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A Unified MERN Application for Holistic Elderly Assistance-Companion+

Dr. S. Prakash[1], Archana Gurusamy[2], Anika.V[3], Anisabarvin.A[4] & Hemalatha. P. N[5]

[1]Head Of Department & Professor, Department of Information Technology, Sri Shakthi Institute of Engineering and Technology, An Autonomous Institution, Coimbatore-641062.
[2]Bachelor of Technology in Information Technology, Second Year Student, Department of Information Technology, Sri Shakthi Institute of Engineering and Technology, An Autonomous Institution, Coimbatore-641062.
[3,4,5]Bachelor of Technology in Information Technology, Second Year Student, Department of Information Technology, Sri Shakthi Institute of Engineering and Technology, An Autonomous Institution, Coimbatore-641062.

Abstract:

The Companion+ app is a unified MERN-based mobile solution designed to provide seniors with all-encompassing support by facilitating their interactions with family members, caregivers, medical professionals, and critical service providers. With features like real-time communication, intelligent caregiver matching, health and activity monitoring, medication reminders, and family interaction tools, the platform is meant to encourage independence and enhance quality of life. Companion+ promotes physical and mental health, lessens caregiver stress, and maximizes healthcare resources through proactive service coordination and predictive assistance. Utilizing contemporary online and mobile technology, the system creates a networked care ecosystem that enables older people to live more secure, healthy, and satisfying lives with confidence and dignity.

Keywords:

Aging in place, Assistive technology, Caregiver connectivity, Companion system, Connected care ecosystem, Digital health platform, Elderly care, Family-caregiver integration, Geriatric support system, Healthcare coordination, Health technology for seniors, Medication reminders, Mobile health application, Predictive health monitoring, Preventive healthcare, Quality of life enhancement, Real-time communication, Remote health monitoring, Senior wellness, Smart elderly assistance.

Introduction:

In the rapidly changing world of today, where families are frequently dispersed across great distances and the number of elderly people is continuously rising, systems that can safely handle vital health data for seniors are desperately needed. A strong backend constructed with Node.js and Express.js, along with MongoDB for data storage, is how the Companion+ Profile Management System fills this need. It safely saves the profiles of senior citizens, including their name, age, health history, and emergency contacts. The solution makes it possible to submit data using POST requests and retrieve it using GET queries, guaranteeing prompt access in an emergency. Simpleness, scalability, and dependability are provided by this backend solution. Its lightweight construction allows it to be easily modified for future improvements in healthcare.
The platform is very crucial for the protection of senior health data. During development, dependable

functionality is ensured via testing tools such as Postman. In the past, family-based support has been crucial to elder care, particularly in nations with mixed family structures like India. However, a lot of older people are now under supported and socially isolated due to urbanization and the move toward nuclear families. By providing intelligent caregiver matching, real-time health monitoring, prescription reminders, and emergency alerts, Companion+ fills this gap. By encouraging integrated treatment and early problem detection, it promotes preventative healthcare. Tools for family participation provide both practical and emotional support. The system's wearable integration and user-friendly interface accommodate seniors with different levels of tech knowledge.

Performed Analysis of Existing Methodology:

1. Introduction to model:

Recent technological developments have had a profound impact on both academic research and industrial operations. Choosing the right technique is essential to guaranteeing the success and precision of any research or implementation process as systems grow increasingly intricate and data-driven. The purpose of this paper is to investigate, assess, and improve the methodology pertinent to the chosen field of study.

2. Literal Review:

The significance of methodology in the selected topic has been covered in a number of previous research. Numerous methods, resources, and frameworks have been offered by earlier research; each has advantages and disadvantages of its own. This section identifies the gaps that warrant more research and provides a brief summary of relevant work.

3. Assistive Technologies for Elderly Care:

The main goals of assistive technology and apps for the elderly are usually to improve communication, cognitive function, or physical mobility. Fall detection sensors, wearable health monitors, and voice-activated systems are a few examples. Despite their usefulness, these technologies frequently function alone and are unable to offer comprehensive support. Furthermore, the efficacy of many current systems in managing long-term care is limited since they are not made to actively interact with caregivers or medical experts.

4. Telemedicine Platforms:

Telemedicine has revolutionized healthcare by removing the need for frequent in-person visits and allowing senior individuals to communicate with medical professionals from a distance. However, telemedicine systems focus on one-time consultations or treatment monitoring rather than providing continuous, real-time monitoring of an individual's health status. Furthermore, these systems usually don't integrate well with other critical aspects of senior care, such emergency alerts, medication reminders, or caregiver management.

5. Health Monitoring System:

Commonly employed in senior care are health monitoring devices that measure vital signs like heart rate, blood pressure, and glucose levels. While these systems are useful for providing health data, they frequently fall short in offering predictive analysis or actionable insights. Potential health problems can

be found with the aid of predictive analysis before they become serious emergencies. The Companion+ project relies heavily on this predictive function, which is typically absent from existing system.

6. Caregiver Supportive Platform:

In eldercare, platforms for managing caregiver support have grown in popularity. Some of these platforms offer features including task management, scheduling, and caregiver matching. Most of these platforms, however, do not provide real-time updates on the state of the old person or are not integrated with health monitoring systems. Furthermore, they frequently fail to enable direct communication between the family members and the elderly user, which may cause support to be delayed in emergency situations.

Demerits and Disadvantages:

- **Fragmented Services:** Poor coordination between caregivers, families, and healthcare practitioners results from the majority of current systems' discrete features (such as merely communication or health tracking).

- **Lack of Real-Time Monitoring:** Numerous eldercare platforms lack emergency detection and ongoing health monitoring, which causes delays in prompt treatment in dire circumstances.

- **Low Digital Literacy Compatibility:** Many eldercare apps have complicated user interfaces that are not senior-friendly, discouraging older people with little technological proficiency from using them independently.

- **Poor Data Security and Privacy**: Sensitive health data is frequently not sufficiently protected, which raises questions about abuse, breaches, and illegal access to the personal data of senior citizens.

- **Limited Multi-Stakeholder Communication**:
The inability of current platforms to facilitate seamless, real-time communication between physicians, caregivers, and family members lowers overall responsiveness and care coordination.

- **Inflexibility for Personalized Care Plans:** The majority of systems provide general solutions that might not work for everyone, failing to adjust to the unique health requirements and lifestyle choices of senior citizens.

- **Lack of Multilingual and Regional Support**: Elderly people in non-English speaking or rural areas may find it challenging to use many eldercare applications since they do not support local languages or cultural contexts.

Research on the Proposed Methodology:

The proposed methodology for the Companion+ system integrates several advanced technologies to provide a comprehensive and holistic solution for elderly care. The approach combines real-time health monitoring, predictive analytics, caregiver coordination, and family engagement within a single mobile application platform. The underlying research supporting the methodology draws from various fields, including healthcare technology, human-computer interaction, and machine learning, to ensure the system's effectiveness and accessibility. The following are some major features of Companion+:

1. Caregiver Coordination and Matching

In order to improve care outcomes, research on caregiver coordination highlights how crucial it is for family members, healthcare professionals, and caregivers to communicate seamlessly. According to a 2019 study by Williams et al., appropriate caregiver matching based on user preferences, availability, and skill greatly increases caregiving effectiveness and lowers caregiver burnout.

2. Family and Social Engagement

Elderly people are particularly vulnerable to social isolation, which can have detrimental effects on their mental and physical health. According to research, family involvement is essential for lowering loneliness and enhancing general wellbeing. A study by Cacioppo et al. (2018) found that seniors who maintain strong social ties have better health outcomes.

3. User-Centric Design for Accessibility

The Companion+ platform's user-centric design guarantees that older people, especially those with little technological proficiency, may utilize the system. Human-computer interaction (HCI) research emphasizes how crucial it is to provide user-friendly interfaces for senior citizens. According to a study by Lister et al. (2020), older people find mobile interfaces easier to use when they are simplified and have larger fonts, clear navigation, and voice-assisted commands.

4. Integration of Telemedicine

Elder care now requires telemedicine, which enables remote medical consultations, particularly in underserved or rural locations. Telemedicine consultations, according to studies, lessen the need for in-person visits, saving time and money on medical care without sacrificing quality (Smith et al., 2017).

5. Ethical Considerations and Privacy

The approach also emphasizes how important data security and privacy are. Sensitive health information gathered by the Companion+ system needs to be shielded from unwanted access. Studies on the privacy of health data, like the one conducted by Patel et al. (2019), have emphasized the necessity of strong encryption and compliance with laws like GDPR and HIPAA.

Some Important Software used and its Description:

1. Android Studio (Mobile App Development)

The Companion+ mobile app for Android users was developed using Android Studio, the official integrated development environment (IDE) for Android application development. It contains a number of tools, including a code editor, performance monitors, and a virtual device emulator, which assist developers in creating a high-quality user interface (UI) and implementing the necessary functionalities for health tracking, caregiver communication, and real-time notifications.

2. Firebase (Real-Time Database and Cloud Services)

Google's Firebase is a cloud-based platform that offers features including push alerts, cloud storage, user authentication, and real-time database management. For apps like Companion+ that need real-time updates and monitoring, Firebase provides a real-time NoSQL database that enables developers to store and sync data between users quickly.

3. TensorFlow (Machine Learning and Predictive Analytics

TensorFlow is a popular open-source machine learning package for predictive analytics, deep learning, and data analysis that was created by Google. It offers a vast array of tools and frameworks for creating machine learning models that are capable of pattern recognition, analysis, and prediction.

4. React Native (Cross-Platform Mobile App Development)

Programmers may use a single codebase to create mobile apps for iOS and Android thanks to a JavaScript framework called React Native. Developers can produce incredibly productive and economical applications with a native user experience by utilizing React components.

5. Node.js (Backend Development):

Web development is the primary use case for JavaScript (JS), a versatile programming language that can be used on server-side platforms like Node.js for backend development and on web browsers, which are the client-side environment in which JS functions. JS enables dynamic and interactive elements on web pages, such as form validation, user interaction, and content updates.

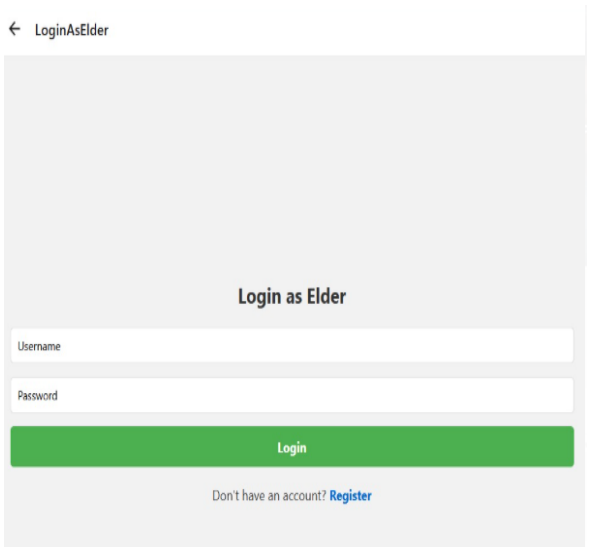
6. MongoDB (Database Management):

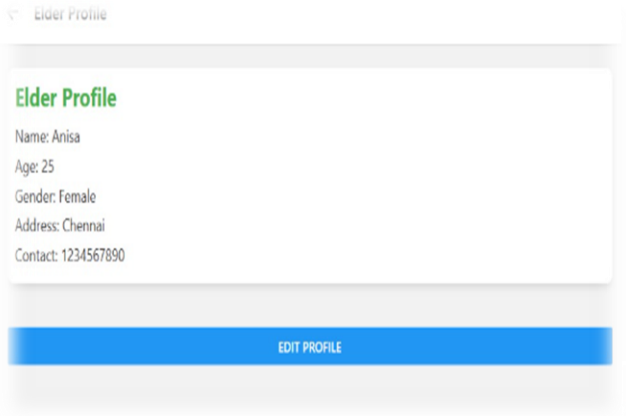
MongoDB is a NoSQL database that, as opposed to conventional table-based relational databases, stores data in adaptable, JSON-like documents. This makes it perfect for applications like user profiles, caregiver schedules, and health records that deal with massive amounts of unstructured or semi-structured data.

Results and Discussion:

1. LOGIN PAGE FOR ELDERS:

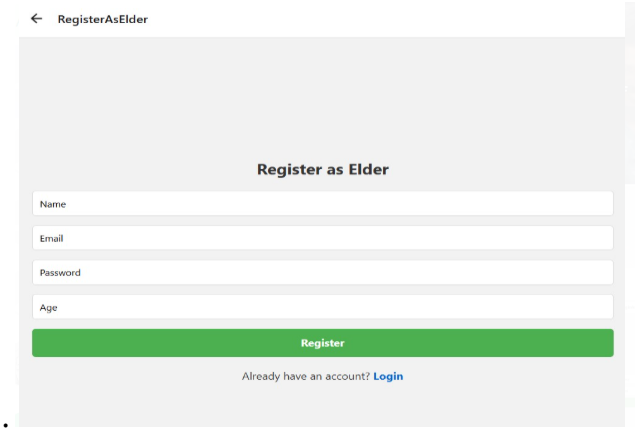
Authorized users can safely access the program by entering their email address and password on this screen. It guarantees access control to the app's functionalities and data privacy.





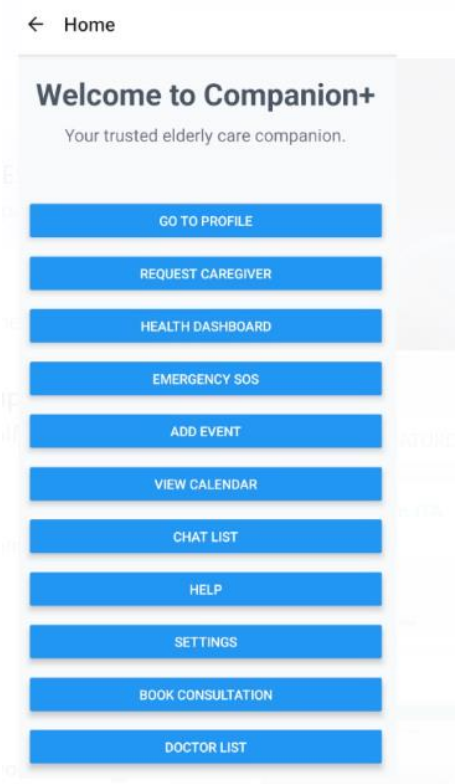
2. REGISTRATION PAGE FOR ELDERS:

By providing their information, a user can register an elderly person or caregiver on this page. For every elder and caregiver, it generates a profile that permits real-time tracking and communication capabilities. Because of security standards, it is structured so that when the page is not in use, it will immediately log out of the other device.



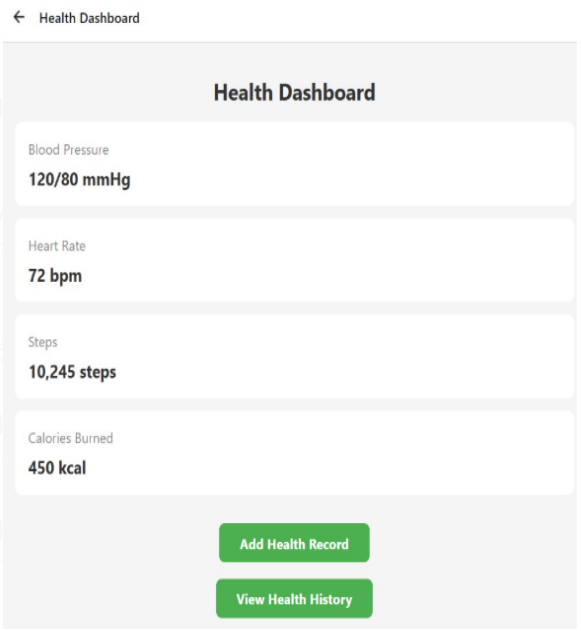
3. MAIN APPLICATION INTERFACE PAGE:

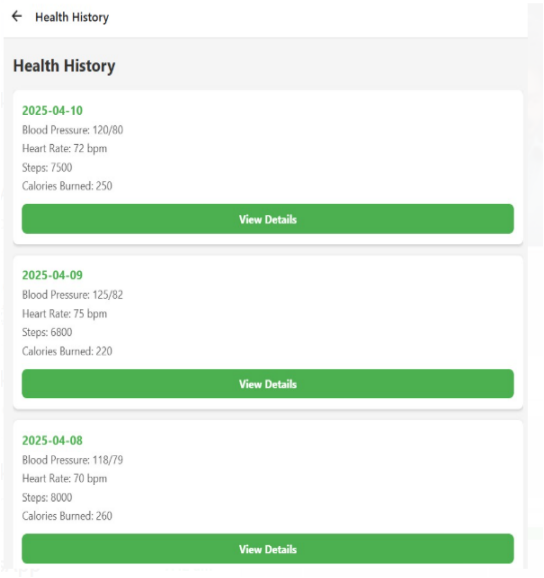
The main navigation hub is the home page. Users can access various modules, examine summaries, and quickly learn about outstanding requests and current connections.



4. ELDER STATUS AND MONITORING PAGE:

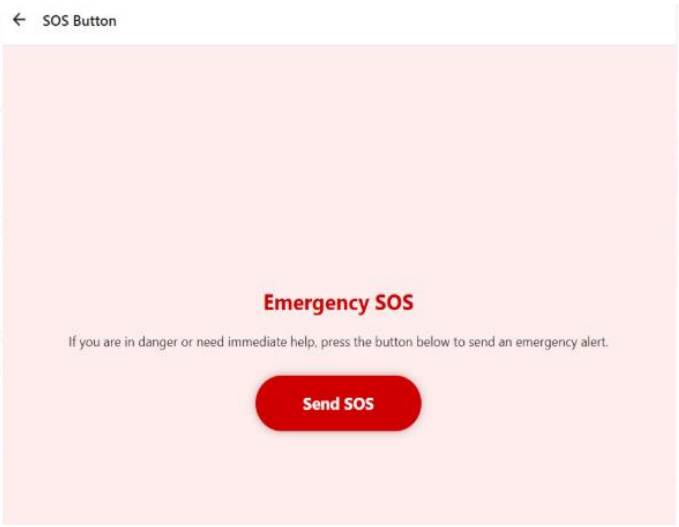
Displays the elders' latest status updates and information. It allows family members or caregivers to monitor health and safety in real time.





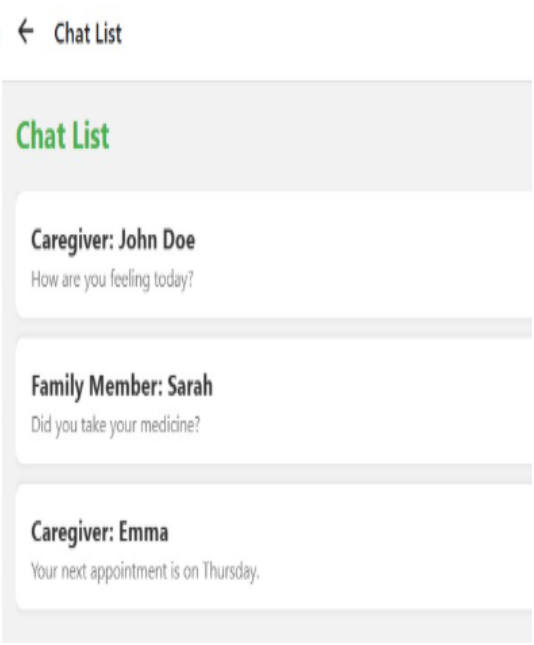
5. EMERGENCY SOS BUTTON

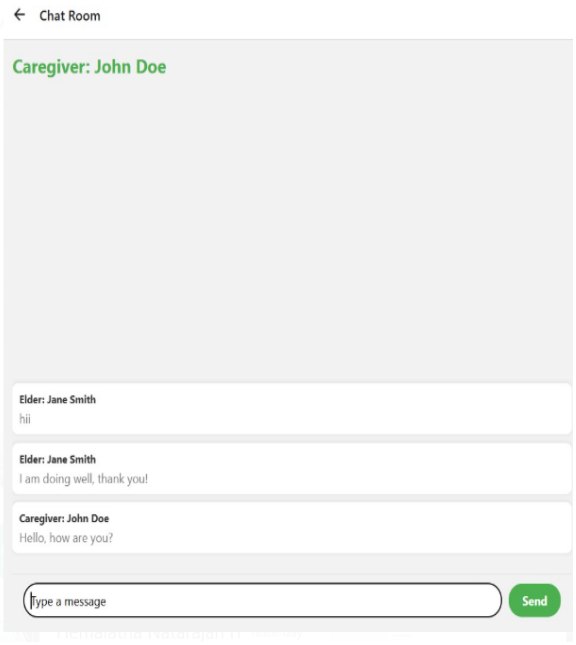
The Companion+ app includes a dedicated Emergency SOS button that allows elderly users to instantly alert caregivers, family members, or nearby responders in critical situations. With a single tap, real-time location and emergency details are shared, ensuring swift assistance and enhanced safety during medical or personal emergencies.



6. COMMUNICATION INTERFACE

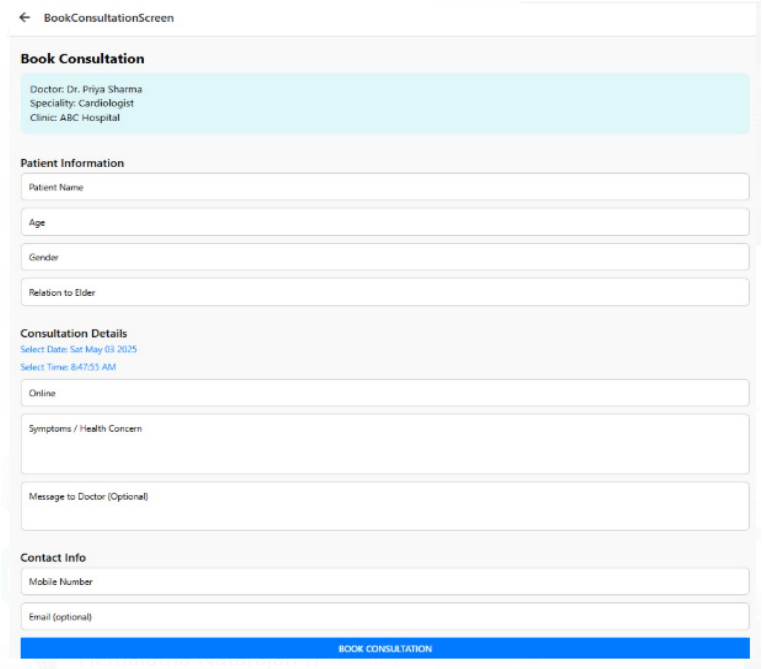
The Companion+ app features an intuitive communication interface that enables seamless interaction between elderly users, caregivers, family members, and healthcare professionals. It supports real-time chat, voice, and video options to ensure continuous emotional support, timely medical guidance, and improved coordination in caregiving efforts.





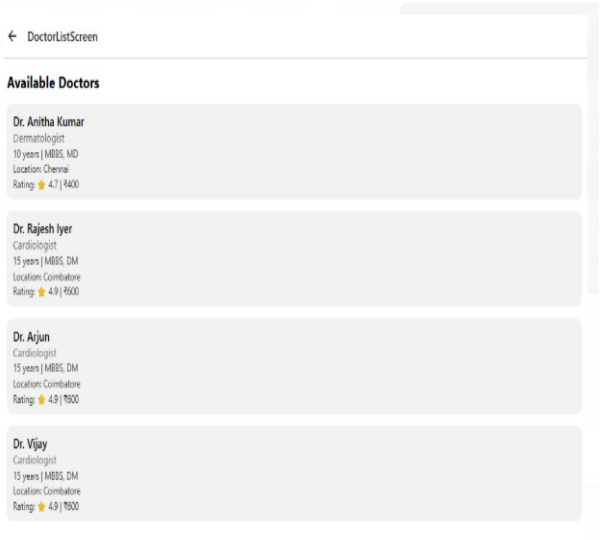
7. CONSULTATION BOOKING

The Companion+ app allows elderly users or their guardians to seamlessly book medical consultations with verified healthcare professionals. The system offers time slot selection, preference-based doctor matching, and instant booking confirmation—ensuring timely medical advice when it's needed most.



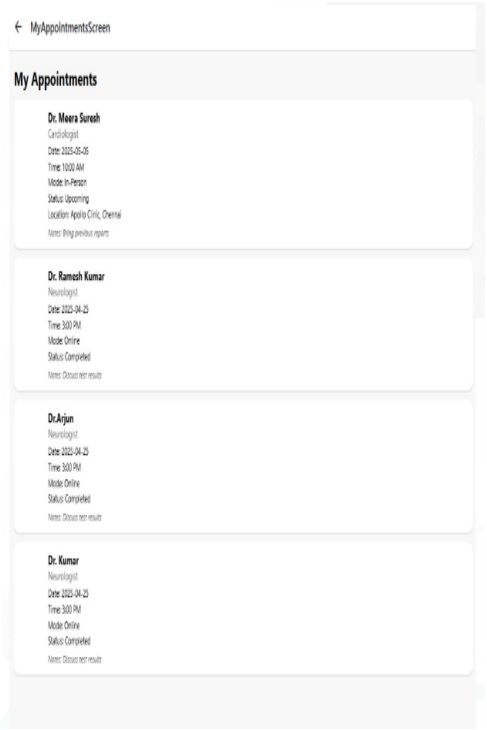
8. DOCTORS LIST

This screen displays a curated list of available doctors across specialties such as geriatrics, cardiology, and general medicine. Users can view doctor profiles, including experience, ratings, and availability, making informed choices for their care needs.



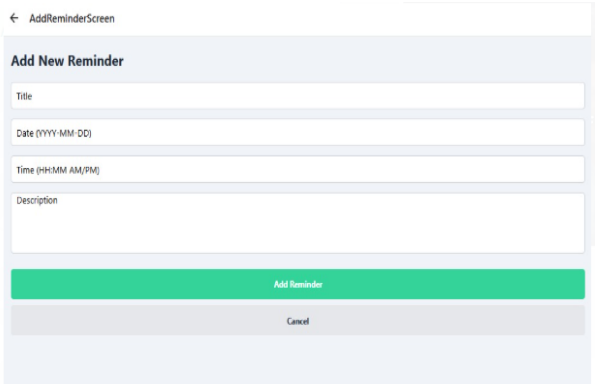
9. APPOINTMENT LIST

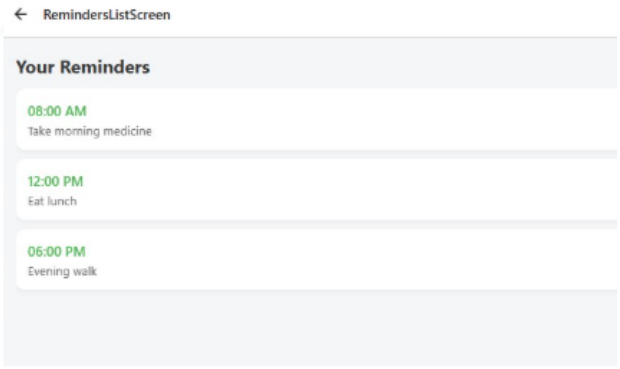
The Appointment List screen provides an organized view of all upcoming, completed, or canceled consultations. Users can track their bookings, receive reminders, and manage appointments effortlessly to maintain continuity in their healthcare.



10. MEDICATION & TASK REMINDERS

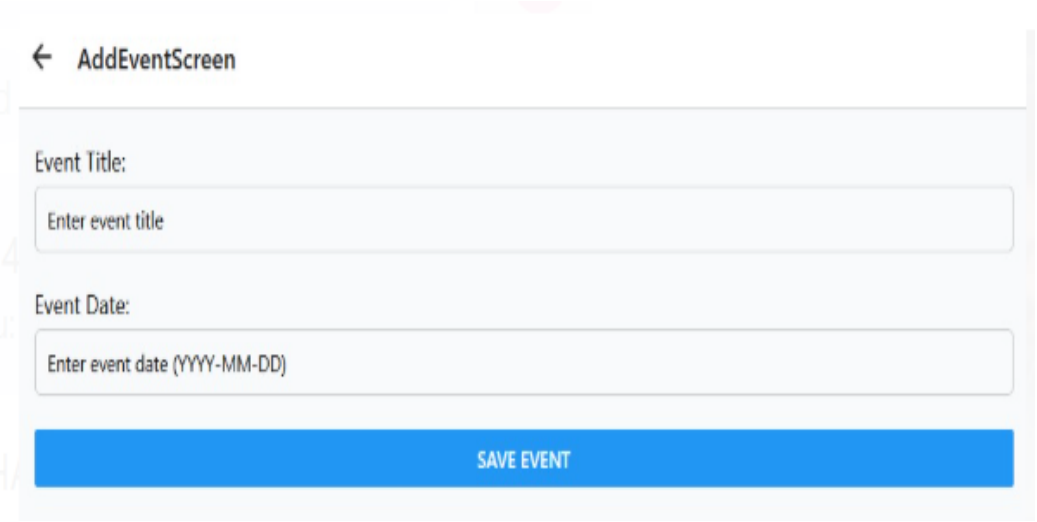
The Companion+ app empowers users to set personalized reminders for medications, doctor appointments, hydration, and daily tasks. The Add Reminder feature allows quick input of time, frequency, and description—helping elderly users stay consistent with their routines. The reminders Screen displays all scheduled alerts in an easy-to-read format, ensuring timely notifications and reducing the risk of missed doses or activities.





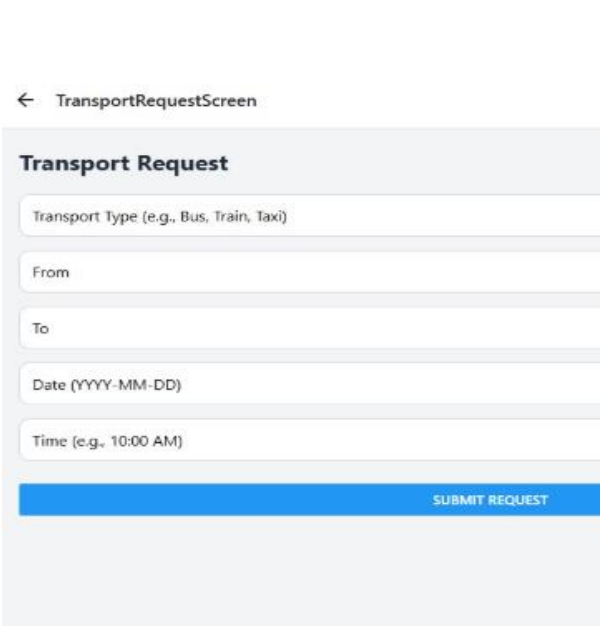
11. EVENT BOOKING & MEMORY JOURNAL INTEGRATION

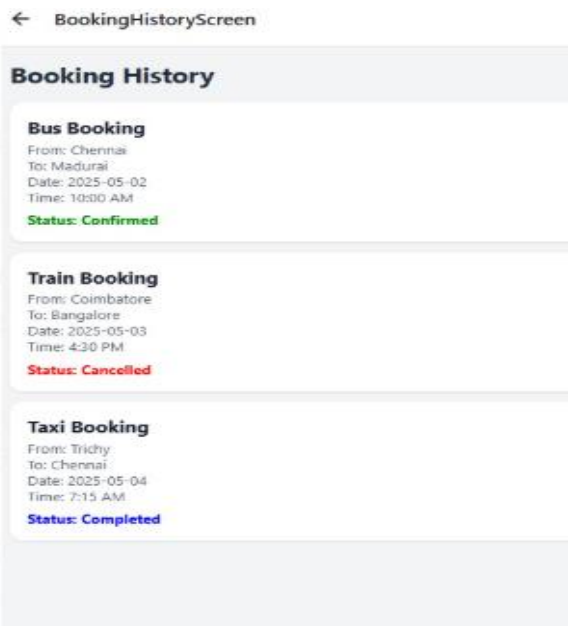
The Event Booking feature allows elderly users and their families to register for social gatherings, wellness workshops, or community meetups directly through the app. Once booked, events can be seamlessly added to the Remember Me journal—helping seniors revisit joyful memories, stay socially connected, and promote emotional well-being.



12. TRANSPORT BOOKING FOR MEDICAL & SOCIAL VISITS

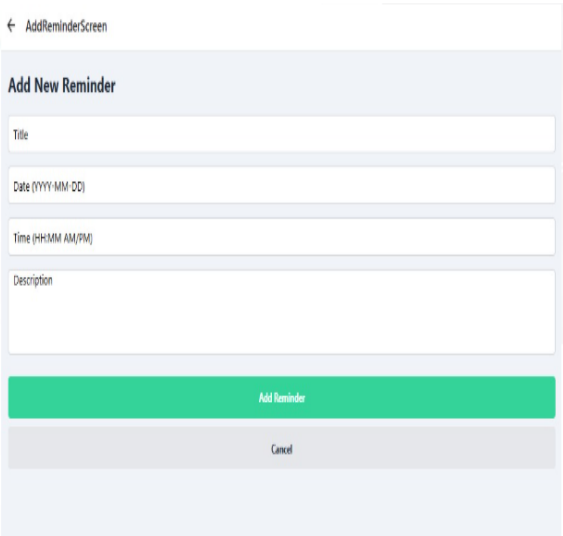
The Transport Booking module offers a simple interface to schedule rides for hospital visits, routine checkups, or social outings. With options for assisted or wheelchair-accessible transport, the system ensures safe and reliable mobility for seniors, reducing dependence and promoting independence.

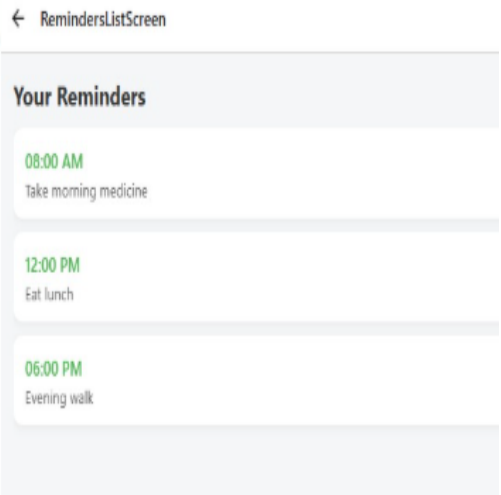




13. SMART MEDICATION & ACTIVITY REMINDERS

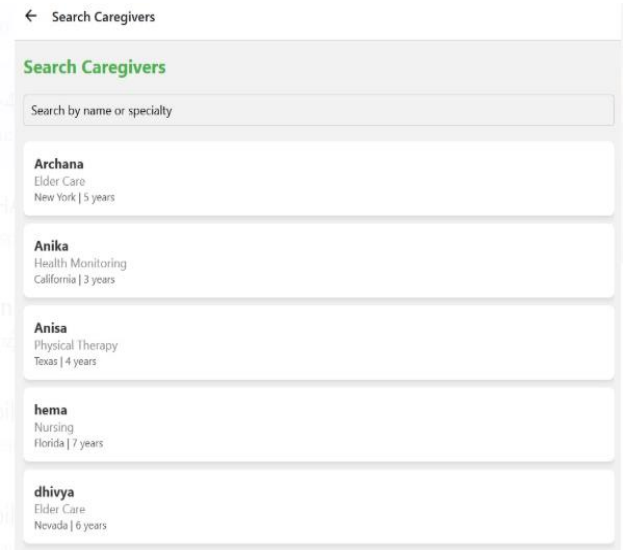
The Reminders feature allows users to set personalized alerts for medications, doctor appointments, hydration, exercise, and daily tasks. Designed with simplicity in mind, it ensures that elderly users never miss important health routines. The reminders are customizable with voice prompts or visual cues, helping enhance adherence and independence in everyday life.





14. AVAILABLE CAREGIVER'S DIRECTORY

The Caregivers Available section displays a curated list of verified caregivers, including their skills, experience, language preferences, availability, and reviews. This helps families and elderly users find suitable companions who meet their physical and emotional care needs, ensuring trust, comfort, and timely support.



Conclusion:

The Companion+ mobile application stands as a transformative step toward improving the quality of life for elderly individuals through technology-driven care. By integrating key features like real-time health monitoring, emergency SOS services, caregiver connectivity, and smart reminders, the platform addresses the multifaceted needs of senior users in a single, intuitive ecosystem. It not only empowers elderly individuals to maintain independence but also ensures their safety, emotional well-being, and access to timely support. The seamless coordination between family, caregivers, and medical professionals ensures that care is both preventive and responsive. Built using the MERN stack, the system ensures scalability, flexibility, and performance. The application emphasizes accessibility, with a user-friendly interface tailored for elderly users with minimal technical skills. By reducing hospital visits through proactive care and fostering a connected environment, Companion+ significantly alleviates the pressure on traditional healthcare systems. The backend system securely stores personal and medical data, ensuring privacy while maintaining availability for caregivers. Overall, Companion+ redefines elder care through thoughtful, inclusive, and efficient digital solutions.

Future Scope:

Looking ahead, Companion+ can be further expanded to include AI-driven predictive health analytics that alerts caregivers about potential health risks before they escalate. Integration with wearable IoT devices can automate data capture for vital signs, sleep patterns, and mobility, enabling more precise and real-time monitoring. Features like multilingual support and regional customization will improve its accessibility across diverse populations. A chatbot assistant could offer 24/7 support for routine tasks and health inquiries. The addition of community forums can also provide social support and engagement for seniors, reducing isolation. Partnerships with healthcare providers and pharmacies can streamline medication delivery and doctor consultations. Furthermore, blockchain can be explored for secure health record sharing across institutions. The application can also incorporate machine learning for personalized care recommendations based on user history. With continuous feedback and adaptive updates, Companion+ has the potential to become a global benchmark for digital eldercare solutions, bringing innovation and compassion into perfect harmony.

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