. The figure below shows the essential coding in the development of AI Chatbot system in MyKstar.

```

1  <!DOCTYPE html>
2  <html>
3
4  <head>
5      <title>Chatbot</title>
6      <link rel="icon" href="assets/bot.png" />
7      <link rel="stylesheet" href="static/css/style.css" />
8      <link rel="stylesheet" href="static/css/main.css" />
9  </head>
10
11 <body>
12     <div class="header">
13         <a href="index.html">
14             
15         </a>
16         <h1 class="headerText"> Youngsook's Apple Store </h1>
17     </div>
18     <div class="menu">
19         <a href="index.html">
20             <div class="menuButton">
21                 
22                 <div class="buttonText">
23                     HOME</div>
24             </div>
25         </a>
26     </div>
27     <a href="aboutpage.html">
28         <div class="menuButton">
29             
30             <div class="buttonText">
31                 ABOUT</div>
32         </div>

```

Figure 15. The Coding Screenshot of AI Chatbot

Interactive Dashboard

Interactive Dashboard, one of the most essential tools for data visualization, has been developed in order to analyze the data gathered from each user and formulated to be visualized as graphs and charts. Since the designs of an interactive dashboard must be user convenience and data comprehension, we have considered dynamic interaction, allowing users to visualize their learning progress, making the complex data set simple. Furthermore, since we have integrated a secure CRM database, it enables targeted marketing and improved customer relations. The project's contributions are exemplified through dynamic GIFs and real-time data visualizations, further enhancing user experience.

```

1  # -*- coding: utf-8 -*-
2  import dash
3  from dash import Dash, dcc, html, Input, Output
4  import plotly.express as px
5  # from mainDash import app
6
7  from pages import (
8      overview,
9      pricePerformance,
10     portfolioManagement,
11     feedline,
12     distributions,
13     newsReviews,
14 )
15
16 app = dash.Dash(
17     name=__name__,
18     meta_tags=[{"name": "viewport", "content": "width=device-width"}],
19 )
20 app.config.suppress_callback_exceptions=True
21 app.title = "SuperStore Sales Report"
22 server = app.server
23
24 # Describe the layout/ UI of the app
25 app.layout = html.Div(
26     [dcc.Location(id="url", refresh=False), html.Div(id="page-content")]
27 )
28
29 # Update page
30 app.callback(Output("page-content", "children"), [Input("url", "pathname")])
31
32 def display_page(pathname):
33     if pathname == "/dash-financial-report/price-performance":
34         return pricePerformance.create_layout(app)
35     elif pathname == "/dash-financial-report/news-and-reviews":
36         return newsReviews.create_layout(app)

```

Figure16. The Coding Screenshot of Interactive Dashboard

Figure 16 illustrates the coding formation of Interactive Dashboard in MyKstar, leading the users to trace their learning progress more effectively.

Lyric Player

In the process of implementing MyKstar, we developed a lyric player using React. We converted LRC files, a format that synchronizes song lyrics with an audio file, to JSON and used this data to display lyrics synchronously with the audio. Users can click on any word to get its definition, and we used React's useRef hook to manage the audio player's current time. We made this project highly interactive by using a scoreboard and a definition modal. In addition, converting an LRC file to JSON is a simple way of making the LRC file data more usable in our React application. JSON (JavaScript Object Notation) is a lightweight data-interchange format that is easy to read and write for humans and easy to parse and generate for machines. Since we intend to upload our song information on Firebase Realtime DB, which is highly compatible with JSON, we convert the LRC file to JSON format.

Korean Dictionary API

Integrating the Korean Dictionary API into the application, we could pull word translations and definitions using the fetch function by sending requests to the API. To handle the XML response from the API, we utilized the parseStringPromise function from the xml2js library to convert XML data to JSON format.

```

import { parseStringPromise } from "xml2js";

export const searchDictionary = async (word) => {
    const url = process.env.REACT_APP_DICT_URL;
    const key = process.env.REACT_APP_DICT_KEY;
    const q = word;
    const translated = "y";
    const trans_lang = "1";
    const response = await fetch(`${url}?key=${key}&q=${q}&translated=${translated}&trans_lang=${trans_lang}`);
    const text = await response.text();
    const json = await parseStringPromise(text);
    console.log("Dictionary result: ", json);
    const wordObj = json.channel.item?.[0].sense?.[0];
    if (!wordObj) {
        return null;
    } else {
        const koreanWord = word;
        const koreanDefinition = wordObj.definition[0];
        const englishWord = wordObj.translation?.[0].trans_word[0];
        const englishDefinition = wordObj.translation?.[0].trans_dfn[0];

        return { koreanWord, koreanDefinition, englishWord, englishDefinition }
    }
};

```

Figure 17. The Code of Korean API

In Figure 17, the code of this function retrieves word translations from the Korean Dictionary API, which we used in Definition.js (the definition popup modal) for our karaoke feature. Additionally, it enabled us to create a dictionary page where users can search for Korean words. The knowledge and experience we gained from previous lessons on the fetch API facilitated this seamless integration. A bookmark feature is one of the exciting functionalities we added to the dictionary page. Users can save words they want to review later by clicking the "add to bookmark" button. Upon clicking, the user is redirected to a bookmark page displaying all saved words. We plan to further extend the bookmark feature for a more personalized and interactive learning experience.

Discussion

The deliverable for this research has been brought by two different research studies regarding the data analysis of demand and the motivation to learn the Korean language. The interesting facts found in the data analysis process illustrate that the impact of K-culture mainly causes the motivation of learning the Korean language. Moreover, there is a lot of content, including Korean dramas or K-pop, on YouTube or other social networking systems, resulting in more foreigners accessing the Korean language.

As the fact that the content and the demand for learning Korean are highly related to each other, the number of people trying to learn the Korean language with previously existing platforms, such as Duolingo and Coursera, has been increased significantly. However, although the current language learning platforms provide a certain curriculum for learning Korean, there is a lack of function that can both achieve educational purposes and entertainment features that can lead the learners to deal with more diverse contents of the Korean language. So, to fill this gap, our objective of this project is to implement an entirely new platform that can have more strengths than other platforms in terms of providing effective solutions when learning Korean. Through the data research, we have drawn vital deliverables in the process of development of MyKstar, and the learners have found that since the entertainment functions, such as AI chatbot, Karaoke, and lyric players, could satisfy the novice users, mostly in their 20s. Also, the learners with older ages have informed that their learning progress has become more effective than when they utilized other educational-purposed platforms.

The processes of development should be divided into design and technical part: Front-end, and Back-end. For the Front-end, it focused on the various contents since it has to differentiate from other language learning platforms, MyKstar focused on a user-friendly design that every user can connect to this website comfortably. On the other hand, the back-end, which needs to be developed in a sophisticated way, includes the most advanced techniques that the language learning platform can have.

By gathering all the information and technical procedures, we could finally approach the answers to questions revealed in the beginning of the research. The first question we have considered was that how much influence a language learning platform called MyKstar has an impact on those who want to learn Hangeul by compensating for the shortcomings of existing language learning programs. The second hypothesis was what kind of entertainment Korean beginners can enjoy together when comparing Hangul learning with existing educational platforms.

Based on the Google Trend Search and the crawling of the data from the web, using GET vs POST requests and HTML parsing, our team figured out there is a lot of demand from numerous people willing to learn the Korean language more effectively, not only learning the language itself but also entertaining the K-culture from the platforms described above. However, the significant needs that learners want to achieve were missing in the current language platforms, including Duolingo and Coursera, making learners limited to only learning the language, leading to the previous question of why there is no platform for learning the Korean language to get the idea of both educational and entertaining purpose, resulting in the development of a new language learning platform, MyKstar. Utilizing various techniques and functions, MyKstar includes unique features, such as an AI chatbot system, Interactive Dashboard, Korean dictionary API, and Karaoke function, which could not only focus on educational purposes but also provide the users with practical approaches to using Korean language itself, which could fill the gap between the learning a foreign language and using the actual language. Moreover, the research data crawled in Google clearly illustrates that

Conclusion

This project has been carried out to reveal the importance of mobile assisted apps and websites in the field of education, specifically focusing on Korean Language, by comparing various websites and current online platforms that can provide the descent curriculums of Korean language. Before developing a learning platform, we collected and analyzed a wide range of data by using various methods, including crawling and HTML parsing since we needed to prove the hypothesis that the current language learning platforms tend to lack content and functions that can meet the professional language abilities, examining the current problems that most language learning platforms face. Moreover, we needed to trace why people are willing to learn Korean language as well. So, further research was conducted to delve into the various motivations of learning a foreign language, including understanding other countries' cultures through many contents, so we researched various motivations that drive people to learn Korean. Based on all the information and data gathered through Google Search Trends, we have discovered many correlations that invoke people to be interested in Korean cultures, such as K-drama and K-pops. Although the interest in learning Korean culture and language has skyrocketed, the lack of language learning platforms could not meet the demand of language learners since online platforms need more functions for those who want to learn and understand the Korean language. Eventually, through the data analysis and detailed comparisons with other language learning apps, MyKstar, one of the most potential mobile apps or websites to provide a well-structured curriculum as well as entertaining features of Korean language, has been developed and implemented, providing people with effective methods to learn Korean language. Consequently, many Korean language learners will be able to utilize MyKstar to not only trace their learning progress but also achieve a significant amount of knowledge about Korean culture, which will benefit them in the future.

Acknowledgments

I would like to thank my advisor for the valuable insight provided to me on this topic.

References

- [1] Ahn, T. Y., & Lee, S. M. (2016). User experience of a mobile speaking application with automatic speech recognition for EFL learning. *British Journal of Educational Technology*, 47(4), 778–786.
- [2] Crompton, H. (2013), “A historical overview of m-learning: toward learner-centered education”, in Berge, Z.L. and Muilenburg, L.Y. (Eds), *Handbook of Mobile Learning*, Routledge and Taylor and Francis Group, New York, NY, pp. 3-15.
- [3] Nami, Fatemeh. “*Towards More Effective App-Assisted Language Learning: The Essential Content and Design Features of Educational Applications.*” *Issues in Language Teaching*, vol. 9, no. 1, June 2020, pp. 245–78. <https://doi.org/10.22054/ilt.2020.52777.501>.
- [4] Gerocs, Joseph. “Korean Alphabet - Learn the Hangul Letters and Character Sounds.” *90 Day Korean*, 28 Feb. 2024, www.90daykorean.com/how-to-learn-the-korean-alphabet.
- [5] Gerocs, Joseph. “Why Learn Korean? - 10 Reasons to Learn This Magical Language.” *90 Day Korean*, 7 Nov. 2023, www.90daykorean.com/why-learn-korean.

[6] Park, Jason. "12 Reasons Why Korean Culture Is so Popular [2024]." *TheKoreanGuide*, 19 Aug. 2022, thekoreanguide.com/why-korean-culture-is-so-popular.