

(PFF)Political Fact Finder

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Abstract—The purpose of our service is to help the general public access easily to assembly minutes. The public will be provided not only minutes but also looking up minutes per agenda, participated politicians, his statements, and searching keywords. Through this service, the public can judge politician on real statement, not edited version of media.

Index Terms—Politician, Minutes, AI, Speech, Speaker, Searching, Web, system, service

TABLE I
 ROLE ASSIGNMENTS

Roles	Name	Task description and etc.
User	NUGU speaker users	The users needs are the final goal of the project. They want to make their lives easier and more efficient through the output of the project. They can raise concerns and necessities to the project if their needs dont meet up to satisfaction. It is the most important their rules in a project.
Customer	SKT	Customers demand to the project to make satisfied with users. Customers are located between Develop teams and users. The users needs through the whole project are really close to the main purpose of their rules because they are closely related to their interests. They want project teams to use NUGU speaker to satisfy users.
Software Developers	Hyunho Kim Kyumin Kim	Software developers are main resources of the the project. Their technical stacks and engineering skills create actual product. They demand core function requirements to Development managers which give them up to their developing process. Their final goal is to satisfy users and customers by realizing close to the requirements.

I. INTRODUCTION

In Korea, theres a fashioned sentence The general publics are dog and pig. This sentence was just a script of Korean

Roles	Name	Task description and etc.
Development managers	Sangwon Kim Injun Hwang	Development mangers intercommunicate with Customer and Software developer to satisfy with whole stakeholders. They schedule timelines to stick to the project before deadline. They build overall developing design process. So they should figure out what they are confronted by, such as threats and variables, plan projects and direct business matters that Software developers cant handle with. They support Software developers to focus on developing processes.

movie, Insiders, but it gives sympathies to many citizens. Our team started to think about why this sentence is caught in the minds of the people.

The articles of Korean presses tend to be written on suggestive, prejudiced by inclination of that press rather than political facts, while editing politicians opinions or moves. Also, the presses tend to report only in just portion of facts, only in favor of certain political orientations. Consequently the public cant decide whether that article is neutral or biased on amicable organizations. So they tend to be instigated by that biased report quite often unknowing the facts. In fact, when looking at Naver(the largest portal site of Korea)s political news article, a lot of people are instigated, unilaterally and aggressively commenting on the contents due to stimulating titles or contents that mixed with specific utterances and reporters' opinions. So Naver often hides highest recommended comments in such articles.

Furthermore, by the research of "Statista, Reuters Institute Disitral News Report 2018", Worldwide fake News are seriously produced, and Korea ranked 5th. Also, by the research of "Tomorrow university 20th laboratory" reported 43.3 percent of people are encountered fake news more than once a week. To deal with this situation, Government and Assembly should check this situation and make suitable actions.

It means there is a lack of fact information that politics cant judge politician objectively. Current articles are processed based on reporters political orientation, so people are more and more complicated, and cant make decide based on their criteria. To escape on this situation, some people make an

effort to access on assembly site to judge that certain politicians utterances and their political orientation. But, finding information only on facts is not just easy. It brings about three problems below.

First, the most objective way to determine what a politician has spoken is to hear and judge pure speech of politician, not someone elses refined words. Usually, the politician speaks something that is full of political beliefs in the political meeting. It would be a fact information that politic can determine about the politician. The public fact data of the politician in the assembly site are just only on election records, award records, criminal facts, etc. These simple examples dont provide inclination of the politician. Hence, our team got conviction that the real opinion of politician is in the congressional records. Therefore, our team will develop a service that can verify what politician has spoken by serving assembly minutes easily.

Second, the way to find congressional records is too complex. Congressional records in the assembly are typed by stenographer, and opened to the public through National Assembly Minutes. Public should link in National Assembly Minutes System and download pdf files to find remarks. Many citizens dont interested in politics because it doesnt give any monetary benefits or it doesnt give fun to them. To turn their minds, minimized way to get information of politicians is needed. The National Assembly Minutes that doesnt provide convenience to the citizen is just a nominal system. So our team decide to give information about Assembly minutes to citizen easily through web page. Also, we would like to use AI speaker to fulfill desires of various people.

Furthermore, the current minutes is not classified of its contents and politicians. The file name of minutes just designates on conference date and order. If the user wants to find specific agenda, they need to search it manually by scrolling the pdf files. So our team decide to give solution of this problem. We are going to parse all of the minutes and after classify the politicians agenda and speech in the minutes. This service will provide an useful function that search specific agenda and politician to users. It will be applied to AI speaker to make our service more useful.

The AI speaker(Smart speaker) is a kind of wireless speaker, which is activated by more than one impressive words(hot words). Voice-Command-Device wh ch embed The Virtual Assistant carries out co-interactive functions and hands-free commands.

The biggest difference between AI Speaker and typical Speaker is that the AI speaker recognizes Speech Recognition to perform specific commands like listening to music, setting alarm and timer, searching information like News, weather, etc. The main input and output unit of Speech-Recognition device is built-in Microphone and Speaker. The AI speaker is consisted of such like these simple units, so it is efficient to send and receive information than any other smartphone, smart TV.

Specifically, The NUGU speaker is the first Korean-made AI speaker made by SKT in 2016. Over the last two years,

The NUGU speaker so far developed a lot so typical functions such as mentioned above are already applied. So our team had to decide to make service that speaker doesnt provide and groundbreaking service

Third, There is no current services that gather personalized inclined politician or his related field. By lacking of information of politicians, just some specific politicians are reminded to citizens. Though, even if the politician is not popular, some peoples area of interest can be similar to him. Maybe they want to subscribe regularly of that politician. When they want to find information of him, but they will find out that there are only refined, edited version of his mentions. So, based on whole minutes of specific politicians participated, we will make a interested area or keyword extraction service through big data analysis for our big future plan. This will be a good method to listen on politician who is similar to users interested area by setting up users keyword of interested area and scrapping of his activation.

In conclusion, we want to make a personalized subscribe system of interested politician so the politic can determine of the politician based on objective facts. For this, our team will make service that meet four functions. first, recognizing specific politicians statements by looking up assembly minutes. second, printing the words through web service and AI speaker. third, the function that finding agenda or politician easily. fourth, a method of searching system that user can input his interested words and mentions in the article and the system print outputs the most realated log. Through this service, It is anticipated that the publics independence and judgement will be improved.

II. REQUIREMENTS

A. Public

The public can be provided with not only providing information on the minutes of the assembly but also detailed functions of the minutes. It consists of Log-in page and Main page as big category. They can be provided various useful functions like Looking up function about meeting contents per agenda, participating specific politicians, and their real speech in that agenda. Subscribing interesting politicians and searching keywords system are also provided.

- 1) *Log-in Page:* In the log-in page, the user can saves specific politicians or interested keywords individually. subscribed politician, interested keywords are saved in back-end server. through this, the user can uses subscribe or registering functions.
 - a) *Sign-up:* Log-in page is a first page that users can see when they enter to our website. If username and password are match to our database, user can log in our web page to use our personalized system.
 - b) *ID/PW search:* When the user forgets their id or password, this function can find their ID or

- password after certificating process.
- 2) *Main Page:* The main page is a key feature of this service. Users can search for detailed information about minutes. To concrete this, the following functions are implemented.
- a) *Basic components residing whole web-site:* It consists of website's basic components like Navigation bar that contains several link on whole web page and footer that contains subordinate information. Also, our web service's overall color concept is based on black-navy color.
 - i) *Navigation bar:* it contains several components of the application and user can navigate to the selected page by selecting the list.
 - ii) *Footer:* It resides on our whole web page in upper side to make our user see our team information easily.
 - a) *Looking up function about meeting contents per agenda:* Users can view agendas entering by organized meeting contents following three pages. Each pages intercommunicate to user to surf easily our web service.
 - i) *Looking up list of assembly minutes:* Users can view list of assembly minutes. Each minutes are classified by kinds of that minutes. If user click a minutes, he go through the next page.
 - ii) *Looking up list of agendas per specific assembly minutes:* Users can view list of agendas held on specific minutes. If user click a agenda, he go through the next page.
 - iii) *Looking up dialogue of specific agenda:* Users can view politician's dialogue that held on specific agenda. The dialogue looks like each politician talks each other.
 - b) *Looking up function about politicians' speech according to agenda:* User can view politician's personal information page. This page consists of what meeting, what agenda the politician participated in and his or her utterances in that agenda.
 - c) *Looking up function about subscribing politicians:* Users can view specific politicians that the user was subscribed. User can customize by following politicians.
 - d) *Searching real speech of the politician function:* Users can search interesting keywords or quotations from articles, news, etc. Search Engine will find real speech of the politicians and agendas.
 - e) *Looking up function about politician list:* User can view politician list. User can view current members of assembly along with what political party they are belonged to.
 - f) *Registering of interested political keyword:* User can input his interested keywords to his profile. Also, users can be recommended about politicians by entering interested keywords.
 - g) *Subscribing function about interesting politicians:* Users can subscribe about interesting politicians. This function can be spotted on anywhere on our web service for easy and convenient use of service.
- 1) *Nugu service:* User can use our service through Nugu speaker. They can input specific utterance and the Nugu speaker answers back to the users. At this side, three functions should be implemented.
- a) *Searching information of the politicians function:* This function can search politicians participated agendas. If the user utter curious politician, Nugu speaker send back most recent participated agenda of the politician.
 - b) *Looking up real speech of the politician in that agenda:* User can look up real speech of the politician. Nugu speaker speak out specific politicians most recent utterance.
 - c) *Changing real speech of the politician in that agenda:* User can request Nugu speaker to play back or forward speech of the politician. Nugu speaker speak out back and forward speech of current playing.
 - d) *Subscribing function about interesting politicians:* Users can subscribe to interesting politicians by ordering to Nugu.
 - e) *Deleting subscribed politicians function:* Users can delete subscribed politicians what he registered by ordering to Nugu.

III. RELATED WORKS

We have researched for some softwares that are doing similar works or having similar services to ours. There are some tools that are providing similar service in the side of political things, with different logics and platform . By doing

this research, we found out that software about politics is widely used in various kinds of fields and it has a lot of potential powers.

A. g0v

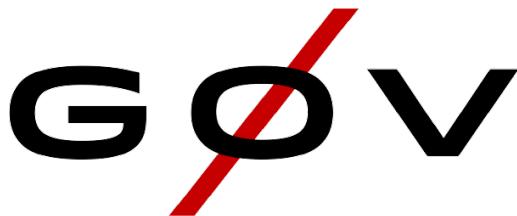


Fig. 1. g0v

The g0v is an open source, open government collaboration started by Chia-liang Kao, ipa, kirby and others in late 2012 in Taiwan. Originally driven by a bimonthly hackathon, the community has expanded to include different professional and non-information technology background members. a "forked" version of that agency with contributions by civic hackers. Continuing this inspiration from the software development world, the forked content can then be "merged" back into the government agency's website. g0v is a community that promotes the transparency of government information and is committed to developing information platforms and tools for citizens to participate in society. As of the beginning of 2014, there have been contributors across three continents, and the results have been released in a free software model that embraces knowledge sharing.

B. Gov track



Fig. 2. Gov track

GovTrack.us is a website developed by then-student Joshua Tauberer. It is based in Washington, D.C., and was launched as a hobby. It enables its users to track the bills and members of the United States Congress. Users can add trackers to certain bills, thereby narrowing the scope of the information

they receive. The website collects data on members of Congress, allowing users to check members' voting records and attendance relative to their peers. It propagates the ideology of increasing transparency in the government and building better communication between the general public and the government.

C. sunlight foundation



Fig. 3. sunlight foundation

The Sunlight Foundation is an American 501 nonpartisan, nonprofit organization that advocates for open government. The organization was founded in April 2006 with the goal of increasing transparency and accountability in the United States Congress, the executive branch, and in state and local governments. The foundation's primary focus is the role of money in politics. The organization seeks to increase campaign finance regulations and disclosure requirements. The Sunlight Foundation advocates for more regulation and limitations regarding campaign finance. The organization opposed the ruling in *Citizens United v. FEC*, calling it "disastrous.". The organization supported the DISCLOSE Act, a congressional bill that would have enacted stricter campaign finance regulations by requiring increased disclosure of political spending in federal elections. The Sunlight Foundation believes that Congress should mandate real-time online disclosure of political contributions. It opposes dark money, or funds given to nonprofit organizations that are not required to disclose their donors.

D. Brigade media

Brigade Media, also known as Brigade, is a civic technology platform that was formed on June 4, 2014, and founded by James Windon, Jason Putorti, John Thrall, Matt Mahan, and Miche Capone. The platform is intended to serve as a



Fig. 4. Brigade media

way for users to connect with others who share the same or similar views and voice their opinions, create debates, or organize petitions. This process is intended to make the users' concerns more visible to and influential towards United States' policymakers. One mission of Brigade Media is to act as a foreground for its users to connect and organize so that they can voice their opinions on our nation's issues. Another more general goal is to increase voter participation. Brigade interacts with American voters by linking its users to the same held concerns. The opinions of elected officials on those concerns will be provided and metrics about the candidate most similar in concerns and degree of concern will be available. This data should be useful for both candidates and voters, in that voters can voice their grievances and candidates must respond accordingly.

IV. DEVELOPMENT ENVIRONMENT

A. Choice of development platform

1) Used platform and why

We will going to use Linux OS platform, specifically Ubuntu ver 16.04 LTS. (Ubuntu is free, completely customizable, resource-friendly than Windows platform.) Furthermore, Linux command line is the biggest reason to use this platform. Its Bash(Shell) with a various command makes our development process easy. In addition, our team going to use Amazon Web Service(AWS) to upload our service to cloud server. Amazon Elastic Compute Cloud (EC2) is a leading infrastructure cloud service that offers scalable compute capacity in the cloud. It allows clients to rent powerful virtual computers and run their own applications. To use this, we have to boot an Amazon Machine Image(AMI). AMI Ubuntu ver 16.04 LTS is provided by the AWS in free tier, so we decide to use. Continuity with local OS version with server OS version helps to develop without incompatibility that occurred due to OS differences.

2) Used Programming Language and why

a) Python 3.7

The Python Package Index(PyPI) contains

numerous third-party modules that make Python capable of interacting with most of the other languages and platforms. Python provides a large standard library which includes areas like internet protocols, string operations, web services tools and operating system interfaces. Many high use programming tasks have already been scripted into the standard library which reduces length of code to be written significantly.

b) Java 1.8

When use spring, the Java language framework, it provides comprehensive infrastructure support for developing Java based applications. Spring also enables the developer to create high performing, reusable, easily testable and loose coupling enterprise Java application. So to speak, Spring provides an abstraction layer on existing technologies like servlets, jsps, jdbc, jndi, rmi, jms and Java mail etc., to simplify the development process. Spring also provides a light-weight container which can be activated without using web server or application server.

c) Javascript

Vue.js, a Javascript framework with various optional tools for building user interfaces, is widely used across the world for web development. One of the greatest advantages of Vue.js is its small size. The size of this framework is 1821KB and it takes not much time to download. Also, it is quite easy to understand. In simple web structure like our project software, Vue.js can be easily added. The documentation with Vue.js is so comprehensive so we can develop our service quickly and concretely.

d) HTML5

HTML is one of the best option to develop the webpage or website for the small or growing business that does not want to invest more in purchasing software or its license and does not require any advanced programming for their websites. HTML provides an easy way to optimize the website in HTML according to browsers to the web developers. HTML can be easily integrated with multiple languages and does not create any issues in it. The most important thing is HTML is used in frontend development for over so many years before we have no other languages available in the market for web development.

e) CSS

CSS allows for more control over the presentation of our web pages. The Style Sheets specification works by allowing to specify rules that say how the content of elements within our document

should appear. One of its key benefits is the way it allows the separation of document content. Converting from an HTML page to a CSS design page may be a bit difficult and time consuming task. So, we decide to use CSS.

3) Cost estimation (Software):

TABLE II
COST ESTIMATION

Category	Name and Version	Cost
Operating System	Ubuntu 16.04 LTS	0
VMware	VirtualBox 5.2.20	0
Search Engine	Elasticsearch 5.7	0
Text editor	Sublime text 3	0
	Visual Studio Code 1.39	0
IDE	Eclipse 20188-12	0
Development Kit	JDK 1.8	0
Version control	Git	0
	Github	0
Server	AWS EC2(free tier)	0
Documentation	Latex	0
	Google Docs	0
Communication	Slack	0
	KakaoTalk	0
Design	Balsamiq	0

B. Software in use

1) Git



Fig. 5. Git

The Git is a distributed version-control tool. So to speak, Git can review previous version easily, when it comes to complicated codes. Many users can share their entire codes dividing their part, even if they are developing same module. Even if the network doesn't work, the user can version control their codes until network works.

2) Github

The Github is a web hosting service which uses Git. Github provides graphical user interface(GUI) Web UI, In contrast to Git(CLI). Github projects can be operated



Fig. 6. Github

through Git CLI interface. In addition, Open repository of Github can be visited not only registered users but also non-registered users. So, when another user wants to fork other persons repository, they can fork theirs. One of a function of Github is pull requests, that is, when the other users want to push modified codes, the original author can review their codes and can confirm to change his code.

3) AWS



Fig. 7. AWS

Amazon Web services(AWS) is a subsidiary of Amazon that provides on-demand cloud computing platforms to individuals, companies, and governments as they pay. AWS provides various infrastructures and gathered service that every physical computing resources such as Web and mobile applications, big data projects, social game can be executed through cloud system. The AWS technology is implemented at server farms throughout the world. Subscribers can obtain large scale computing capacity more quickly and cheaply than building an actual physical server farm. It is known as most safe and trustable cloud service in the world. It also has easy and fast expandability.

4) Sublime text

Sublime Text is a proprietary cross-platform source code editor with a Python application programming



Fig. 8. Sublime text

interface (API). It natively supports many programming languages and markup languages, and functions can be added by users with plugins, typically community-built and maintained under free-software licenses.

5) *Slack*



Fig. 9. Slack

Slack is a cloud-based proprietary instant messaging platform developed by Slack Technologies. Slack offers many Internet Relay Chat(IRC) features, including persistent chat rooms(channels) that is organized by topic, private groups, and direct messaging. By using Slack, users can find previously uploaded files easily in the messenger. Users also can communicate on its each files. Users can communicate on each topics, and can comment on individual messages.

6) *Latex*

Latex is a document preparation system. When writing, the writer uses plain text as opposed to the formatted text like word processors like Word. The writer uses markup tagging conventions to define the general structure of a document, to style text throughout a document, and to add citations and cross-references. Latex is widely used in academia, and it can be used



Fig. 10. Latex

as a standalone document preparation system, or as an intermediate format. LaTeX is intended to provide a high-level, descriptive markup language that accesses the power of TeX in an easier way for writers.

7) *Google Docs*



Fig. 11. Google Docs

Google Docs is a word processor included as part of a free, web-based software office suite offered by Google within its Google Drive service. The application allows users to create and edit files online while collaborating with other users in real-time. Edits are tracked by user with a revision history presenting changes. An editor's position is highlighted with an editor-specific color and cursor. A permissions system regulates what users can do.

8) *Balsamiq*

Balsamiq Wireframes is a graphical user interface that is website wireframe builder application. It allows the designer to arrange pre-build widgets using a drag-and-drop WYSIWYG editor. Balsamiq Wireframes is a rapid low-fidelity UI wireframing tool that reproduces the experience of sketching on a notepad or whiteboard, but using a computer. It really forces to focus on structure and content, avoiding lengthy discussions about colors and details that should come later in the process.



Fig. 12. Balsamiq

9) *virtualbox*



Fig. 13. virtualbox

Oracle VM VirtualBox is a free and open source hosted hypervisor for x86 virtualization. It can be installed on various operating systems like Windows, Mac OS, Linux, etc. It supports the creation and management of guest virtual machines that run Windows, Linux, limited macOS. Users can load multiple guest OSes under a single host operating system. Each guest OS can be started, paused, and stopped independently within its own virtual machine.

10) *JDK*

Java Development Kit is an implementation of various platforms released by Oracle Corporation aimed at Java developers on Linux, macOS or Windows. It includes a private JVM and a few other resources to finish the development of a Java Application. The JDK comes with a complete Java Runtime Environment (JRE) that is composed with Java Virtual Machine (JVM) along with all of the class libraries. Also, it includes Java Compilers, Debuggers, JavaDoc that are needed to develop Java software.

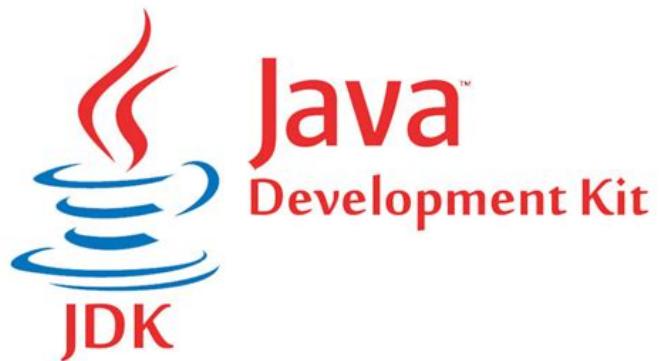


Fig. 14. JDK

11) *Eclipse*



Fig. 15. Eclipse

Eclipse is an integrated development environment used in computer programming, and it was the most widely used Java IDE in one website's poll in 2014. It contains a base workspace and an extensible plug-in system for customizing the environment. Eclipse is written mostly in Java and its primary use is for developing Java applications. Development environments include the Eclipse Java development tools (JDT) for Java. Eclipse supports development for Tomcat, GlassFish and many other servers and is often capable of installing the required server (for development) directly from the IDE. It supports remote debugging, allowing a user to watch variables and step through the code of an application that is running on the attached server.

12) *Visual Studio Code*



Fig. 16. Visual Studio Code

Visual Studio Code is a source-code editor developed by Microsoft for Windows, Linux and macOS. It includes support for debugging, embedded Git control and GitHub, syntax highlighting, intelligent code completion, snippets, and code refactoring. It is highly customizable, allowing users to change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality. Visual Studio Code is a source code editor that can be used with a variety of programming languages. Instead of a project system it allows users to open one or more directories, which can then be saved in workspaces for future reuse.

13) Elasticsearch



Fig. 17. Elasticsearch

Elasticsearch is a search engine based on the Lucene library. It provides a distributed, multitenant-capable full-text search engine with an HTTP web interface and schema-free JSON documents. Elasticsearch is developed in Java. Following an open-core business model, parts of the software are licensed under various open-source licenses. Elasticsearch can be used to search all kinds of documents. It provides scalable search, has near real-time search, and supports multitenancy.

C. Task Distribution

TABLE III
TASK DISTRIBUTION

Name	Task distribution
Kyumin Kim	Web back-end, Web front-end
Hyunho Kim	Refining Dataset, Database back-end
Sangwon Kim	Nugu speaker back-end, Teach Dataset to Nugu
Injun Hwang	Nugu speaker back-end, Teach Dataset to Nugu

V. SPECIFICATION

A. Public

The public can be provided with not only providing information on the minutes of the assembly but also detailed functions of the minutes. It consists of Log-in page and Main page as big category. They can be provided various useful functions like Looking up function about meeting contents

per agenda, participating specific politicians, and their real speech in that agenda. Subscribing interesting politicians and searching keywords system are also provided.

1) Log-in Page:

In the log-in page, User can Sign-up, Log-in, and find ID or Password. If the user logged in, he can saves specific politicians or interested keywords individually. subscribed politician, interested keywords are saved in back-end server. through this, the user can uses subscribe or registering functions.

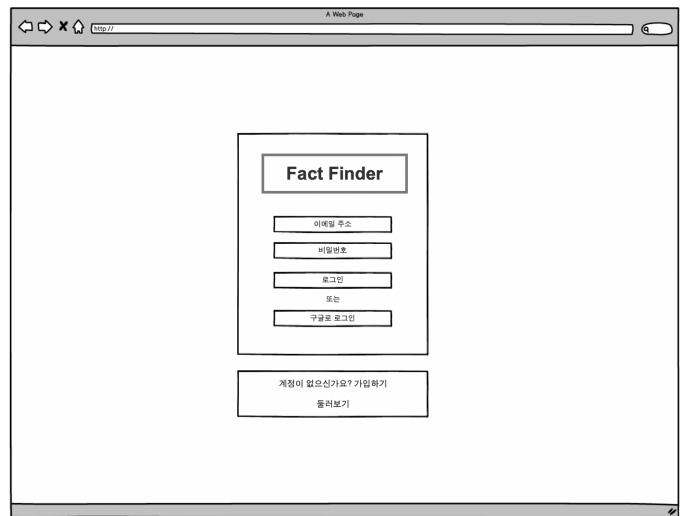


Fig. 18. Log-in

- a) *Log-in:* Log-in page is a first page that users can see when they enter to our website. The user have to fill out their e-mail and password in this page. If username and password are match to our database, user can log in our web page to use our personalized system. If users succeed to log in, they can be identified through the internal identifying process so that they can move into the main page . Although, they bump into the failure message if the password is wrong. furthermore, if they enter wrong password over five times, their accounts are locked so that they have to certificate their identity through contact address such as e-mail, phone number to get certification number to unlock their accounts. If they want to use our service without login, they can press looking around button. In this case, they can use our service without our subscribing function of interested politician. Also they can choose Sign up button to get into the sign up page if they want to sign up to our service.

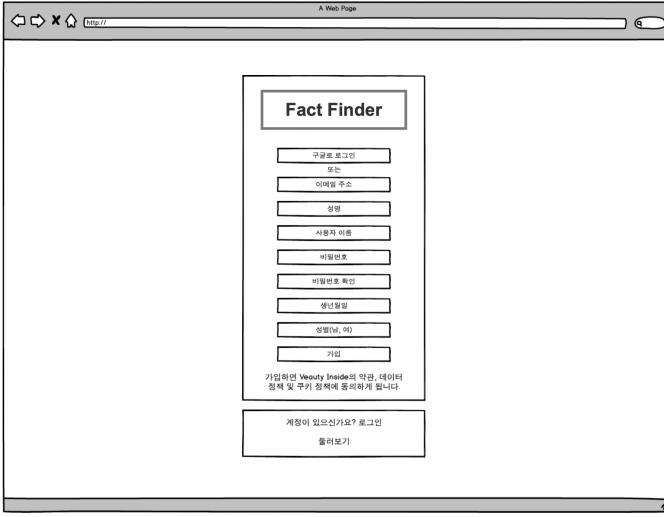


Fig. 19. sign-up

- b) *sign-up*: This page requires user to users information such as E-mail, Username, Nickname, password, birth date, sex. These information are submitted to our database. Also, user must agree on our services terms, data, cookie policy. User can sign in into our page if they finish their forming information process. Furthermore, User can sign up through Kakao talk, Google, Naver ID certificating processes. If they want to use our service without login, they can press looking around button. In this case, they can't use our service without our subscribing function of interested politician. Also they can choose Sign up button to get into the sign up page if they want to sign up to our service.
- c) *ID/PW search*: If the user forget about their ID or Password, they can find theirs through this page. Through the information saved on our database, user can certificate themselves by sending certification number to their E-mail, phone number, or I-PIN. User should change their password after this function.

2) Main Page:

The main page is a key feature of this service. Users can search for detailed information about minutes. Service website is designed with simple and easy features because of users' readability of our letters. To concrete this, the following functions are implemented.

- a) *Basic components residing whole web-site*: It consists of website's basic components like Navigation bar that contains several link on whole

web page and footer that contains subordinative information. Also, our web service's overall color concept is based on navy color.

- i) *Navigation bar*: it contains several components of the application and user can can navigate to the selected page by selecting the list. navigation bar consists of the following items and is linked to each item. This Navigation bar resides on our whole web page in under side to make our user link in whole web site easily. It's links consists of to all of our core web function, "1. Looking up list of assembly minutes, 2. Looking up list of agendas per specific assembly minutes, 3. Looking up dialogue of specific agenda, Looking up function about agenda participating specific politicians, 4. Looking up function about politician's speech according to agenda, 5. Looking up function about subscribing politicians, 6. Searching real speech of the politician function"
- ii) *Footer*: It consists of our team location, contact numbers, email, Legal information, Official SNS links, related website. It resides on our whole web page in upper side to make our user see our team information easily.
- a) *Looking up function about meeting contents per agenda*: This function consists of three pages, Looking up list of assembly minutes, Looking up list of agendas per specific assembly minutes, Looking up dialogue of specific agenda.

Looking up function about meeting contents per agenda		
Meeting contents inquiry function per agenda	Looking up function about politician's speech according to agenda	Looking up function about politician's speech according to agenda
Looking up function about politician's speech according to agenda	Looking up function about concerned politicians	
372회 국회 본회의 회의록	373회 국회 본회의 회의록	374회 국회 본회의 회의록
377회 국회 본회의 회의록	378회 국회 본회의 회의록	379회 국회 본회의 회의록
383회 국회 본회의 회의록	384회 국회 본회의 회의록	385회 국회 본회의 회의록
388회 국회 본회의 회의록	390회 국회 본회의 회의록	391회 국회 본회의 회의록
395회 국회 본회의 회의록	396회 국회 본회의 회의록	397회 국회 본회의 회의록
401회 국회 본회의 회의록	402회 국회 본회의 회의록	403회 국회 본회의 회의록
407회 국회 본회의 회의록	408회 국회 본회의 회의록	409회 국회 본회의 회의록
413회 국회 본회의 회의록	414회 국회 본회의 회의록	415회 국회 본회의 회의록
419회 국회 본회의 회의록	420회 국회 본회의 회의록	421회 국회 본회의 회의록
		422회 국회 본회의 회의록
		423회 국회 본회의 회의록
		424회 국회 본회의 회의록

Fig. 20. Looking up list of assembly minutes

- i) *Looking up list of assembly minutes:* In first page, it shows assembly minutes list. Minutes list that is classified periodically includes monthly, weekly, and certain time period setting function. Because of this, user can search the record of the past and view minutes in certain date. The minutes are classified by kinds of minutes. The kinds are like, "The main session of state affairs, standing committees, special committees, confirmation hearings, subcommittees, parliamentary audits, public hearings, hearings and joint meetings". If the amount of list in single page is too many(up to 50), this page is paginated to next page.

Fig. 21. Looking up list of agendas per specific assembly minutes

- ii) *Looking up list of agendas per specific assembly minutes:* In Second page, It consists of each minutes count number and agendas. In the big table, it shows each count number, specifically, each table contains what agendas are discussed in that congress meeting. If user wants to search specific agenda, he can just view that by clicking that agenda. He can move onto the detail page. This page can be basically scrolled down, but, If the amount of list in single page is too many(up to 10), this page is paginated to next page.

- iii) *Looking up dialogue of specific agenda:* In third page, it shows detail page that belonged to chosen agenda by the user. It looks like social messenger, talking each other like shown above. Specifically, The politicians image is attached and his or her speech is surrounded in a box. One single page is not finish until

Fig. 22. Looking up dialogue of specific agenda

specific agenda is over.

Fig. 23. Looking up function about politician list

- b) *Looking up function about politician list:*

- i) *In this page, user can view politician list.*
User can view current members of assembly along with where they are belonged to. If user click a member, they can move onto the page that politicians commented agendas. in other words, This page is connected to as a separated function as third below, Looking up function about politicians speech according to agenda.

- ii) *Subscribing function about interesting politicians:* If user wants to follow specific

politician what they did in assembly on and on, they can click subscribe button in the member box. In this case, user can check what they saved in the fourth function, Looking up function about subscribing politics. This function is activated only if the user was logged in.

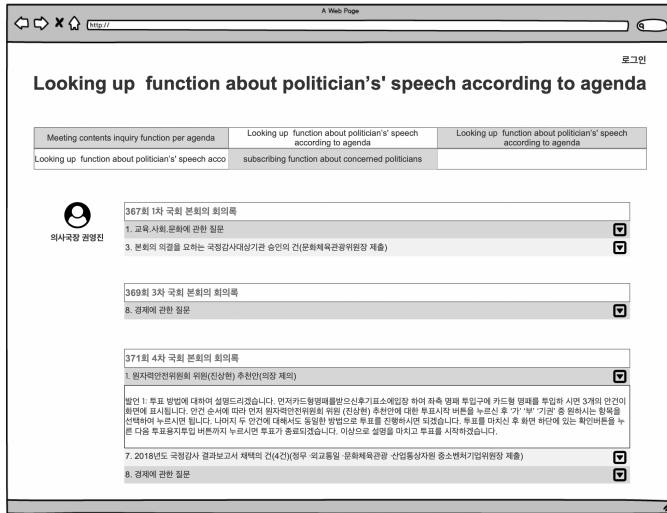


Fig. 24. Looking up function about politicians' speech according to agenda

c) *Looking up function about politicians speech according to agenda:*

- If user selected or searched to specific politician, they can view this page. In this page, User can see specific politicians participated agenda. Each table is consisted of the name of the assembly minutes, and details are filled with that politicians participated agenda. If user wants to view what they spoke specifically at that agenda, they can click the pointing down arrow button. the pop-up box shows the politicians speech, and its contents are separated with numbers like speech1, speech2.
- Subscribing function about interesting politicians:* If user wants to follow specific politician what they did in assembly on and on, they can click subscribe button in the member box. In this case, user can check what they saved in the fourth function, Looking up function about subscribing politics. This function is activated only if the user was logged in.
- Looking up function about subscribing politicians:* User can subscribe users interested politicians.



Fig. 25. Looking up function about subscribing politicians

In this page, user can customize this page by subscribing specific politicians functions implemented above. They can choose their favorite politicians. If the user click the image of politician, they can move onto the third function, Looking up function about politicians' speech according to agenda.

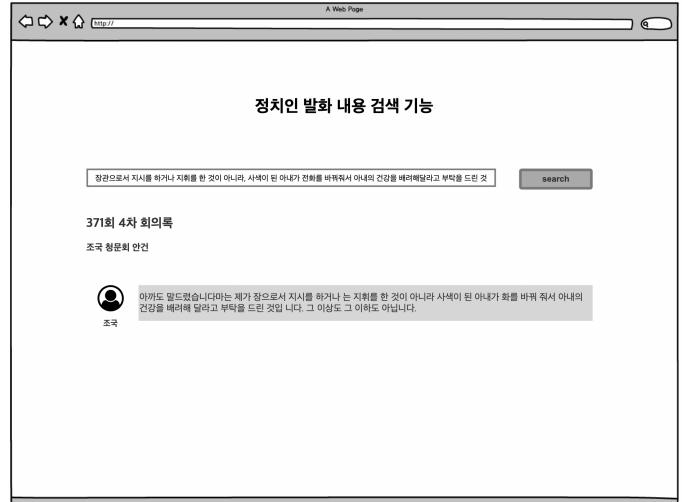


Fig. 26. Searching real speech of the politician function

- e) *Searching real speech of the politician function:* This page is useful if the user wants to judge articles quotation is true or not. User can search the facts in the minutes data, by filling out the search bar. If the user copy quotation in the article and paste in the search bar, they can click the search button. If then, what the politician actually said is popped out below with name of

the assembly minutes, and agenda when he said at.

registered. If the user subscribe specific politician, this is synchronized with our web service.

- e) *Deleting subscribed politicians function:* Users can delete subscribed politicians what he registered. If the user delete specific politician, this is synchronized with our web service.

3) *Nugu service:* User can use our service through Nugu speaker. They can input specific utterance and the Nugu speaker answers back to the users. Searching information of the politicians, Looking up real speech of the politician in that agenda, Changing real speech of the politician in that agenda, Subscribing, Deleting about interesting politicians are should be implemented. This service is based on our database to be synchronized with our web service.

TABLE IV
GENERAL SERVICE FLOW

Speaker	Utterance
User	Aria, tell me politician list that I subscribed.
Nugu	You subscribed [Politician1], [Politician2], [Politician3].
User	Aria, tell me [Politician]'s (recent) participated meeting.
Nugu	[Politician] was participated in National Assembly [0th] conference.
User	Aria, tell me [Politician]'s (recent) participated agenda.
Nugu	[Politician] was participated in [agenda].
User	Aria, tell me [Politician]'s (recent) utterance.
Nugu	[Politician] said, " ".

- a) *Searching information of the politicians function:* This function can search politicians participated agendas. If the user utter curious politician, Nugu speaker send back most recent participated agenda of the politician. That Politician should be in our politician list data to be searched.
- b) *Looking up real speech of the politician in that agenda:* User can look up real speech of the politician. Nugu speaker speak out specific politicians most recent utterance based on our database.
- c) *Changing real speech of the politician in that agenda:* User can request Nugu speaker to play back or forward speech of the politician. Nugu speaker speak out back and forward speech of current playing utterance.
- d) *Subscribing function about interesting politicians:* Users can subscribe to interesting politicians. Politician should be in our politician list to be