Forget Me Not

An Alzheimer's Care App

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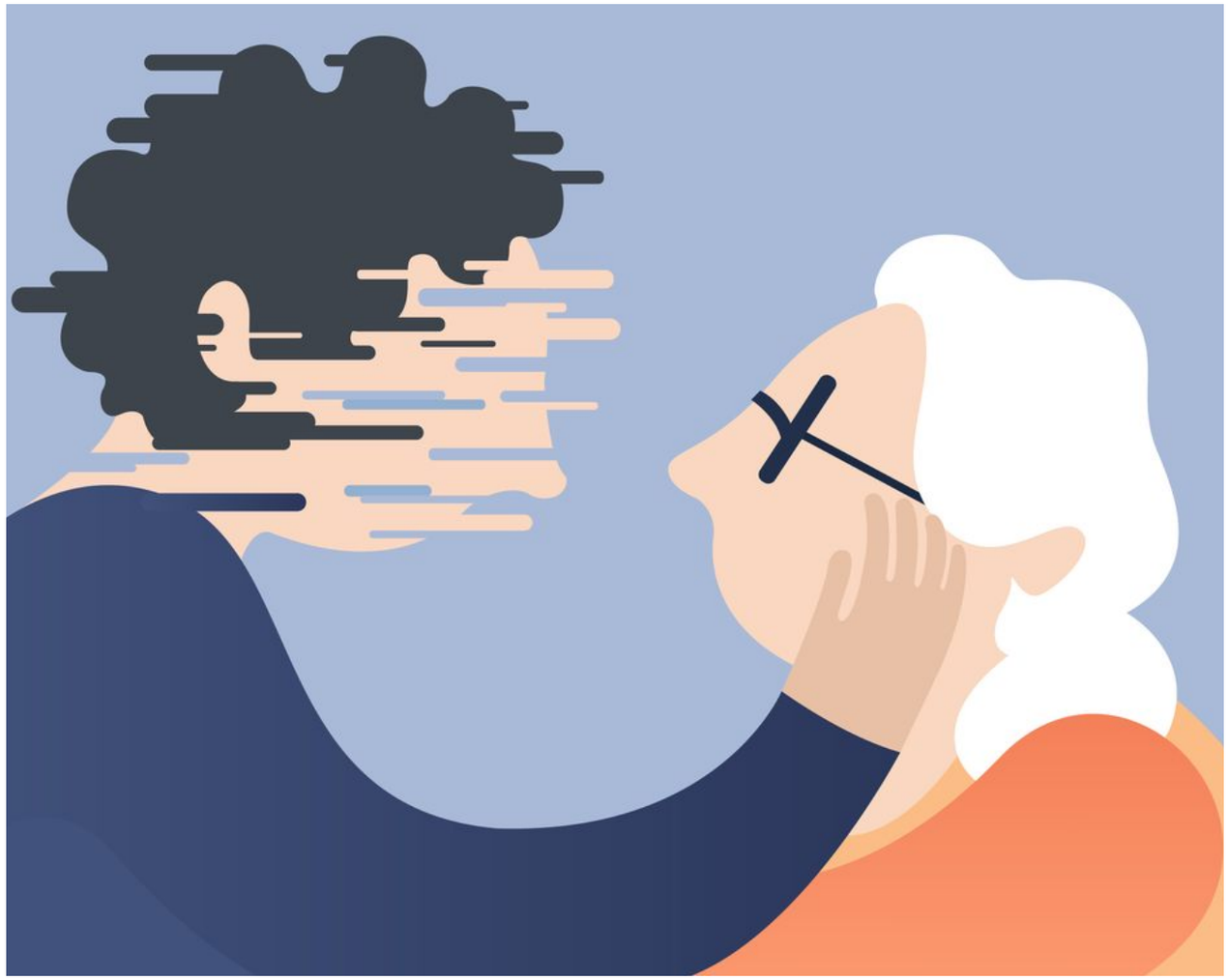
Project D99 Non-RRI

Introduction

Motivation/Main Concern

Alzheimer's is a progressive disease that destroys memory and other important mental functions.

Alzheimer's is impacting many people in our society today. Many patients may feel lonely and distant from their family in these times and need to be occupied and engaged in order to avoid further damage and harm.



The Problem

What Research Tells us about Alzheimer's Disease:

- Alzheimer's Patients need to stay occupied when diagnosed to avoid wandering or unwanted actions. Being occupied is important for patients with Alzheimer's to keep them from being lonely or from performing actions that can result in harm or significant memory loss. Examples of specific problems due to loneliness and being unoccupied can include:
    - Forgetting your location when going on a walk (ie. wandering)
    - Social Isolation and loneliness can result in a 50% increase in risk of dementia (cdc.gov)

My Solution

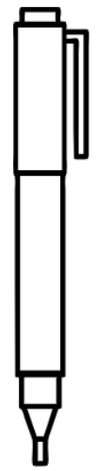
In order to combat these issues of boredom and loneliness in Alzheimer's patients, I created an application that provides features to patients that can help them stay engaged and occupied. In approaching this problem, I narrowed down my main features to two:

- A chatbot that responds to user queries and engages with the patient.
- A games feature where the patient can play memory tests to train their memory and engage in other games to keep them occupied.

Methods and Procedures

General App Development Process

Step 1:
Researched about Alzheimer's Disease and the potential help needed for patients.



Step 2:
Started designing the UI of the app on Canva; built the prototype sketches.

Step 3:
Started coding the features including the chatbot and games feature.

Step 4:
Tested using the Android Studio Emulator Software —> consistently ran my code.

Methods and Procedures

Building the Chatbot

In approaching the design of the chatbot, I researched other chatbot examples/tutorials that served as references for my own.

Phase 1:

Starting out, I developed a chatbot with pre-programmed responses that would be picked depending on what the user asks or replies with.

Phase 2:

To sharpen the effectiveness of my chatbot, I also decided to add some more features including a search feature and a feature that allows the patient to text about their day.

Phase 3:

Testing took place to test the efficiency of the chatbot and the amount of logical replies it gave compared to the number of illogical responses.

Results

Efficiency/Chatbot Testing

Although there are benefits to my chatbot, there are times when the responses are illogical and a little repetitive. The picture to the right demonstrates the faulty response of my chatbot, as it shows a series of illogical responses to the query given. After more testing and trials, I came to the conclusion that the chatbot understands the majority of queries, but stumbles on a few of them with no pre-programmed answer, and proceeds to respond illogically.

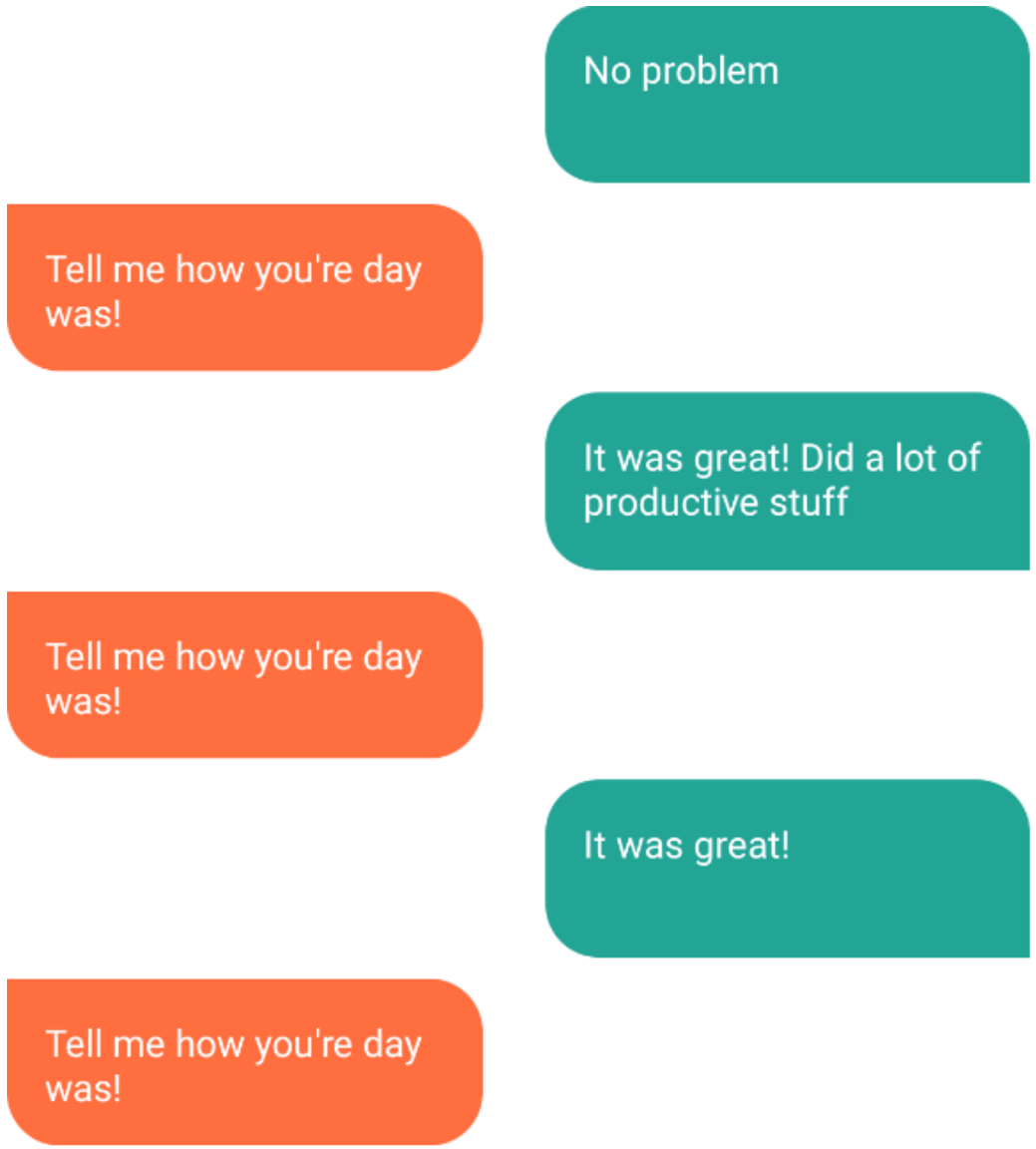
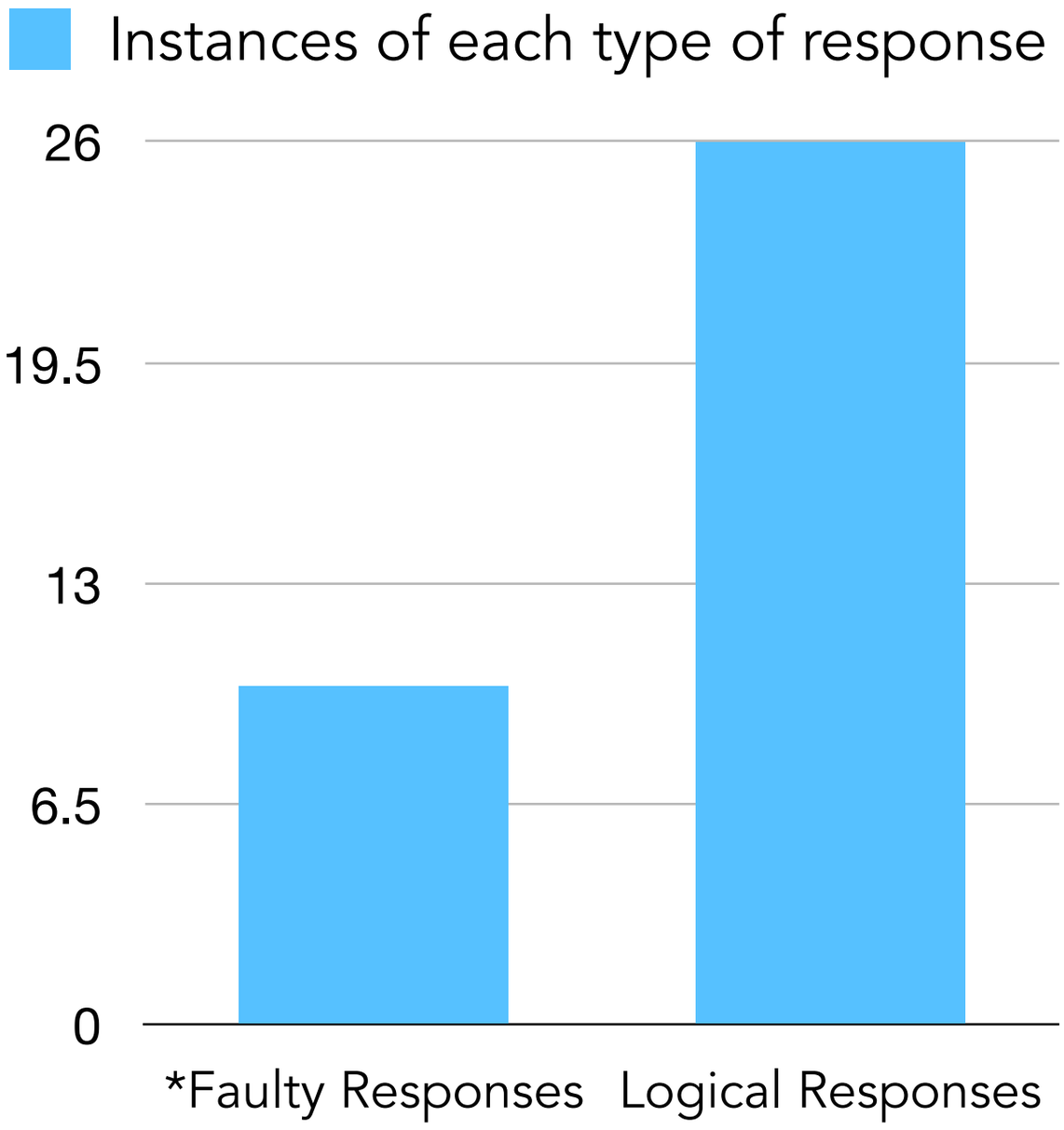


Image: Example of a Faulty Response

Results

Figures/Pictorial Examples



Overall, the efficiency of the chatbot was good, as the logical responses outweighed the illogical ones. There is room for improvement however, as many of the responses were repetitive and illogical (as seen in the image from the last slide).

***Faulty Responses are classified as any responses that are repetitive, illogical, and don't make sense in the situation.**

Discussion

Interpretation of the Results:

Problems Faced: I faced many hurdles along the way, including bugs in my code and several other compiling problems. I addressed these problems through debugging which definitely took a lot of time out of my project, as these were unexpected errors that I didn't know of beforehand. In testing the app as a whole, bugs generally served as an uncontrollable factor in the project and were addressed by retracing my steps in code.

The Competition: In general, I believe my app is different from other Alzheimer's care apps due to its varying spectrum of features. The chatbot feature definitely stands out in my project as most memory apps don't engage the patient through conversation but rather through games. My app has a significant advantage when it comes to competition due to the chatbot feature which makes it unique from other apps and projects.

```
    java.lang.Throwable: Stack trace:
        at com.android.server.wifi.WifiThreadRunner.call(WifiThreadRunner.java:
        at com.android.server.wifi.WifiServiceImpl.getScanResults(WifiServiceIm
        at android.net.wifi.IWifiManager$Stub.onTransact(IWifiManager.java:730)
        at android.os.Binder.execTransactInternal(Binder.java:1159)
        at android.os.Binder.execTransact(Binder.java:1123)
2021-03-02 20:22:00.315 488-488/? E/netmgr: qemu_pipe_open_ns:62: Could not co
2021-03-02 20:22:00.316 488-488/? E/netmgr: Failed to open QEMU pipe 'qemud:ne
2021-03-02 20:22:00.455 492-492/? E/wifi_forwarder: qemu_pipe_open_ns:62: Coul
2021-03-02 20:22:00.456 492-492/? E/wifi_forwarder: RemoteConnection failed to
```

Image: Example of Debugging

Conclusions

In examining my results and testing, I came to the conclusion that my chatbot was functional and provided a way for Alzheimer's patients to engage in conversations and remain occupied.

Main Takeaways: I believe that my project was effective and definitely met the purpose of my engineering goal, however, there is a lot of room for improvement. Managing time more efficiently and preparing for errors beforehand would have given me more time and would have allowed me to develop more complex features.

Future Applications: In the future, I hope to tweak my project to incorporate more complex and intricate features that are tailored more specifically to patients. For example, I hope to take the chatbot's usefulness one step further by developing a way for it to remind the patient of specific actions he/she needs to complete to help with daily memory and recollection.

Youtube Demo Link

https://youtu.be/LOFuqUJy_8Y

Important References

1. “Alzheimer's and Dementia Care: Tips for Daily Tasks.” *Mayo Clinic*, Mayo Foundation for Medical Education and Research, 7 May 2019, www.mayoclinic.org/healthy-lifestyle/caregivers/in-depth/alzheimers-caregiver/art-20047577
2. “10 Ways to Make Your Home Dementia Friendly.” *Alzheimer's Society*, www.alzheimers.org.uk/blog/10-ways-make-your-home-dementia-friendly.
3. “Ten Apps (and Other Activities) For People With Dementia and Alzheimer's.” *Estate Planning & Elder Law Services, P.C.*, 26 Feb. 2020, www.formyplan.com/elder-law/alzheimers-dementia/2020/02/26/ten-apps-and-other-activities-for-people-with-dementia-and-alzheimers/.
4. “Where Developers Learn, Share, & Build Careers.” *Stack Overflow*, stackoverflow.com/.