COVID-19: Impact to and Response of Highmark Health.

Analysis, Website with interactive Chatbot

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This documentation is created to walk you through my 3 weeklong summer internship case study project at Highmark Health. This includes all the analysis and reasoning for the creation as well as the user instruction on how to and where to find the information. If you find any problems or have recommendation, please send an email to:

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1. Project Background and Requirements

1.1 Highmark Health

Covid-19 had been declared as pandemic before receiving the project details of my 12-week internship at Highmark Health. To adjust to the changes, Highmark Health decided to shorten its summer internship into a 3 weeklong remote intern case study project. This case study project has increased my awareness to the pandemic, and its impact on community.

Most often, all phases of the project planning are implemented and tested by the party that who is already familiar with the product or the project. I wish to contribute to the value and the hard work of Highmark Health by giving personal analysis as an intern who is fresh to the company.

1.1.1   Background

Highmark Health is a national health and wellness organization whose mission is to create a remarkable health experience, freeing people to be their best. Highmark Health recognizes health care urgently needs breakthrough solutions and new visionaries to champion change. They've stepped up to be leaders in that quest and catalysts in that change. Highmark Health and the Allegheny Health Network have been monitoring the coronavirus situation closely and had been preparing accordingly since the onset of the activity.

1.1.2   Task

I was provided with the reference material in chronological order. I had to take a closer look on the action taken by the organization, and to create an assessment of how I think Highmark Health has handled the Covid-19 pandemic. I had a freedom in choosing the format that details my evaluation.

1.1.3   Minimum Requirement

Following is the project requirement provided by the Highmark Health.

- Evaluation of how Highmark Health handled the situation, with supporting facts.

- A clear point of view.

- At least one comparative example that supports the conclusion.

- At least one academic reference.

- Viewpoint on if I were a member of the Highmark Health leadership team, what I would have done differently.

- What risks there are to consider and how I would mitigate them.

- Detail on how I would define success for navigating the outcomes of coronavirus as a leader in the health and wellness industry.

1.2 Penn State University

I am an international student at Penn State University, and it is required to obtain a CPT work permit in order to work for a company in the United States. The process of obtaining a CPT work permit includes an enrollment to an internship course. Penn State University requires at least 150 hours of internship experience to accept an enrollment for the course, which doesn't include my case because my internship at Highmark Health has shortened from 480 hours into 120 hours. However, I was able to enroll for the course by making an adjustment to work extra 30 hours in additional to my given 120 hours at Highmark Health. I decided to work further on the web development and promised to create a full stack website without using any given platforms.

2.   Covid-19: Analysis

2.1 Background on the progression of Covid-19

Covid-19 pandemic is caused by a Coronavirus called SARS-CoV-2. The outbreak began in China when the virus began to infect among human, and now has spread around the world. According to CDC, there are in total of 2,104,346 confirmed cases and 116,140 deaths caused by Coronavirus as of June 16th of 2020 in the United States. In Pennsylvania, there are 79,483 total confirmed cases and 6,276 deaths. According to U.S. Census Bureau, estimated population of Pennsylvania is 12,801,989 as of July of 2019, which makes us realize how quickly the coronavirus is spreading and how many people are getting affected by this pandemic. There have

been social restrictions such as stay at home order, prohibit large gathering more than 25 people,

masks required when entering a business, closure of indoor recreation and all entertainment and

many more depending on the county and the state.

2.2 Impact to and Response of Highmark Health

There is a chatbot, the user interactive virtual assistant on Highmark Coronavirus Update

web page. The chatbot's name is Covid-19 Answers Virtual Assistant, therefore I assume the

chatbot is created for Covid-19 pandemic. Below *figure* 1 flow chart is created after testing the

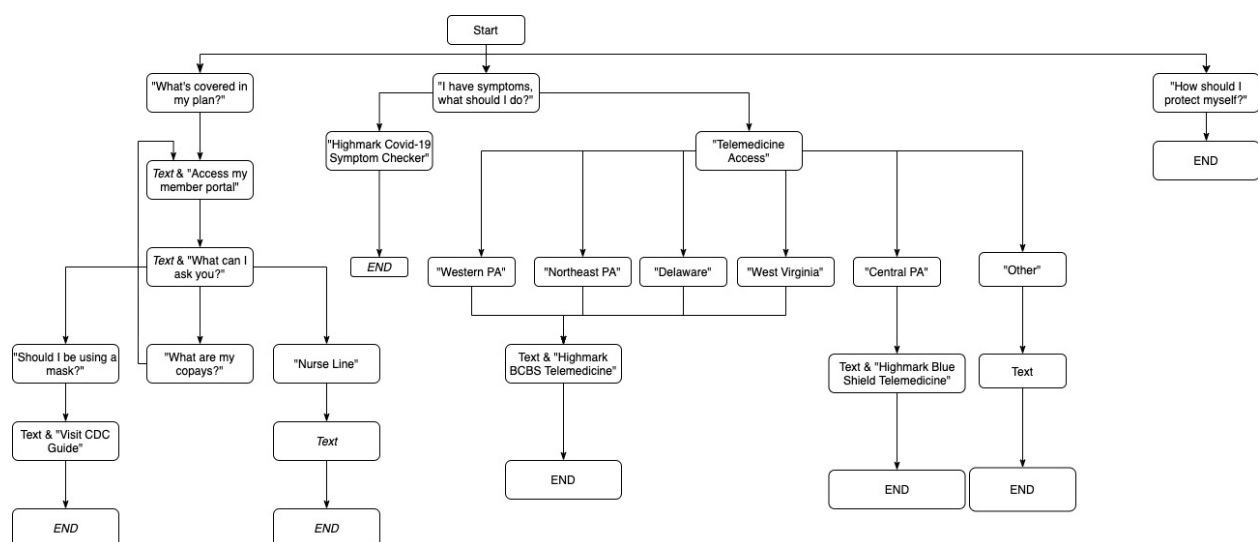chatbot. I extracted the information using sample questions provided by the chatbot.

Figure 1. Flow chart of Highmark Coronavirus Update web page's Chatbot Intent.

I found 2 crucial errors in the chatbot. First, there is an infinite loop after choosing "What

are my copays?". It creates an infinite loop because "Access my member portal" is not

functioning properly. As a tester and a user, I would expect choosing "Access my member

portal" would lead to a log-in portal or a member portal. However, the chatbot guides me

through an infinite loop of choices rather than an action. Second, the chatbot doesn't respond

when I choose "How should I protect myself?". Interestingly, the chatbot provides an answer

when I type the question, rather than clicking the sample question. You can see in *figure 2,* I

clicked on the provided sample question and there is no response from the chatbot. After waiting

for 5 minutes, I typed the same question and the chatbot provided me an answer within a second

as you can see in *figure 3*. This is odd because for all the other cases, the chatbot automatically

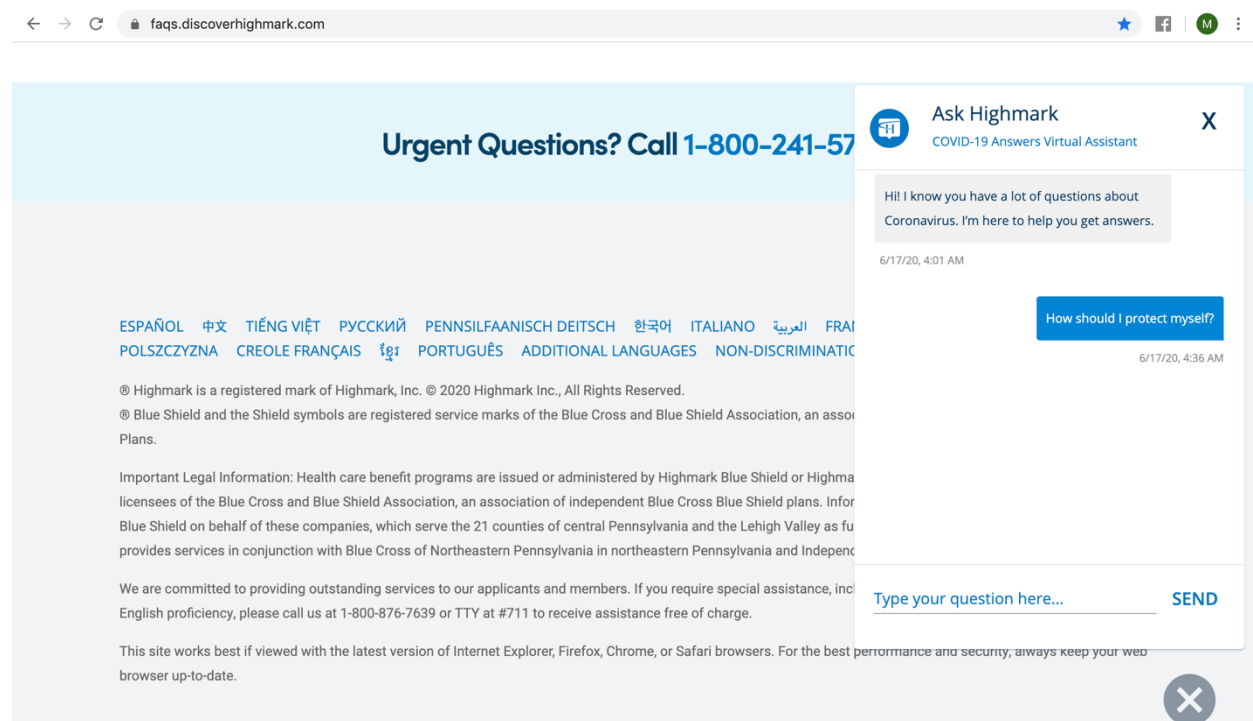responded within a second as soon as I clicked on the sample question.

Figure 2. Chatbot not responding to a clicked question that provided by the chatbot.
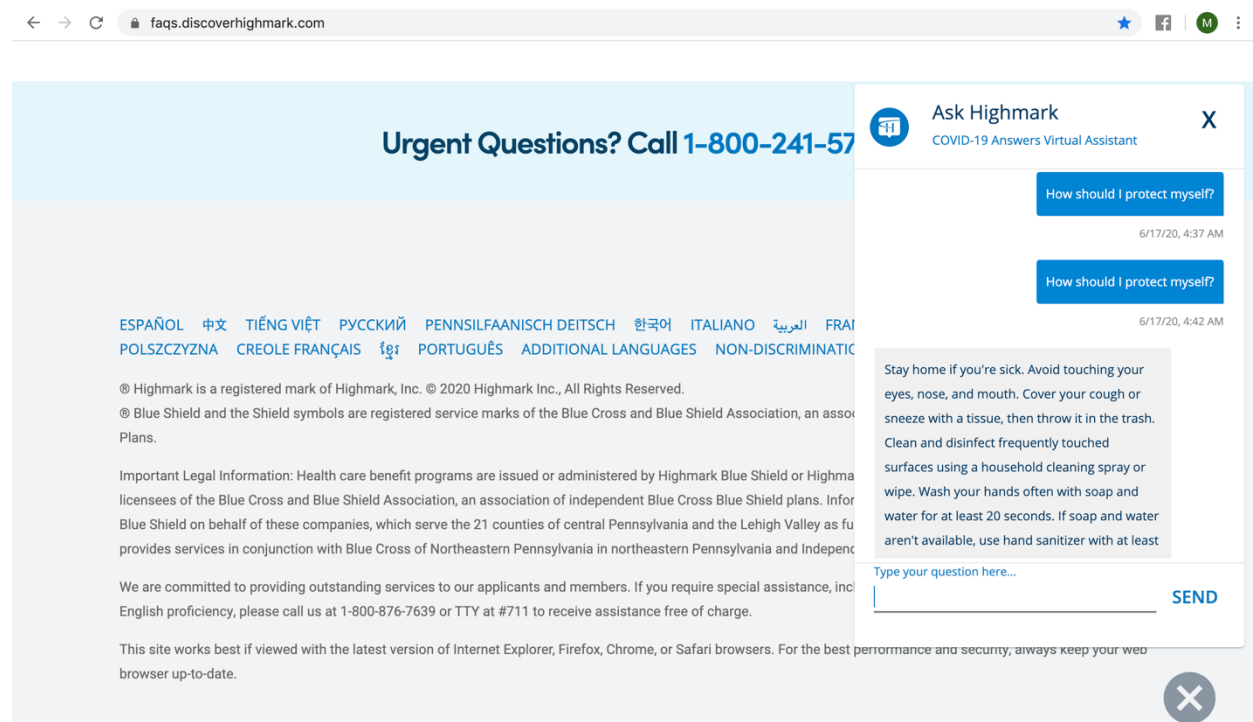
Figure 3. Chatbot immediately responding after typing the question.

The chatbot is located on the right bottom side of the website as shown in *figure 4*. The chatbot is not easily noticeable for 2 reasons which leads to not acknowledging the existence of a chatbot. First, the color of the footer and the color of the chatbot icon is similar blue shade which makes it hard to distinguish. Second, the chatbot does not have animated movement or starter sentence to catch the user's attention.
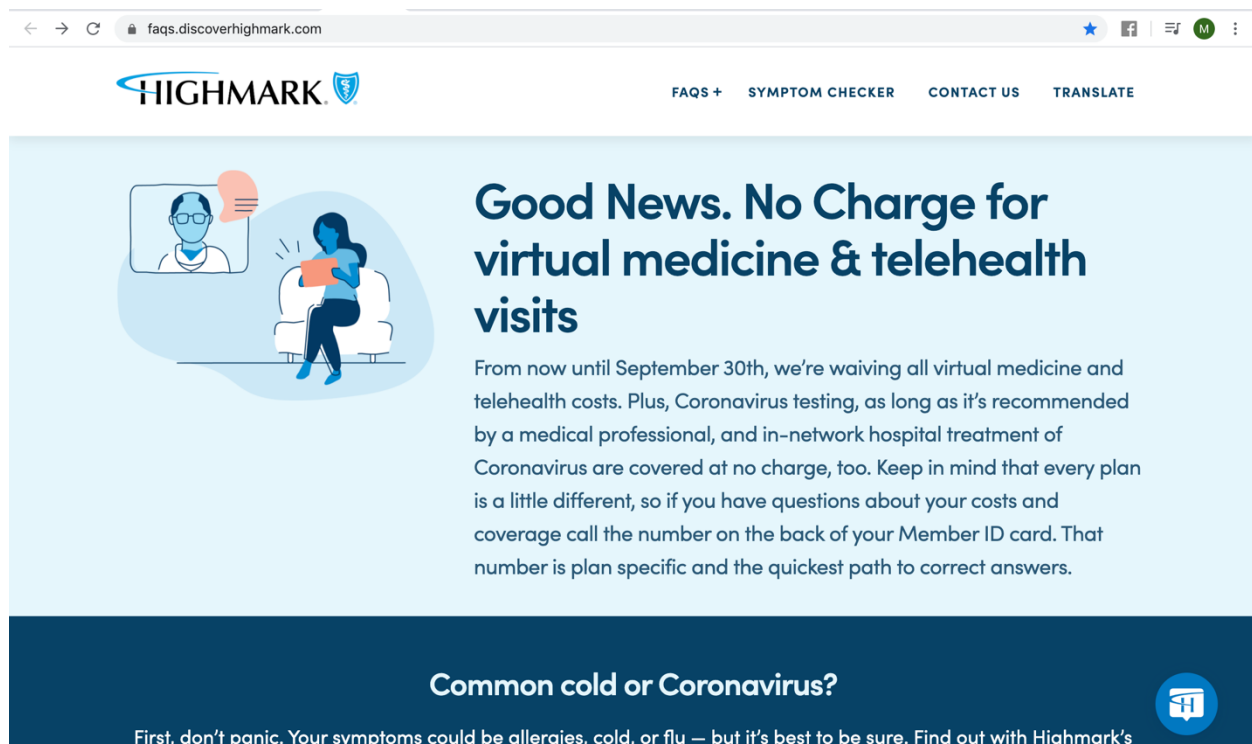
Figure 4. User interface of Highmark Coronavirus Update Web page.

There was an obstacle when I first tested the chatbot. If you see in *figure 5,* the chatbot

asks for a consent before starting the conversation. I couldn't find "Yes, I accept" button which

is in *figure 6.* The idea of scrolling down and clicking the accept button is simple, but because

there is no visible scroll bar, I personally struggled finding it. I asked my colleagues how long it

took for them to find the "Yes, I accept" button, and 3 out of 5 people answered it took more

than 5 seconds. As a developer the idea of scrolling down is simple, but as a user people could
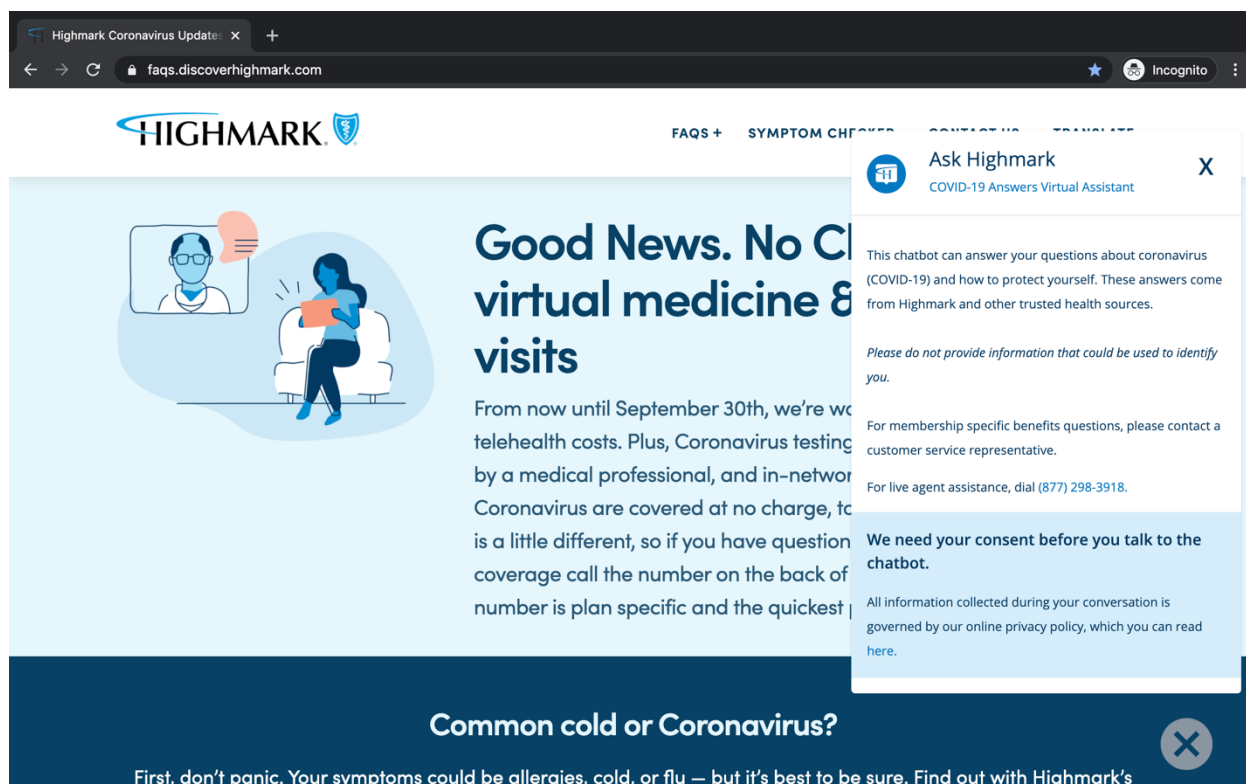
struggle finding it if it is not visible to them.

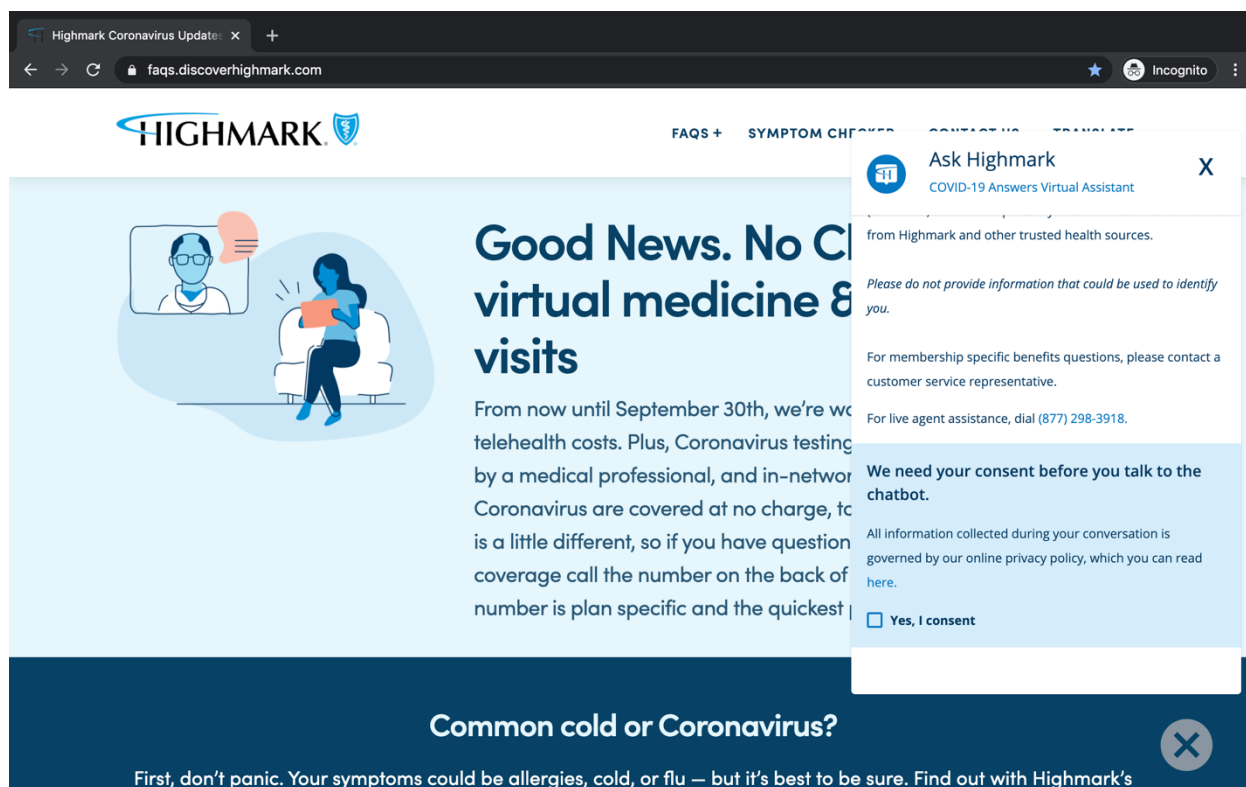*Figure 5. Chatbot asking for a consent before starting a conversation.*

Figure 6. Screen shot of "Yes, I consent" button after scrolling.

The chatbot ease the communication and saves time by providing sample questions which you can see in *figure 7*. Each time the chatbot provides 2 to 3 sample questions that has a higher chance of getting asked. The user can simply click the choice rather than typing the whole sentence. It becomes more harder to predict when the user has a power to type the question, because there is almost an infinite case of scenarios that the user can go for. Sometimes the user can type questions that are too long, too wordy, or just simply misworded. I think Covid-19 Answers Virtual Assistant Chatbot is easy to use because it provides different choices of sample questions as the conversation continues.
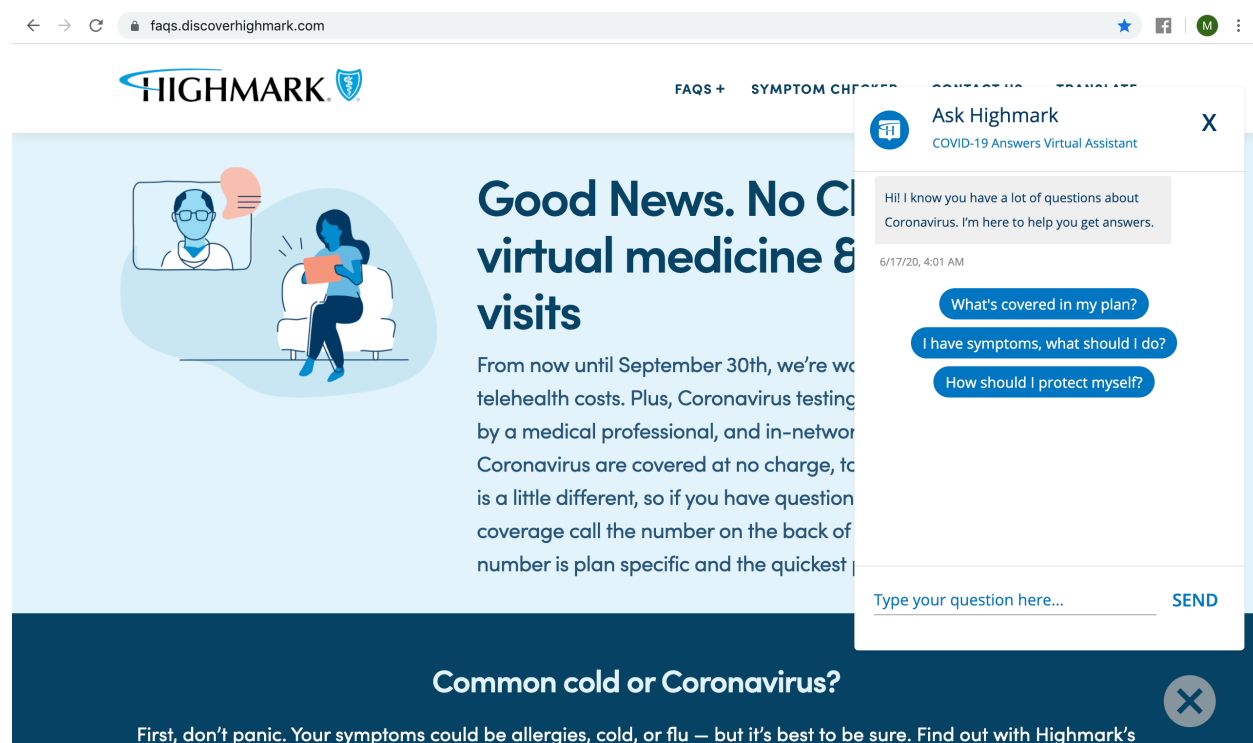

Figure 7. Covid-19 Answers Virtual Assistant providing sample questions to the user.

Having a chatbot on the web page that can provide answers to commonly asked questions is a big advantage. Inbenta, an AI company based in California mentioned that their demand for chatbot increased at least 150%, up to 300% during the Covid-19 pandemic. This shows that the

companies and organizations are developing their website more communicative and easier to find necessary information by adding a chatbot. After testing the chatbot on Highmark Coronavirus Update web page, I gained more knowledge about Covid-19 pandemic and its response of Highmark Health.

2.3 Competitors

I chose two successful competitors of Highmark Health to see the difference in their response to Covid-19 pandemic. I will be comparing UnitedHealthCare and Anthem, but since both of them does not have a chatbot as you can see in *figure 8,* I added more focus points to analyze. All three companies waived their telehealth cost during the Covid-19 pandemic, but the valid dates are different. Highmark Health and Anthem both are cost free until September 30th of 2020, but UnitedHealthCare is cost free until June 18th of 2020. As a customer, I feel safer and satisfied having a longer time for free telehealth. All three companies had symptom checker that was available to user at no cost. I've evaluated the accessibility of the three company during the pandemic depending on the existence of a chatbot (1 point), cost of telehealth (1 point), Length of waiving the fee for telehealth (1 point), existence of a symptom checker (1 point), friendly user interface (1 point).

	Highmark Health	United Health Care	Anthem
Do they have a chatbot?	yes	no	no
Telehealth Cost Free date	until Sept. 30, 2020	Until June 18, 2020	Until Sept. 30, 2020
Do they have symptom checker?	yes	yes	yes

How easy was it to find information? (1 being poor 5 being excellent)	5	3	4

Figure 8. Table comparing the three companies depending on the focus point.

2.4 Possible Improvements

There are few recommendations that I would like to suggest for the chatbot on Highmark Coronavirus Update website.

There are 2 errors I found and mentioned in 2.2 and fixing them by making "Access my member portal" question functional and adding an answer to "How should I protect myself" could improve the completeness of the chatbot. Additionally, implementing a starter question could help increase the awareness of the chatbot. The chatbot could have an animated motion of sending a starter message when the user enters the web page like in *figure 9* that I implemented on my sample chatbot. Last but not least, adjusting the location of the "Yes, I consent" button as I mentioned in 2.2 could ease the communication and increase the usage of the chatbot.
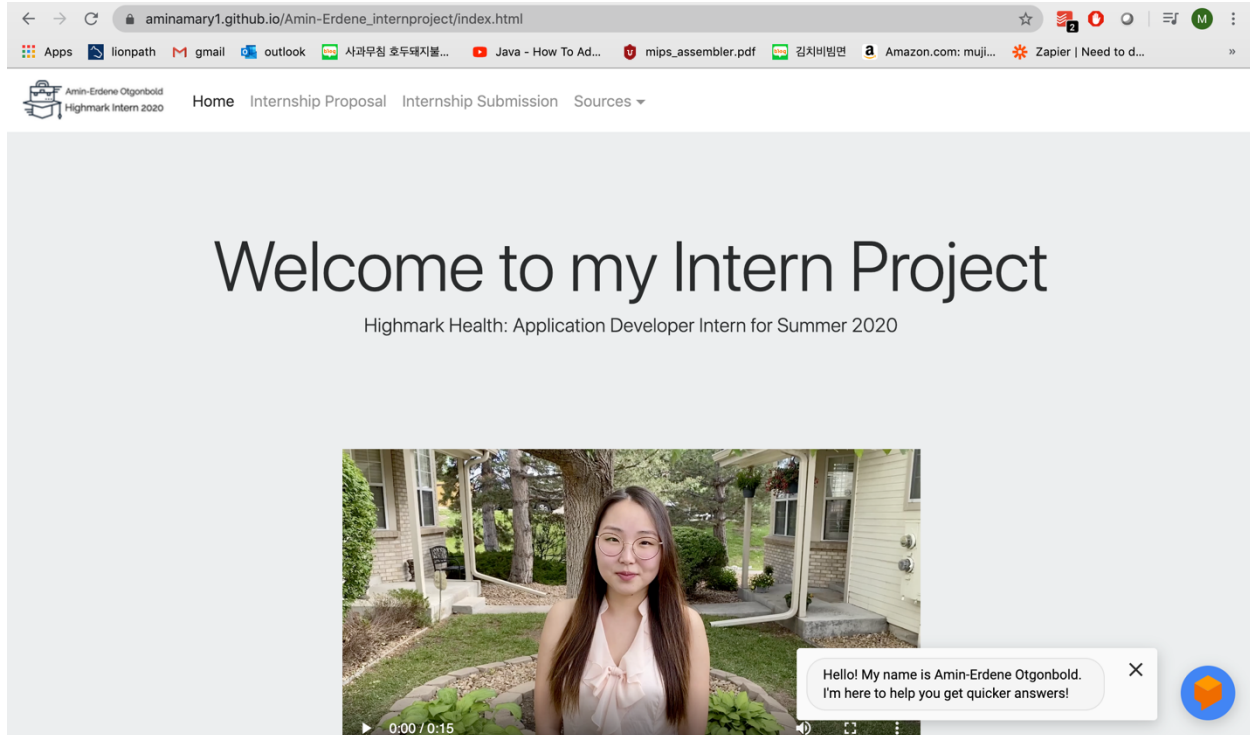
Figure 9. Capture of my sample chatbot that starts the conversation when user enters web page.

2.5 Conclusion

I focused the intern case study project "Covid-19: Impact to and Response of Highmark Health" on chatbot. Thus, I analyzed the response of Highmark Health to Covid-19 pandemic in the existence of a chatbot and its minor details. I found 2 errors including an infinite loop and the case that the chatbot does not respond to a user even though the question is provided by the chatbot. I also had 2 suggestions mentioned above in 2.2 as well, which was to make the "Yes, I accept" button visible when the user give a consent before using the chatbot. Another suggestion was to add a starter sentence, so the user can notice the existence of a chatbot.

3. Submission

3.1 Chatbot

I created a sample chatbot for the simulation. I used dialogflow as an AI engine, and Nodejs to implement the rich messages to build a user interactive virtual assistant called Amin-Erdene. This chatbot is embedded into the website to help the website user to find information more easily. I created the below *figure 10* flowchart to show the bigger picture of the chatbot intent. In addition to the sample questions provided in *figure 10*, the chatbot can have a casual conversation with user such as "how are you today".
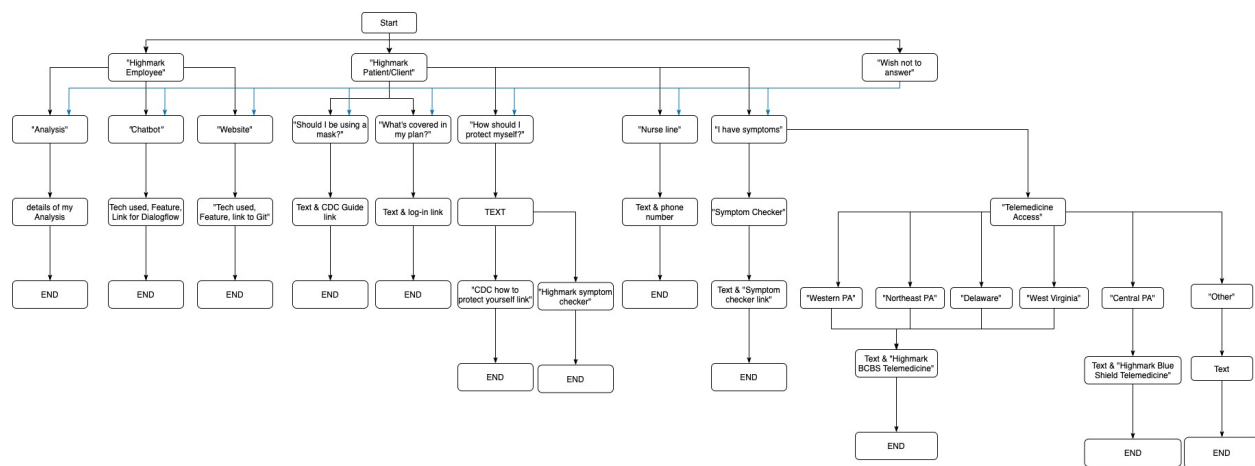

Figure 1. Flow chart of Amin-Erdene Chatbot Intent.

3.1.1   Feature

- Able to start a conversation as soon as the user enters the website
- Able to provide different information depending on the user type such as Highmark Employee, Highmark Customer, and guide the user through the user-friendly conversation.
- Able to display image, link, video, button for the rich user interaction.
- Able to have casual conversations like "where is your favorite place to go?", "you're funny", "are you bored?", "wow" etc.

3.2 Full Stack Website

I created a full stack website to showcase and hold all the information about the intern case study project. I used HTML5, CSS, bootstrap4, NodeJs, Javascript to build the website, and the source code is available in my personal github account (aminamray1@gmail.com). The website has a navigation bar to guide the user between major contents and has a chatbot on the right bottom corner to provide an instant support for the user.

3.2.1   Feature

- Able to display Static information such as project proposal, submission, acknowledgement.
- Able to display the chatbot, and connect to dialogflow
- Able to display user interactive AI assistant, pdf, jpg, mp4, social media links.
- Able to adjust the placement on different screen sizes such as macbook, ipad, iphone etc.

4.   Sources

4.1 Acknowledgement

I wish to express my sincere thanks to Ms. Jackie Baker, Talent Acquisition Program Manager at Highmark Health, for her constant encouragement and help throughout the whole internship program.

I would like to thank Professor J. Brian Adams, Ph.D, PE, my academic & internship course advisor at Penn State - Harrisburg. I am grateful to him for his expert, sincere and valuable guidance and encouragement extended to me.

I also thank Mr. Brian Utz, Director of Digital at HM Health Solutions, for trusting in me and hiring me for the Summer 2020 intern. Even though I couldn't get to work directly due to the

Covid-19 pandemic, I sincerely thank you for giving me an opportunity to become part of this

amazing community.

4.2 References

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and Prevention, 11 June 2020, www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html.

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