Mygenebox

A Smartphone Voice-Command Query App for Your Genetic Report

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Background

Beijing Genomics Institute (BGI) is one of the world's foremost genomics sequencing companies. One of the most well-known products that they offer is a kit called Mygenebox which provides customers with a personalized 200-300 page report about the customer's genetic testing.

The report can take customers almost 10 hours to fully read through- which asks the question: "How can we make the report more customer friendly and easier to understand the results". We decided to create an android app that easily interacts with users, answers questions when prompted, and displays results when needed. By creating an app, the customers can use this product anywhere and at anytime, which can save time and energy.

System Requirements

- Client asks a question (speech to text)
- The app will look through a CSV file and respond (text to speech)
- Link an order page to either Amazon or BGI website
- Create a bot using existing API to assist in Natural Language Processing. The bot should be able to answer questions the following questions that a customer could ask:

  - Do I have risk for {disease}?
  - Do I have a {disease} condition?
  - What are the highlights?
  - Give me a Summary of the report!
  - Can you link me to Amazon or BGI to order
  - Have a highlights page that gives a summary of the 200-300 page report based on disease results.

For the User Interface, the users should be able to navigate the app very easily. The users should be able to understand what each section does, and how to find information when needed.

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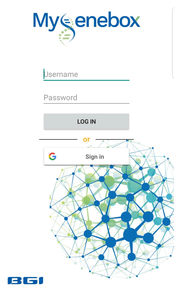
Results

Sign In Page

The sign in page allows the user to log into a Google drive account, or to enter a username/ password credentials that will be hosted on the BGI server . Ideally, the user will sign into their own BGI account, however, BGI does not currently have a server set up. Because of this, the sign in page uses a button that will automatically go to the processing page.



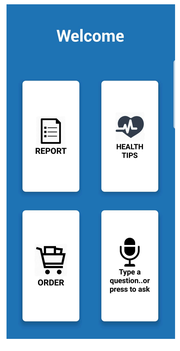
Processing Page

The processing page parses through the CSV file corresponding to the user's personalized genomics report. In doing that, the processing page can achieve the following:

- Split the CSV file using regular expressions.
- Clean the CSV file by removing symbols that do not belong in the report.
- Populates the highlights page

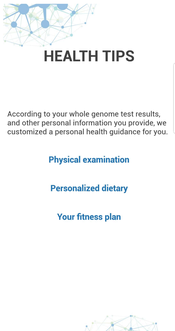
Main Menu

The Main Menu is implemented by creating a grid layout. This allows future BGI software developers to easily add more buttons to the Main Menu screen. The screen allows the user to choose between 4 options. Each option includes a picture for aesthetic and convenience purposes thus allowing easy navigation throughout the app.



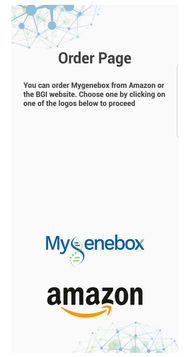
Health Tips

The health tip page divides information into 3 sections that can be accessed by clicking on the text . The sections include Physical examination, Dietary plans, and a Fitness plan. All the plans are the same for every user as BGI has not yet come up with personalized tips in the report.



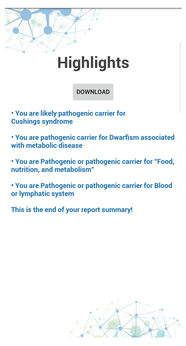
Order Page

The order page contains two buttons that when clicked, will link the user to either the BGI website or to Amazon.com. Many users buy additional products from BGI or Amazon, so this page will allow for better usability and navigation.



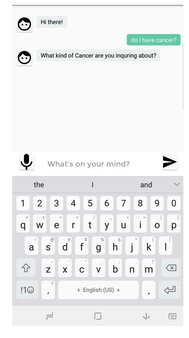
Highlights

The highlights page uses code that we created to parse through a CSV file and generate a summary of the report. The page includes a written summary, as well as a speech summary. The user can ask the app questions listed in the systems requirements section.



Talk to Bot

The bot is created using IBM Watson conversation service with the main purpose of bringing the report to life through understanding natural-language input and using machine learning to simulate a conversation between humans. It is capable of answering questions regarding the report and how to order the BGI Mygenebox kit.



Conclusion / Future Work

In conclusion, we learned how to use Android Studio and NLP services, in doing so, we learned more about Java and user interface techniques. For future work, we hope to link the health tip portion of the app to health trackers such as Fitbit. We also would like to integrate the sign in page to the BGI server so users can download the PDF report, CSV results file, and ultimately, have custom accounts.