TCS' assisted living project SHINESeniors is helping elderly citizens age in place

Abstract

With hospitalization and healthcare costs rising steeply, senior citizens in countries with large elderly populations – Germany, Japan, and Singapore, for instance – are struggling to reconcile medical challenges with living independently. To help them safely continue living on their own, Tata Consultancy Services Ltd. (TCS) and the Singapore Management University (SMU) are working on a pilot project deployed in the island nation. Called SHINESeniors, the project explores monitoring and assistive technologies at around 100 local Housing Development Board (HDB) apartments.
Business Challenge

The urban population today requires far more than basic health, education, and security amenities. Digitally-aware citizens are demanding more inclusion in civic affairs, with greater personalization of services, even as natural resources shrink. To develop cities of the future, governments need to consider enabling technology-driven service delivery. Towards this end, the Government of Singapore provided the iCity Lab with a grant so that researchers could work on technologies that non-intrusively monitor the well-being of elderly citizens who want to age in place in their own homes.

TCS' Solution

Researchers at the iCity Lab piloted Assisted Living project, which combines sensor-based internet of things (IoT) technology with data analytics to help people age in place. By using community assistance through a caregiver network and not the healthcare system, it helps the elderly control costs significantly, while still providing last-mile human touch.

Sensors installed at the homes of senior citizens collect and transmit vital information about their well-being non-intrusively. This discreet mode of tracking helps the elderly lead normal lives without feeling self-conscious. In case of divergent data patterns, timely alerts tip off community caregivers, who can step in for support. All this enables the elderly to live comfortably and independently, while also retaining a safety net in case of an emergency.

But how does the system recognize an emergency? Well, daily activities are closely mapped by motion sensors, door sensors, and medication box sensors, and an event is generated based on periods of movement, rest, and ingestion of medication. Apart from an emergency button, a few homes also have bed, keychain, smart plug, and water sensors.

All these sensors together monitor the activity at each home, parsing through the data generated to predict whether there is need for intervention. These data patterns can tell us when the house has been empty for too long, when the emergency button is pressed, when there is no movement inside the house for a long time, and when the medication box has not been opened.
The iCity Lab is a good example of collaboration under the COIN™ program. We look forward to the iCity Lab pursuing more Smart Nation themes and creating an impact globally.

K. Ananth Krishnan, Chief Technology Officer, TCS

Results

Based on the data captured by the sensors, a pattern emerges for each person. A narrative of their daily lives is created, which helps the team deliver the right care. Community caregivers use a specially designed app interface to access the data and upload updates, and can also collaborate with other caregivers through the app. Also, the system puts no pressure on the residents – they don’t need to feed in any information manually.

Led by researcher Srinivasa Raghavan Venkatachari, who collaborates with SMU researchers, a team at TCS also analyzes patterns emerging from this project. This team is using machine learning algorithms to predict cases of mild cognitive impairment, nocturia, and social isolation in the elderly, thereby helping provide early medical assistance.
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