

Aggregation of Computer-Based Cognitive-Training/Rehabilitation and Personalized Brain-Care Interventions into the CognoTrain App

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Abstract

With over 50 million patients worldwide, Alzheimer's is a pervasive neurodegenerative disease that lacks Computer-based Cognitive Training/Rehabilitation (CBCT/CBCR) testing at the consumer level. So far, applications of CBCT/CBCR have had promising results on studies of Alzheimer's patients, resulting in mental state and quality of life improvements, a decrease in patients' Clinical Dementia Rating (CDR), and improved short term memory. The purpose of CognoTrain is to show the potential of a personalized implementation of CBCT/CBCR and provide rehabilitation to Alzheimer's patients. CognoTrain addresses common manifestations of Alzheimer's such as topographical disorientation, loss of self, and declined recognition ability through the various features of the application. Currently, we are working on collecting data from Alzheimer's patients and tracking their progression by monitoring their activity on the app. To ensure scientific rigor and replicability, we will document sample size, details about each patient, and the patient's progression over time.



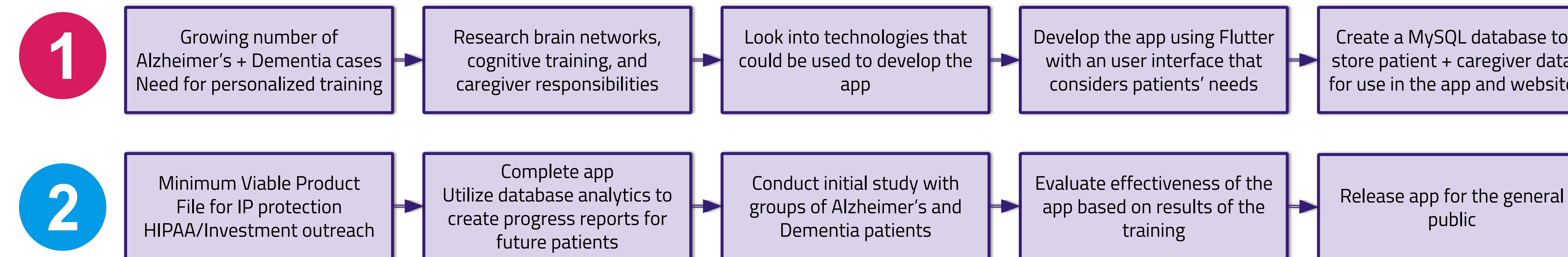
Introduction

- CBCT/CBCR has shown positive influence on groups of Alzheimer's patients, resulting in:
 - Mental state and quality of life improvements
 - Decreases in patients' Clinical Dementia Rating
 - Improved short term memory
- Lack of personalized Cognitive Training even though the progression of Alzheimer's is different for every patient
- A commercial app would be more accessible than proprietary technologies that hospitals may use



Methodology

- Conduct research on the needs of patients with early stage Alzheimer's/dementia
- Design a personalized platform that can meet these needs
 - Platform should be able to train patients with activities targeting each major brain network
- Conduct a study to test the platform on early stage Alzheimer's/Dementia patients
- Analyze the results of the study to determine if it is effective
- Seek out sponsorships from non-profit organizations



Technologies

Flutter & Dart

- Flutter is a software platform that utilizes the Dart programming language. It offers:
 - Cross-platform development with one codebase
 - This includes iOS, Android, and Web
 - A vast ecosystem of secure, easy-to-use plugins and technology
 - Many were developed by Google, the creator of Flutter and Dart
- Overall, it allows for a speedy development of our prototype.

MySQL

- Relational database used to store user data, including personal information and images
- Utilizes the SQL query language in order to manage data from the database
- Mature community and support

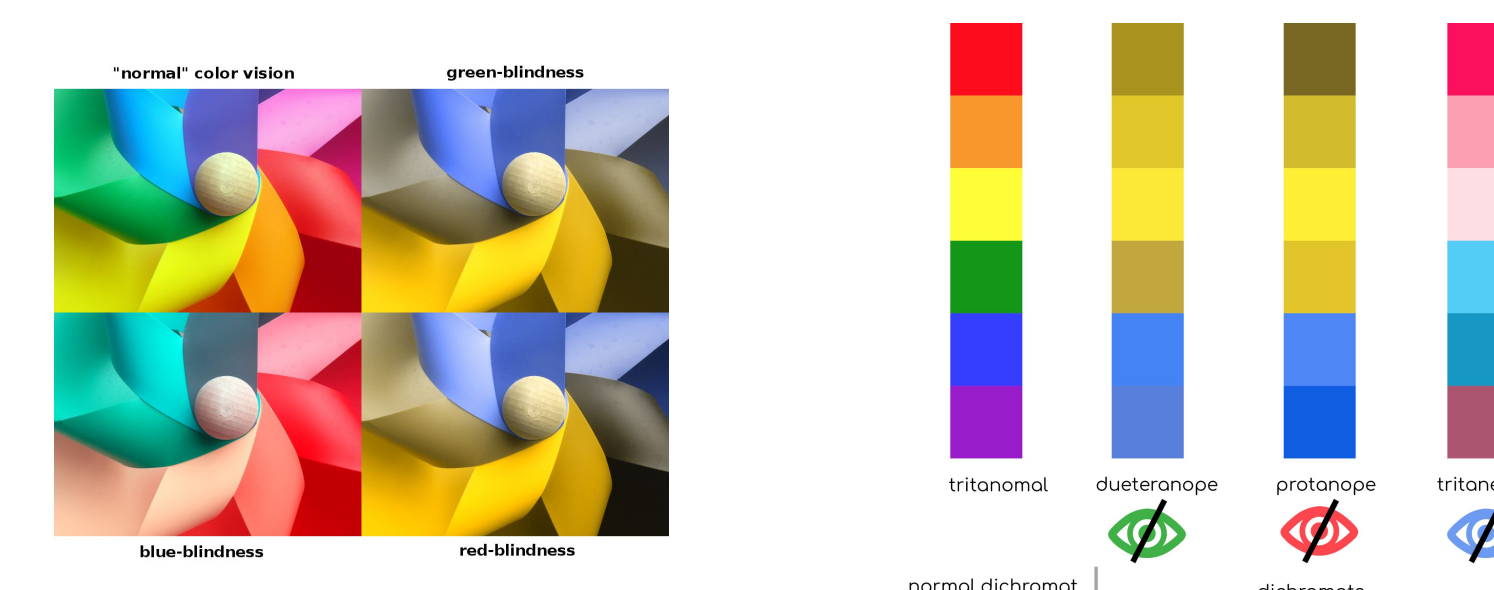


Results

- Developed a minimum viable product, an app with the home screen, user settings, patient medications and numerous activity pages
 - Targeted various networks of the brain such as visual and motor cortices
- Considered user interface with patient in mind
 - Integrated color research to enhance feelings correlating to the given colors
- Developed a structure for a database to anonymously store user information
 - HIPAA-Compliant Platform
- Submitted a provisional patent
- Created a website (<https://www.cognotrain.com/>)
- Currently conducting investor outreach

Future Directions

- New features (e.g. color blindness accessibility provisions, internationalization) allowing for a more holistic and comprehensive platform



- Adding ability for each patient to customize the app to their preferences and requirements



- Beta-Testing the app with the help of patients with dementia
- Develop caretaker database along with the existing user database so that hospitals and other institutions may view progress and provide further care to patients
- Seek sponsorships from non-profit organizations to provide us with the resources required for future development and HIPAA compliance

Donations!



Conclusion

- Computer-based training apps have been proven to be effective in targeting patients of Alzheimer's and dementia
- Utilizing an app can increase accessibility and overall ease of administration for patients in order to target a larger audience
- The platform designed for patients makes it easy for them to get used to and focus on their cognitive training
- Helps caregiver with easier patient care; helps researchers understand Dementia/Alzheimer's
- 22% increase in Alzheimer's patients

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