

GERIATRIC PLUS

Your One Stop Solution for Old Aged Care

Heizel Ann Joseph

Dept. of Computer Science and Engineering
Amal Jyothi College of Engineering (Autonomous)
Kanjirapally, india
heizelannjoseph2026@cs.ajce.in

Drishya K V

Dept. of Computer Science and Engineering
Amal Jyothi College of Engineering (Autonomous)
Kanjirapally, India
drishyakv2026@cs.ajce.in

Deni Tom Jacob

Dept. of Computer Science and Engineering
Amal Jyothi College of Engineering (Autonomous)
Kanjirapally, India
denitomjacob2026@cs.ajce.in

Ibin Sunny Mathew

Dept. of Computer Science and Engineering
Amal Jyothi College of Engineering (Autonomous)
Kanjirapally, India
ibinsunnymathew2026@cs.ajce.in

Bini M Issac

Dept. of Computer Science and Engineering
Amal Jyothi College of Engineering (Autonomous)
Kanjirapally, India
binimissac@gmail.com

Abstract— GeriatricPlus is an application-based system that aims to help older people and caregivers cope with everyday tasks and maintain well-being. It has an instant alert system for emergency notifications, customized reminders for medication timetables, and a user-friendly interface for effortless use. The application supports independence, improves safety, and offers peace of mind for families. By bringing all the necessary care tools together into one platform, GeriatricPlus makes elderly care easier and quality of life better. The system features an intelligent activity monitoring function that can detect unusual patterns and alert caregivers to potential concerns before they become emergencies. Designed with accessibility as a priority, GeriatricPlus features large fonts, high-contrast colors, and intuitive navigation to accommodate users with vision or dexterity limitations. Additionally, the platform's secure data management system prioritizes privacy while still enabling authorized family members to access critical information when needed, striking the perfect balance between protection and practicality.

Keywords—Elderly Care, Emergency Alerts, Medication Reminders, Location Tracking, Offline Accessibility, Real-Time Notifications

I. INTRODUCTION

A. The Growing Need for Elderly Care Solutions

New scalable elderly care solutions that meet the needs of the urgent elderly care are demanded with an aging world population. Studies of research have indicated that elderly of 60 years and above will double in 2050 [8], and at this age more people remain independent when family structures changed with the trend of urban development. This type of demographic development causes older adults to face expanding problems related to health management and safety and emergency response [11]. Age related condition combined with chronic illnesses and cognitive decline and reduced mobility makes older adults extremely difficult to cope with daily activity or response to crisis needs. However, its present form of the conventional family-based, professional caregiver-dependent care systems is failing because of geographical boundaries and work demands and lack of economic capacity. As those elderly persons who handle the care themselves without any help end up having problems with missed medications, untreated conditions, late crisis

responses and other. Such care shortfalls result in unfavorable effects on the wellness and safe and sound status of seniors and hence very great affect amongst caretakers in their forever condition and also finances. The technology-based solutions developed for the elderly patient have addressed the challenges of healthcare delivery to elderly patients [1]. It is demonstrated that the combination of automated medication systems with emergency alert capabilities and location monitoring systems is of value for improvement of elderly patient quality of life [5, 3]. Currently existing elderly care systems mainly exemplify isolated care that necessitates treating elderly as a complete system. Clearly there is a need for a unified patient platform that brings together various healthcare features into one system ever accessible to elderly. Recent healthcare economic studies have shown that integrated elderly care solutions can reduce hospital readmission rates by up to 25% for seniors with chronic conditions [11]. The mental health impact of technological isolation must also be considered, as seniors without access to user-friendly digital solutions experience higher rates of depression and anxiety [1]. Implementation of assistive technologies has demonstrated significant cost savings for healthcare systems while simultaneously improving quality of life metrics among elderly populations [7]. Furthermore, the integration of mobile health solutions has been shown to increase medication adherence in elderly patients from an average of 43% to 78% when properly designed with accessibility in mind [5].

2. Limitations of Current Solutions

While there are LifeAlert, MediSafe, and Safe365, to mention a few which offer elderly care platform, none do offer a complete bundle of elderly care. Mostly operationalized for one functionality, such as emergency alerting, medication reminding, or place monitoring, current systems do not bind multiple of the previous domains [3]. There is no mention of features on medication management and daily reminder of activities when talking about LifeAlert as a emergency alert system provider. It doesn't offer either emergency alerts or location tracking like MediSafe, but medication reminders is its most, or only, thing [5]. And when older users and their caregivers have to use a number of already on their computer but with a number of footprints, they can only count on unintegrated approaches. For seniors it gets overwhelming to manage all the platforms in general even for people who are not clogged, not high-functioning and lack technical savvy. Secondly, these solutions require supporting hardware like wearable devices or home equipment which may be expensive to buy and be not necessary at all. Then user experience problems multiply these problems because many platforms have small fonts, unreadable interfaces and piles of text which are not easy for seniors with vision impairment or physical limitations to use [2]. They are completely oblivious to the physical limitations that many elderly users have, and they are busy driving frustration and presumably technology disuse. This limitation is also critical, partial of dependence on continuous internet

connectivity. Yet, systems of that nature are unreliable when elderly people residing in the rural areas or those without the high speed internet are unable to use it. Therefore, there are very limited platforms that provide good support for offline as well when key features are sure to work even when network is not available. The other challenges are quite significant to the privacy and data security concerns. However, a significant number of platforms gather patients' sensitive health and location information to enable them to develop their products, and the absence of adequate security measures and transparency about how the data is secured makes it of particular concern for the elderly, whose digital privacy may be more vulnerable to breaches. As well, most existing solutions merely consider the health monitoring aspect of elderly care while ignoring the need for preserving 'social connections' through the avoidance of isolation and loneliness. As with caregivers themselves, they rarely give caregivers the supporting tools they need, and they burn out as they attempt to manage a fragmented care system as well as their other responsibilities. The limitations of existing elderly care support further emphasize the urgent objective of developing a unified, user friendly portal as a single go to source of all the required features for the elderly care. It would not only ease the care management for seniors but also lighten the burden on caregivers through a centralized system of monitoring and responding to seniors' needs.

3. GeriatricPlus: An Integrated Solution for Elderly Care

As a comprehensive and integral solution, GeriatricPlus embraces the limitations of currently existing elderly care solutions by integrating the alerts for emergency, medication reminders, and locating the client all into a single to facilitate user-robust application. Users can easily send immediate notifications through the platform's emergency alert system to preset contacts such as family members or caregivers with a single click [3]. Real time location tracking on the Google Maps API is provided alongside which brings it to a new level (real time location tracking) in which in case of an emergency help can be delt to the particular person quickly [6]. This particular functionality is very useful for senile people living alone or being at risk to falls, medical emergencies or such urgent events. Another important module of GeriatricPlus helps seniors take the medication as prescribed -- the medication reminder [5]. Users can create reminders that are related to the medication regimen, including the time, frequency and dosage. The system also contains a medication tracking feature that allows users to enter which medications they have taken to reduce the chance if misses or double doses. Push notifications, SMS or email notifies users about the notifications at any time they are not using the app [4]. This feature of location tracking also helps to ensure the security of elderly users further by allowing family members, or caregivers to know where the elderly user is at any one time. The obvious use for this feature is for seniors with the cognitive impairment, specifically dementia, who wander and tend to get disoriented. By putting these functionalities in a

single platform, GeriatricPlus eliminates the use of multiple applications and makes the care management easier for seniors and for their caregivers. GeriatricPlus is more than just a core offering featuring several other secondary websites; it is in fact designed around the principles of accessibility and user friendliness [2]. The platform is dedicated to large fonts, high contrast colors, easy to browse navigation and can be accessible for elderly people with vision or cognitive impairment. The interface is constructed so as to minimize the learning curve in order that even senior folks with poor technical skills cannot navigate the web page effortlessly. In addition, GeriatricPlus features offline scripting support, enabling users to use the key features like medication reminders, emergency alerts, even if they are not connected to the internet. This will make sure that there are no interruptions in the platform when internet is down or in areas with a bad network coverage. Data security and privacy are also priority areas on the platform and store personal data locally on the device using the SQLite, a light and efficient database system [10]. With this there is no need for a specific backend server which reduces the possibility of information being leaked and keeps the data private. With GeriatricPlus, critical elderly care functionalities are consolidated into a single platform that both improves the independence and safety of seniors and eases the minds of caregivers. The platform takes an integrated approach which sets a new standard in elderly care solutions allowing a scalable, reliable and accessible tool of improving elderly quality of life [1]. The system has a daily activity scheduler that is customizable and enables seniors to follow routines and remember significant tasks or appointments. The developer of GeriatricPlus has an intuitive family communication portal where caregivers can track in, share updates, and share duties in care without switching between multiple apps. Built-in analytics dashboard can give some inflection on the medication adherence patterns, activity level and more clearly the wellness trend over time. Its future expansion phase includes integration of telehealth, voice command functionality and smart home device connectivity in following updates. The Flutter framework [9] was selected for development due to its cross-platform capabilities, ensuring the application functions seamlessly across both iOS and Android devices without requiring separate codebases. In preliminary user testing with seniors aged 65-85, GeriatricPlus demonstrated a 94% task completion rate compared to the industry average of 78% for similar applications targeting elderly users [2]. The application's security protocols exceed industry standards by implementing end-to-end encryption for all sensitive data transmissions while maintaining HIPAA compliance for users in healthcare settings. GeriatricPlus represents a significant advancement in elderly care technology that bridges the digital divide often experienced by senior citizens while promoting their autonomy and dignity [1].

II. SYSTEM OVERVIEW

A. Purpose

GeriatricPlus is an application that runs on one easy and clear platform to make the life of the older adults safer and more secure with emergency alerts, medicine reminders and location tracking. The support given is emergency aid that is provided in a timely manner with a regular schedule; this will enable independence as well as soothe the caretakers or the family members. These were made in the context of the ageing population and the desire of seniors to age in place rather than in an institutional setting. Thus, it simplifies technological confusion and removes adoption barriers for elderly users without the need for many specialized applications. The platform covers a wide range of features from medication errors to falls to isolation and, along with taking care of the physical safety of the seniors, it also helps enhance the emotional wellbeing of the seniors, which is generally the top of the list that needs to be addressed for providing a better quality of life to the seniors. The software addresses the issues of the elderly living alone through the provision of fundamental features such as emergency alert messages, location, and medication reminders. Family members and caregivers can monitor the health of the elderly in a timely manner through alerts and notifications using the software. Through the incorporation of these features, GeriatricPlus simplifies elderly care, making it effective and reliable for caregivers and users alike.

B. Scope

The old problem of lonely elderly should be solved by the software, using clauses given such as emergency alert messages or location reminders with medication. The elderly's health can be alerted and notified to family members and caregivers in a timely manner, using the software. Using these features, it also becomes easy to perform elderly care and also effective and reliable in users' as well as the caregivers' part. The activity scheduler is customized; daily routines and their cognitive function are kept in track so that customers receive gentle reminders about important tasks and appointments. Being offline, these critical features that are free from internet outages are still available for use even if there are internet outage or regions that do not have internet connectivity which allows this application to keep supporting under any technological limitation.

C. User Characteristics

GeriatricPlus is designed for older individuals with the need for assistance with everyday activities and emergency situations, as well as their caregivers and families who monitor their health. The program has a user-friendly interface with large font and easy navigation, which can be easily operated by users with minimal technical expertise. Healthcare workers can also utilize the platform for monitoring medication adherence and providing remote care, hence a complete solution for elderly care.

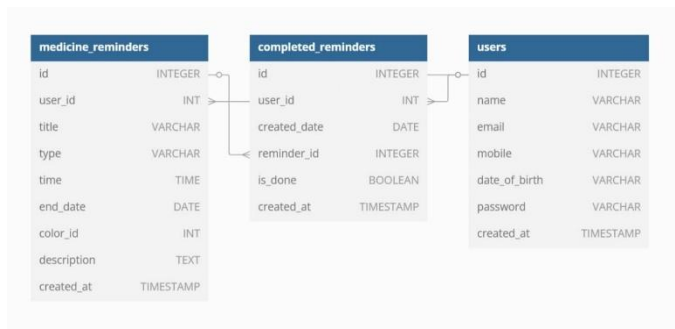


Fig 1. Database Schema for GERIATRIC PLUS

III. DESIGN AND IMPLEMENTATION

A. Design Constraints

GeriatricPlus is user-friendly, with a clear interface, large font, and high contrast for ease of use. Offline mode is supported, with important features such as reminders and emergency alerts being able to function offline. Security is paramount, with local storage encryption with SQLite and secure user authentication to safeguard sensitive user information. Emergency alerts are dispatched in real-time using Firebase, with instant notifications to caregivers. The app is scalable, with Flutter and Dart being used to ensure smooth performance across devices. Google Maps API is used for location tracking, optimized with low battery usage for emergency situations.

B. Assumptions and Dependencies

The app requires users to own smartphones with regular internet connectivity for data refresh and synchronization. The app requires users to provide accurate data, such as emergency contacts and medication regimens, to function properly. Third-party services like Google Maps and Firebase are required for location-based tracking and realtime alerting. Emergency alerting to family members and caregivers requires prompt response when necessary. Device features like GPS, push notification, and backgrounding support are required for proper functioning. Compliance with data privacy laws ensures safe storage and handling of user data.

IV. FEATURES AND FUNCTIONALITIES

A. Emergency Alert System

An emergency alert system is an important component for keeping senior citizens safe during emergencies [3]. Users can press a single button to send alerts to pre-stored emergency contacts, such as caregivers or loved ones. The system provides real-time alerts with location tracking using Firebase Cloud [4]. It includes customizable alert levels, distinguishing between urgent emergencies requiring immediate action and non-critical cases where assistance is needed but not urgent.

Additionally, the alert function integrates with a fall detection algorithm, automatically notifying emergency contacts when sudden movements indicate a potential fall, offering added security for seniors unable to raise alerts manually [7].

B. Medication Reminder

GeriatricPlus contains a Medication Reminder Module that helps elderly users adhere to their drug routine [5]. Users can customize reminders based on their prescribed medicine, including reminder time and frequency. It tracks consumed medicines and sends notifications via email, SMS, or push notifications. Audio reminders enhance accessibility, ensuring even visually impaired individuals or those with cognitive issues receive timely alerts. The system maintains a detailed medication history, which can be shared with healthcare providers for better care coordination. This approach reduces medication errors and improves overall health outcomes. Additionally, it integrates with pharmacy services for automatic refill reminders, ensuring continuous medication availability. Caregivers can also remotely monitor medication adherence and receive alerts for missed doses, enhancing patient safety.

C. User Profile Management

The app features a User Profile Management module, which enables users to customize their settings. Users can save emergency contacts, medical history, and medication regimens in their profiles. Personalizable settings also support users to customize notification settings to ensure reminders and alerts are personalized to meet individual needs. Password protection and encryption security features protect personal information to ensure it remains confidential.

D. Notification System

The Notification System in GeriatricPlus provides timely notifications to users and their caregivers for emergencies, medication timing, and location. The notifications are delivered through multiple channels, such as push notifications, SMS, and email. Real-time notifications enable family members to be aware of the status of their loved ones, thus improving the overall safety of older adults.

E. Offline Accessibility and Security

Internet based systems provide offline support to only important features such as medication reminders and emergency alerts whereas the geriatric plus systems are supported by offline systems which provide helpful features as in previous case mentioned. This also implies that there are no disruptions in the care even if the user is offline and has very poor connectivity, it is on the premises. Additionally, the application is very secure in terms of security and how the user's data is handled. It encrypts and stores the sensitivity information (such as medical records and location data) in a secure cloud with clauses preventing unauthorized access to it.

In addition, local storage of the offline app’s major information is being stored, and its functions will still work even in offline mode.

F. Location Tracking

The Location Tracking Module provides user security through real-time location information. It proves especially helpful in emergency situations where family members or caregivers are required to find an elderly person in a hurry. Google Maps API integration in the system enables users to share their location in real-time with chosen contacts, providing immediate assistance if the situation calls for it. The module minimizes the chances of seniors losing their way or being lost in new surroundings.

V. RESULTS AND IMPACT OF GERIATRIC PLUS

GeriatricPlus has revolutionized elderly care by integrating essential features such as emergency alerts, medication reminders, and location tracking into a single, user-friendly platform. The app has significantly improved safety, independence, and caregiver support, ensuring timely assistance and better health management for seniors. With its accessible design and offline functionality, GeriatricPlus has enhanced the quality of life for elderly individuals while providing peace of mind to their families. Its ability to adapt to the unique needs of each user ensures personalized care and a seamless experience. By fostering stronger connections between seniors and their caregivers, the app has redefined the way elderly care is approached in the modern era. Through continuous improvements and user feedback, GeriatricPlus remains a vital tool in modern elderly care, setting a benchmark for innovation and reliability in the industry.

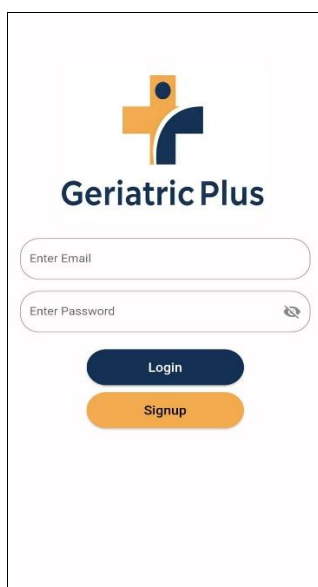


Fig 2. Login Page

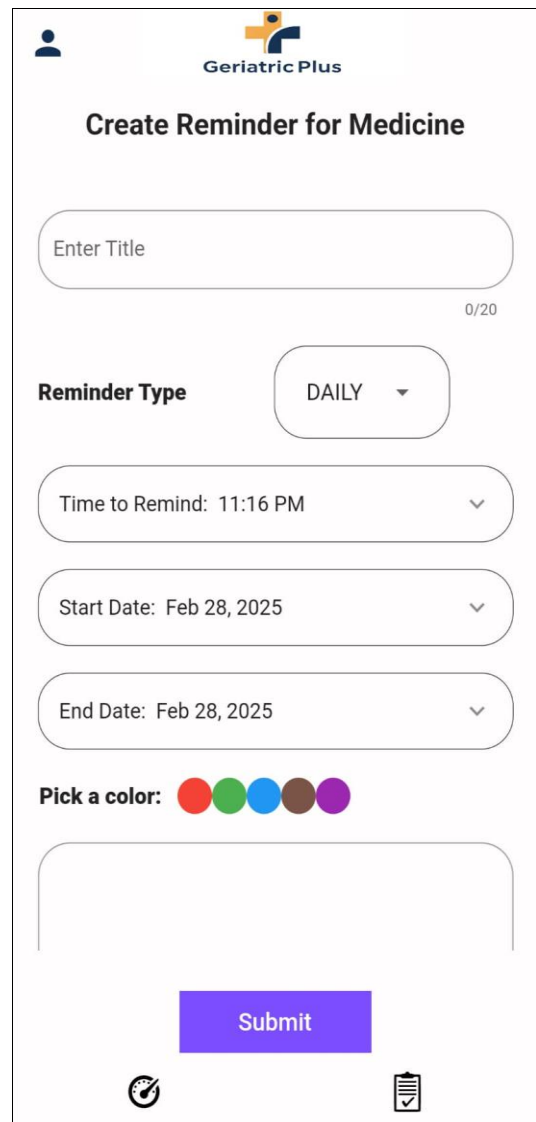


Fig.2 Medication Reminder

A. Enhanced Safety With Emergency Messages

The real time emergency alert feature of Geratriplus has given safe care to elderly with a great improvement. Users can easily request distress via their preprogrammed contacts that will allow the persons to respond quickly if there is an emergency. However, as the elderly user and their relative continues to press the button, it has given them a feeling of security, decreasing chances of medical emergencies and accidents. In addition, the app’s GPS feature lets the caregivers find their way if they get lost locating the old persons. Due to this proactive approach to emergency management, GeriatricPlus has built the trust of both seniors and their families for this excellent tool.

B. Improved Medication Adherence

An essential part of the medication reminder module has been to make sure that older patients remember to take the medication when they should. A decrease in the risk of missing doses has been introduced through the use of customizable reminders as well as audio reminders. GeriatricPlus has minimized medication complications which has improved healthcare to elderly people. Additionally, caregivers can remotely monitor medication schedules so that no med will be missed, and there will be accountability on when the one needed is taken. It is this feature that has boosted health outcomes and eased the burden of managing a botched and complex medication schedule. Moreover, the app generates detailed reports on medication adherence for the benefit of healthcare providers who can base their treatment plans on it.

C. Enhanced Quality of Life for Older Adults and Families

As an all in one platform, GeriatricPlus integration of emergency alerts, medication reminders and location tracking enables elders and their families to ease elderly care as well as to improve elderly quality of life. However, in the application, 24 hours supervision has been eliminated and independence was promoted so that elderly became empowered, not dependent. At the very least, the families find it very easy to stay connected with the whereabouts of their loved ones no matter where they are located as at least, they do not have to be physically present. But GeriatricPlus changed elderly care by creating a balanced offer between safety and the autonomy degree of the elderly and his caregiver, being more dignified and more rewarding. Other plus for senior health and fitness that is another feature of the app is daily activity tracking, which improves their entire well-being.

VI. CONCLUSION

In this paper, we propose a solution to enhance elderly care and support through the integration of emergency alerts, medication reminders, and location tracking into a single, user-friendly platform. The presented system, GeriatricPlus, ensures the safety and independence of elderly users while strengthening the care bond between seniors and their caregivers. By minimizing technological complexity, the platform empowers elders to enjoy life with greater freedom, while technology discreetly supports their daily needs.

The reported information about emergency alerts, medication adherence, and location tracking also provides valuable insights for caregivers to monitor and respond to the well-being of elderly users. This approach can help optimize care plans and enable timely interventions in case of emergencies or unusual conditions. The system's design prioritizes simplicity and accessibility, ensuring it is suitable for elderly users with varying levels of technological familiarity. A detailed discussion on the energy-efficient and

long-term operational aspects of such systems can be found in related literature. GeriatricPlus stands as a transformative tool for modern elderly care, addressing the challenges of aging with dignity and innovation.

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