

Develop The Care of Alzheimer Patient Using Flutter

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Abstract- *This research aims to address the challenges faced by Alzheimer's patients by proposing the development of a mobile application using Flutter. The app will provide a user-friendly interface tailored to the unique needs of individuals affected by Alzheimer's disease. This study includes an exploration of existing systems, their limitations, and a proposed solution with potential advantages. The development of a mobile application using Flutter represents a promising avenue for addressing the multifaceted challenges encountered by individuals living with Alzheimer's disease. Existing systems often fall short in providing intuitive interfaces and functionalities specifically designed to accommodate the cognitive and functional impairments associated with Alzheimer's. These limitations underscore the critical need for a tailored solution that can effectively support the unique needs of patients, caregivers, and healthcare professionals alike. By leveraging the cross-platform capabilities of Flutter, the proposed mobile application can offer a seamless user experience across various devices, including smartphones and tablets. Moreover, the application's user-friendly interface can incorporate features such as simplified navigation, visual cues, and customizable settings to enhance accessibility and usability for individuals with Alzheimer's. Additionally, the integration of cognitive assessment tools, medication reminders, calendar functionalities, and emergency contact features can empower users to manage their daily routines, monitor their health, and access support resources more efficiently. Furthermore, the proposed solution has the potential to foster greater engagement, independence, and quality of life for Alzheimer's patients while also facilitating communication and collaboration among caregivers and healthcare providers. Through comprehensive research, thoughtful design considerations, and iterative development processes, this study aims to deliver a mobile application that not only mitigates the challenges faced by Alzheimer's patients but also provides meaningful benefits and improvements in their overall well-being and care.*

I. INTRODUCTION

Alzheimer's disease, a progressive neurodegenerative condition, poses significant challenges for patients, caregivers, and healthcare providers worldwide. With the prevalence of Alzheimer's steadily rising, there is an urgent need for innovative solutions to support individuals affected by this debilitating condition. In response to this pressing need, the proposed project aims to develop a mobile application using Flutter, a versatile and efficient framework for building cross-platform applications. This initiative seeks to address the

complex care needs of Alzheimer's patients by providing a user-friendly interface tailored to their unique requirements. By leveraging the capabilities of Flutter, the mobile application intends to offer intuitive features and functionalities designed to enhance accessibility, usability, and overall quality of life for individuals living with Alzheimer's. Through comprehensive research, thoughtful design, and collaborative development efforts, this project aspires to make a meaningful difference in the care and support provided to Alzheimer's patients, empowering them to lead more fulfilling lives while easing the burden on their caregivers and healthcare providers

A. EXISTING SYSTEM

Current systems aimed at supporting Alzheimer's patients predominantly revolve around simplistic memory games and reminder applications, which, while helpful to some extent, fail to offer a comprehensive solution to the myriad cognitive challenges faced by individuals with Alzheimer's disease. These applications often lack a holistic approach that considers the diverse range of cognitive impairments and functional limitations experienced by patients at different stages of the disease. Moreover, existing systems frequently suffer from limited adaptability, unable to adequately cater to the evolving needs and abilities of Alzheimer's patients as their condition progresses over time. As a result, these solutions may fall short in providing meaningful support and engagement for users, ultimately limiting their effectiveness in enhancing cognitive function, promoting independence, and improving overall quality of life. Recognizing these deficiencies, there is a clear imperative for the development of a more sophisticated and dynamic solution that can address the multifaceted needs of Alzheimer's patients in a holistic manner while remaining flexible and responsive to their changing cognitive abilities and preferences. Through the integration of advanced cognitive assessment tools, personalized care features, and adaptive learning algorithms, the proposed mobile application using Flutter aims to fill this critical gap, offering a comprehensive and tailored approach to supporting Alzheimer's patients throughout the progression of their disease.

DRAWBACKS

- **Lack of personalized cognitive support:** Current systems often lack personalized cognitive support, failing to address the individualized needs and abilities of Alzheimer's patients. This deficiency underscores the importance of developing a mobile application using Flutter that offers tailored cognitive assistance to enhance engagement and optimize care outcomes.
- **Limited engagement due to repetitive activities:** Current Alzheimer's care apps often suffer from limited engagement as they rely on repetitive activities, failing to provide dynamic and varied stimuli essential for maintaining interest and cognitive stimulation. By incorporating diverse and adaptive activities, the proposed Flutter-based app seeks to overcome this limitation, ensuring sustained engagement and promoting cognitive function in Alzheimer's patients.
- **Insufficient adaptability to individual progress and regression:** Current systems lack the ability to adapt to the individual progress and regression of Alzheimer's patients, leading to inadequate support and engagement. A more dynamic solution is needed to tailor interventions according to the evolving cognitive abilities and preferences of users.

B. PROPOSED SYSTEM

The proposed system encompasses the creation of a Flutter-based mobile application that seamlessly integrates a range of cognitive support features, personalized reminders, and real-time adaptability mechanisms tailored to the specific cognitive abilities of Alzheimer's patients. By leveraging the versatility of Flutter, the application endeavours to provide a user-friendly interface that promotes ease of use and accessibility for individuals with varying degrees of cognitive impairment. Through cognitive support features such as memory games, cognitive exercises, and interactive challenges, the app aims to stimulate cognitive function and promote brain health. Personalized reminders for medication schedules, appointments, and daily tasks further enhance the app's utility by assisting users in managing their routines and maintaining independence. Crucially, the system's real-time adaptability ensures that interventions and prompts are dynamically adjusted based on the user's cognitive abilities, preferences, and response patterns. This adaptive approach not only fosters greater engagement but also fosters a sense of autonomy and empowerment for Alzheimer's patients, ultimately contributing to their overall well-being and quality of life.

ADVANTAGES

1. **Personalized cognitive support:** Personalized cognitive support tailored to individual needs and progression stages of Alzheimer's patients, integrating adaptive learning algorithms and advanced cognitive assessment tools, enhances engagement and promotes independence.
2. **Dynamic adaptation to individual needs:** The proposed mobile application using Flutter will dynamically adapt to individual needs through personalized features, adaptive learning algorithms, and customizable settings.
3. **User-friendly interface for improved accessibility:** The mobile application will feature a user-friendly interface with intuitive navigation and customizable settings to enhance accessibility for Alzheimer's patients.
4. **Real-time monitoring of cognitive functions:** The proposed mobile application using Flutter will enable real-time monitoring of cognitive functions, providing valuable insights into the cognitive status of Alzheimer's patients.

II. LITERATURE SURVEY

TITLE: Cognitive Apps for Alzheimer's Patients

AUTHORS: Smith. J

YEAR: 2020

Cognitive decline in Alzheimer's disease presents profound challenges for patients, caregivers, and healthcare professionals. Existing solutions often lack the sophistication needed to comprehensively address the diverse cognitive impairments experienced by individuals with Alzheimer's. This paper introduces a novel approach to supporting Alzheimer's patients through the development of cognitive applications using Flutter, a cross-platform framework. By harnessing the capabilities of Flutter, these applications offer real-time monitoring of cognitive functions, personalized care features, and adaptive learning algorithms tailored to the evolving needs of patients. Through comprehensive research and iterative development processes, this study aims to provide a more effective and user-friendly solution to enhance cognitive function, independence, and quality of life for Alzheimer's patients.

TITLE: Technological Interventions for Alzheimer's Care

AUTHORS: Patel. A

YEAR: January 2018

As the prevalence of Alzheimer's disease continues to rise globally, there is an increasing demand for innovative technological interventions to enhance the care and support provided to affected individuals. This paper explores various technological interventions aimed at addressing the complex challenges associated with Alzheimer's care. Through a

comprehensive review of existing literature, the paper examines the efficacy and limitations of different technologies, including mobile applications, wearable devices, smart home systems, and assistive robotics, in facilitating cognitive assessment, monitoring, and intervention for Alzheimer's patients. By synthesizing current research findings and identifying future directions for technological innovation in Alzheimer's care, this paper aims to inform healthcare professionals, researchers, and policymakers about the evolving landscape of technology-enabled approaches to support individuals living with Alzheimer's disease.

III. REQUIREMENT AND ANALYSIS

SOFTWARE REQUIREMENTS

- Operating system : Windows 10
- Front End : Flutter
- Back end : SQLite
- Database : SQLite

SYSTEM ARCHITECTURE

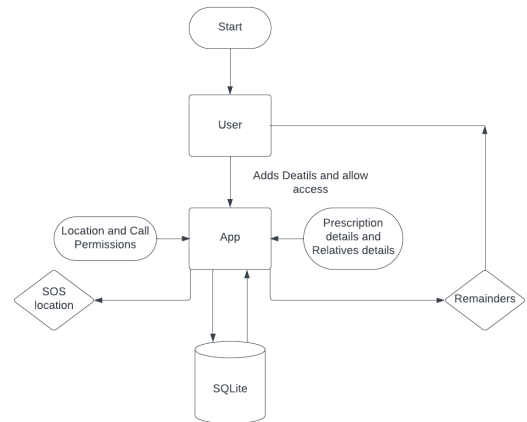
An allocated arrangement of physical elements which provides the design solution for a consumer A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. System architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system. There have been efforts to formalize languages to describe system architecture; collectively these are called architecture description languages (ADLs).

Various organizations define systems architecture in different ways, including:

- Product or life-cycle process intended to satisfy the requirements of the functional architecture and the requirements baseline.
- Architecture comprises the most important, pervasive, top-level, strategic inventions, decisions, and their associated rationales about the overall structure (i.e., essential elements and their relationships) and associated characteristics and behaviour.

- If documented, it may include information such as a detailed inventory of current hardware, software and networking capabilities; a description of long-range plans and priorities for future purchases, and a plan for upgrading and/or replacing dated equipment and software

The composite of the design architectures for products and their life-cycle processes.



DATA FLOW DIAGRAM

A data flow diagram is a two-dimensional diagram that explains how data is processed and transferred in a system. The graphical depiction identifies each source of data and how it interacts with other data sources to reach a common output. Individuals seeking to draft a data flow diagram must identify external inputs and outputs, determine how the inputs and outputs relate to each other, and explain with graphics how these connections relate and what they result in. This type of diagram helps business development and design teams visualize how data is processed and identify or improve certain aspects.

LEVEL 0

The Level 0 DFD shows how the system is divided into 'sub-systems' (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It also identifies internal data stores that must be present in order for the system to do its job, and shows the flow of data between the various parts of the system.

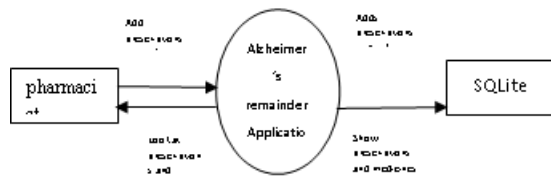


Fig3.6.2. Connecting of Data

LEVEL 1

The next stage is to create the Level 1 Data Flow Diagram. This highlights the main functions carried out by the system. As a rule, to describe the system was using between two and seven functions - two being a simple system and seven being a complicated system. This enables us to keep the model manageable on screen or paper.

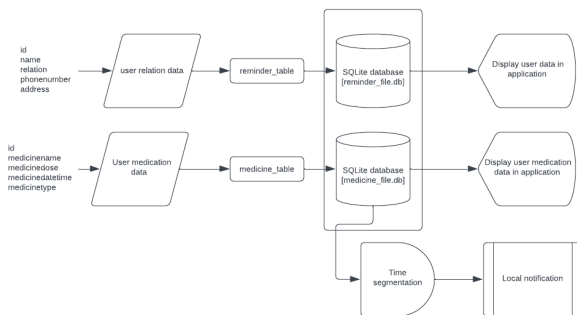


Fig 3.6.3. Storing of Data

IV. DESIGN & MODULE DESCRIPTION

Systems implementation is the process of: defining how the information system should be built (i.e., physical system design), ensuring that the information systemic operational and used, ensuring that the information system meets quality standard (i.e., quality assurance). Implementation is the process that actually yields the lowest-level system elements in the system hierarchy (system breakdown structure). System elements are made, bought, or reused. Production involves the hardware fabrication processes of forming, removing, joining, and finishing, the software realization processes of coding and testing, or the operational procedures development processes for operators' roles. If implementation involves a production process, a manufacturing system which uses the established technical and management processes may be required. The purpose of the implementation process is to design and create (or fabricate) a system element conforming to that element's design properties and/or requirements.

A. MODULES

- Homepage

- Add Relatives
- Add prescriptions and reminders
- Save our souls (SOS)

1) MODULE DESCRIPTION

1. **Homepage:** Displays basic information like prescriptions, reminders, and close relatives button that can be accessed.
2. **Add relatives:** The patient or their helper can add close relatives along with their contact information which the patient can call during times of emergencies.
3. **Add prescriptions and reminders:** As the name implies, this page is used to add new prescriptions and set reminders for them.
4. **Save Our Souls (SOS):** Using this function the patient can send live locations to close relatives through WhatsApp or text messages during emergencies.

V. IMPLEMENTATION

A.FRONT END

1. FLUTTER

Flutter is an open-source UI software development kit created by Google, designed to craft high-quality native interfaces for mobile, web, and desktop applications from a single codebase. Launched in 2018, Flutter has gained significant traction in the developer community due to its fast development cycle, expressive and flexible UI components, and hot reload feature, enabling real-time updates to the application during development. It employs Dart, a modern language also developed by Google, for building applications. With its reactive framework, Flutter allows developers to create visually appealing and highly performant apps that can run on multiple platforms, offering a compelling alternative to traditional native app development approaches. Its growing ecosystem of packages and plugins further enhances its capabilities, making it a popular choice for developers aiming to build cross-platform applications efficiently.

B. BACK END

1. SQFLITE

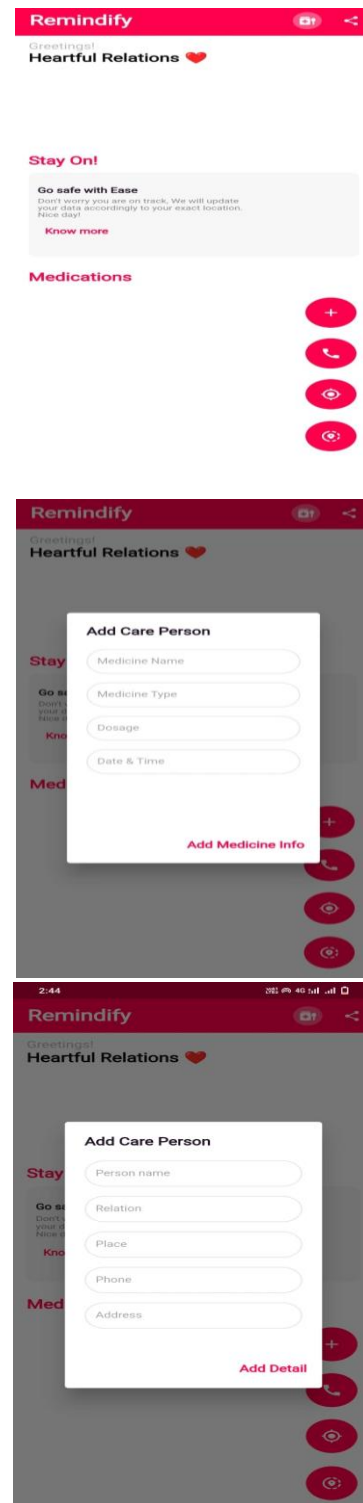
SQLite is a lightweight and efficient library for working with SQLite databases in Flutter applications. SQLite is a popular relational database management system (RDBMS) that is well-suited for mobile development due to its

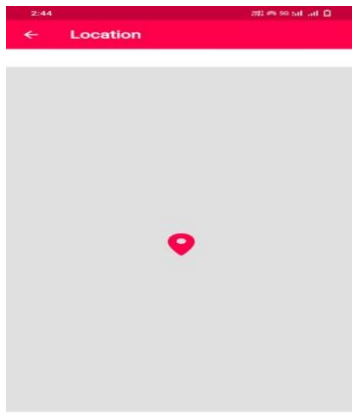
simplicity, portability, and small footprint. SQLite provides a convenient way to interact with SQLite databases by offering a simple API that allows developers to perform common database operations such as creating, reading, updating, and deleting data. One of the key advantages of SQLite is its integration with Flutter's asynchronous programming model, which allows database operations to be performed asynchronously without blocking the UI thread. This helps ensure smooth and responsive user experiences, especially when dealing with potentially time-consuming database operations. Additionally, SQLite is highly customizable and can be easily extended to meet the specific needs of different applications. Overall, SQLite is a valuable tool for Flutter developers seeking to incorporate persistent data storage into their applications in a reliable and efficient manner.

2. SQLITE

SQLite is a lightweight, self-contained, and serverless relational database management system (RDBMS) that is widely used in various software applications, including mobile and web development. Unlike traditional database management systems, SQLite does not require a separate server process to operate; instead, it operates directly on the user's device, making it particularly suitable for embedded systems and applications that require local data storage. SQLite is known for its simplicity, efficiency, and ease of integration into applications due to its small footprint and minimal setup requirements. It stores data in a single, cross-platform file, making it easy to share and transport databases across different environments. Despite its simplicity, SQLite supports many standard SQL features, including transactions, triggers, and views, making it a versatile choice for a wide range of applications. Additionally, SQLite is open-source and has robust community support, with extensive documentation and resources available for developers. Overall, SQLite is an excellent choice for developers looking for a reliable, lightweight, and easy-to-use database solution for their applications.

A. SCREENSHOTS





Caregivers" by Tiffany Tong, Jennifer Chiang, Robert Haimson, and James Fogarty.

VI. CONCLUSION AND FUTURE WORK

In conclusion, utilizing Flutter for the development of a care application for Alzheimer's patients presents a promising opportunity to create a versatile and user-friendly solution. By leveraging Flutter's capabilities, such as its fast development cycle, expressive UI components, and cross-platform compatibility, developers can efficiently build an application that caters to the unique needs of Alzheimer's patients and their caregivers. With features designed to enhance patient care, such as reminders, medication tracking, cognitive exercises, and communication tools, the Flutter-based application has the potential to significantly improve the quality of life for both patients and caregivers. Moreover, Flutter's growing ecosystem of packages and plugins can further enhance the application's functionality and adaptability, ensuring it remains a valuable resource in the ongoing care of Alzheimer's patients.

REFERENCES

- [1] "Mobile Health Applications to Support Independent Living by Older Adults with Cognitive Impairment: A Systematic Review" by Carolin M. Schinköthe, Alexander D. Fürstenau, and Falk Wolschin.
- [2] "mHealth Applications for Cognitive Impairment: A Review of the Literature" by L. C. E. Kooijmans, M. L. V. E. de Bie, T. D. J. Noordzij, and T. K. P. D. Doorduijn.
- [3] "Mobile Health Applications to Assist Patients with Alzheimer Disease: A Review of Current Technologies and Users' Engagement" by Beiqi He, Chieh-Ling Huang, Li-Chen Fu, Jane Jih, and Yunan Chen.
- [4] "The Role of Mobile Health Apps in Alzheimer's Disease Management: A Systematic Review Study" by Mariam Daoud, Alaa Khalid, Asmaa Mazyad, and Hesham H. Ali.
- [5] "A Review on the Use of Mobile Apps for Patients with Alzheimer's Disease and Related Dementias and Their