Lab 1 – Thought Locker

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Table of Contents

1 Introduction 3
2 Product Description 4
   2.1 Key Product Features and Capabilities 4
   2.2 Major Components (Hardware/Software) 5
3 Identification of Case Study 7
4 Product Prototype Description 9
   4.1 Prototype Architecture (Hardware/Software) 9
   4.2 Prototype Features and Capabilities 9
   4.3 Prototype Development Challenges 9
5 Glossary 10
6 References 11

List of Figures

Figure 1: Thought Locker Major Functional Component Diagram 7
1 Introduction

Dementia is a condition that affects many older Americans, with approximately one in ten people aged 70 and older experiencing some form of it. As people age, their risk of developing dementia increases, making it a growing concern for healthcare providers, families, and communities. According to the Alzheimer's Association, Alzheimer's disease is the most common type of dementia, accounting for 60-80% of cases.

The majority of dementia cases are mild or moderate, with 50.4% being mild, 30.3% being moderate, and 19.3% being severe. Individuals with mild dementia may experience mood changes, memory problems, and difficulty effectively planning and thinking things through. However, they generally require very little assistance in daily living activities.

On the other hand, individuals with moderate dementia may need frequent reminders and some assistance with washing and dressing. They may also experience symptoms of anxiety, depression, and paranoia, with their memory problems worsening over time. In severe cases of dementia, individuals may become completely dependent on others for care.

As dementia symptoms worsen, assistance becomes necessary from either a family member or outside source. However, individuals with mild or moderate dementia often prefer to maintain some of their independence. Caregiving for dementia patients can become stressful for family members due to the constant attention required. Caregivers may struggle with managing
their own emotions, balancing their caregiving responsibilities with other commitments, and coping with the changes in their loved one's behavior and cognition.

The number of individuals diagnosed with dementia is steadily increasing over the years, highlighting the need for innovative solutions to help patients maintain their independence. In recent years, there has been a growing interest in developing technology-based solutions for dementia care. One such solution is Thought Locker, a mobile assistant designed to help dementia patients and their caregivers.

Thought Locker provides reminders, item location assistance, monitoring, and analytics to the present caregiver, allowing dementia patients to maintain their independence while still receiving the necessary assistance. For example, the app can send reminders to take medication or complete certain tasks, such as turning off the stove. It can also help caregivers keep track of their loved one's location and monitor changes in their behavior.

In addition to assisting with day-to-day activities, technology-based solutions like Thought Locker can also provide valuable insights into the progression of dementia. By collecting data on a patient's activity levels, the app can help caregivers and healthcare providers track changes in cognition and behavior over time. This information can be used to adjust treatment plans and provide personalized care.

In conclusion, dementia is a complex condition that affects many older Americans and their families. As the number of diagnoses continues to rise, it's becoming increasingly important to find innovative solutions to help patients maintain their independence and improve their quality of life. Technology-based solutions like Thought Locker have the potential to revolutionize dementia care by providing support and insights to patients and their caregivers.
2 Product Description

Introducing Thought Locker, a mobile assistant designed to help individuals with mild to moderate dementia maintain their independence while still receiving the necessary assistance. Thought Locker provides a range of features to help individuals with dementia and their caregivers manage daily living activities. The app sends reminders to take medication or complete certain tasks, such as turning off the stove, helping individuals stay on track with their daily routine. Additionally, Thought Locker assists with item location, making it easier to find misplaced items like keys or wallets.

One of the standout features of Thought Locker is its monitoring and analytics capabilities. By collecting data on a patient's activity, the app can help caregivers and healthcare providers track changes in cognition and behavior over time. This information can be used to adjust treatment plans and provide personalized care, ensuring that individuals with dementia receive the best possible care.

Thought Locker is easy to use and customizable to the user's needs, making it an excellent option for individuals with mild to moderate dementia who prefer to maintain some of their independence. The app is available on both iOS and Android devices, making it accessible to a wide range of users.
In summary, Thought Locker is a revolutionary mobile assistant designed to improve the quality of life for individuals with dementia and their caregivers. With its range of features and monitoring capabilities, the app provides valuable support and insights, making it a must-have for anyone dealing with the challenges of dementia care.

2.1 Key Product Features and Capabilities

Thought Locker is a mobile assistant that is compatible with smartphones, tablets, and other devices running on both Android and iOS operating systems, making it accessible to a wide range of users. To use Thought Locker, users will need to sign up for an account using their email address, ensuring secure and personalized access.

Users can schedule reminders and appointments using the app's calendar feature to keep track of important tasks and events. The app's settings can be customized for each individual user, allowing family members or caregivers to tailor the app to the patient's specific needs. Patients can also control some settings, giving them a sense of independence and control over their care.

Thought Locker helps users locate commonly misplaced items such as keys or wallets, which can be particularly useful for individuals with mild to moderate dementia. The app can also integrate with sensors to track item location, making it easier to find lost items. The app comes equipped with motion sensors that can detect activity in the home, providing caregivers with valuable information on the patient's daily routine and activity levels.

The app provides daily reminders and notifications to help users stay on track with their daily routine, such as taking medication or completing household tasks. This feature is particularly helpful for individuals with memory problems, ensuring that important tasks are not
forgotten. Family members or caregivers can use Thought Locker to monitor patient activities, providing peace of mind and allowing for timely intervention if necessary. The app's monitoring capabilities also provide valuable insights into changes in cognition and behavior over time, helping healthcare providers adjust treatment plans and provide personalized care.

In summary, Thought Locker is a powerful mobile assistant designed to help individuals with dementia maintain their independence while still receiving the necessary assistance. With its customizable settings, item finders, sensors, and monitoring capabilities, the app provides valuable support to patients and caregivers alike, making it a must-have for anyone dealing with the challenges of dementia care.

2.2 Major Components (Hardware/Software)

Figure 1

Thought Locker Major Functional Component Diagram
Thought Locker can be used on Android or Apple mobile devices with internet access. The app requires a stable internet connection to function properly. Additionally, there are two servers required to run the app: an application server and a database server. These servers can be either on-premises or cloud-based.

The backend server for Thought Locker is built on Amazon Web Services (AWS), providing reliable and scalable performance. The app uses two databases: PostgreSQL and MongoDB. PostgreSQL is used for storing structured data such as user information, while MongoDB is used for unstructured data such as sensor data. The programming language used for the app is Javascript, specifically the React/Node.js frameworks. Jest is the testing framework used to ensure the app's quality and reliability. The app's codebase is stored on GitHub for easy version control and collaboration among developers. GitHub is also used for issue tracking, allowing developers to quickly address any bugs or issues that arise. GitLab is used for continuous integration and deployment (CI/CD) to ensure a seamless deployment process. The app is containerized using Docker to ensure easy portability and scalability.

3 Identification of Case Study

Thought Locker is a mobile assistant designed for individuals with mild to moderate dementia and their caregivers or family members. It can be used for a variety of purposes, including locating lost items, monitoring patient habits, reminding patients to take their medication or attend appointments, and providing patients with a direct line of communication to a caregiver in case of emergencies. Additionally, it offers a more cost-effective option than hiring a full-time caregiver, making it a valuable resource for those who may not have the financial means to do so.
Aside from individuals with dementia and their caregivers, Thought Locker may also benefit medical facilities, insurance companies, and Alzheimer’s research groups. Its ability to track patient habits and provide analytics could prove useful in clinical settings, while insurance companies and Medicaid may find it to be a more affordable option for patients in need of assistance.

The prototype for Thought Locker will demonstrate a variety of use cases, including item finding, scheduling, and contacting caregivers for individuals with dementia. The prototype will feature six users, three with mild dementia and three with moderate dementia, each with mocked-up profiles. In addition to the user cases for individuals with dementia, there will be three mocked-up profiles for caregivers or family members, with a focus on monitoring patient habits, providing assistance, and analyzing trends.

Hardware requirements for Thought Locker are minimal, as it can be used on any Android or Apple mobile device with internet access. The application server and database server will provide the backbone for the software, which will be hosted on a backend server using AWS. The databases utilized will include PostgreSQL and MongoDB, while the programming language will be Javascript, specifically using React and Node.js. Testing will be conducted using Jest, with version control and issue tracking being handled by GitHub. CI/CD will be handled by GitLab, and containerization will be handled by Docker.
4 Product Prototype Description

- [ TO BE DETERMINED ]

4.1 Prototype Architecture (Hardware/Software)

- [ TO BE DETERMINED ]

4.2 Prototype Features and Capabilities

- [ TO BE DETERMINED ]

4.3 Prototype Development Challenges

- [ TO BE DETERMINED ]
5 Glossary

[ TO BE DETERMINED ]
6 References


