# A  Medical Emergency Response System for Elderly People

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## Abstract

The elderly people living alone may either have existing medical issues or can be in vulnerable situations because of their age and loneliness and may need immediate attention and care in case of any medical emergency. These emergencies may require assistance from another person or guided system to get proper level of care. In medical emergencies, the most critical parameter is the response time. The current work proposes a medical emergency response system (MERS) for elderly people living alone in the community. It introduces the concept of informal caregivers (IC), who can be friends, family or neighbours living nearby, and integrates them with formal caregivers, like ambulance, nurses and doctors, using a mobile application. The mobile app can automatically forward the help request from an elderly patient in case of emergency to the formal caregivers or ambulance service providers such as St. John in New Zealand and the selected ICs. The reply from one of the selected ICs, who approaches to help the patient, is then communicated to the patient as well as to other selected ICs and formal caregivers. This can minimize the time to respond to a medical emergency and also reduce the operational cost of dispatching an ambulance in case of non-emergency situations (Hossain, A. etc. al., 2019).

The proposed research aims to provide support for elderly people during medical emergency by connecting and aligning informal caregivers with formal caregivers. The primary focus is to develop the miniature functioning system through which elderly patients can raise an emergency alert, selected ICs can be contacted and one of them can rush to help the patient within a very short time. The proposed system and its components serve not only as a proof of concept for the fundamental research, but also for providing an artefact that becomes the focus of expanded and continuing research that goes through a life cycle in the form of concept, system development and refinement, evaluation and impact assessment.

The proposed emergency system has been implemented in form of an android based mobile application. The abstract view of the application is presented first. It facilitates two kinds of users: patients and caregivers, as shown in Fig. 2. Input from a user is handled by the interface engine for registration, authentication, authorization. The IC selection and messaging services will be managed by the caregiver selection module.

We use Android studio for the app development and Firebase Firestone real time cloud store database for the authentication and messaging service. Firestone is a NOSQL Structured database, which means that it has no entity relationships that a typical SQL Database generally constitutes of. The main reason for choosing NOSQL/Firestone was to improve the performance/efficiency of the system and to reduce the processing power needed to retrieve and store data.

This research proposes a Medical Emergency Response System to support elderly people living alone in the community during medical emergency situations. MERS involve elderly people living alone, formal caregivers and informal caregivers. The proposed system consists of different module to facilitate communications among the service requesters and the service providers. In future a survey/ Interview or checklist needs to be done among the neighbor using qualitative methodology to identify which notifications they will prefer. This can be done by sampling of (5-25) neighbor and testing the system. Mixed method (both qualitative and quantitative) will be applied here in testing phase. Evaluation and analysis will be done after this testing phase. Notification could be done either registered neighbor mobile or it could be done using agent-based system.

## References

Hossain, A., Ray, S. K., & Shahmari, S.R. 2019. "A Context-Aware and Technology-Assisted Informal Caregiver Selection Method to support Medical Emergency," in *2019 29th International Telecommunication Networks and Applications Conference (ITNAC)* (pp. 1-6). IEEE.