# SYSTEM FOR MONITORING ELDERLY PEOPLE IN THEIR OWN HOMES USING WI-FI SIGNALS

## DESCRIPTION OF THE TECHNOLOGY

Researchers from the Universitat Jaume I have developed a system that allows the non-intrusive monitoring of elderly people in their own homes by their relatives or caregivers. The solution is based on the positioning of mobile devices such as smart watches using the signals emitted by Wi-Fi access points, and therefore has the advantage of not requiring the deployment of any kind of infrastructure. The program issues warnings or alerts if there is any unusual behaviour by the people being monitored and shows the caregivers the pattern of the current behaviour through a web interface.

The system offers advanced solutions capable of detecting potential risk situations derived from slight and progressive changes in the diary routines of the patient, such as if they stay in bed longer than usual. To this end, the program learns the usual behaviour of the monitored person in order to subsequently determine any possible changes.

The objective criteria used to determine a person's behaviour are the patterns of movement within their homes, when these take place and when they enter and leave the home. To do this, it is necessary to know the location of the person within their own home at all times and as accurately as possible, at room level.

The system presented here obtains such positioning from the signal emitted by the Wi-Fi access points that can be found in the home. By means of well-trained innovative algorithms, the person's position is estimated from the intensity of the signals emitted by a mobile device, usually a smart watch. This is the only type of infrastructure that the user must have available, without the need for sensors or other more intrusive devices.

The algorithms that determine the indoor location provide the data that create the behaviour patterns. The activity the user is performing can be estimated by knowing the time and the location of the user.

Thus, the system creates a model of the behaviour of the monitored people based on machine learning techniques.

Finally, after having learned the users' behaviour, they will be monitored continuously in order to detect the possible changes in relation to the pattern that has been learned. There might be some possible anomalies at times, which indicate a gradual change in behaviour or point to possible risky situations. The system is capable of detecting them, classifying them depending on their type and issuing a warning to the caregivers or relatives so that they can take the appropriate measures in each case.

Within a context of progressive ageing of the population due to the continuous increase in life expectancy, it is necessary to have technological solutions that improve people's lives, including both the elderly and their caregivers and relatives.

Most elderly people prefer to live in their own homes rather than in a nursing home. It is estimated that in Europe 60% of all attention and care for the elderly is provided by the family itself. This reduces the employability of caregivers and the number of hours they can devote to work.

Moreover, taking care of the elderly is a source of stress for caregivers that can lead to burnout and absenteeism, as well as significant associated costs. Being able to automatise some of the tasks involved in the care and supervision of the elderly may help to alleviate some of these problems.

## SECTORS FOR COMMERCIAL APPLICATION

The technology is aimed at the business and institutional sectors linked to the elderly. More specifically, the invention is applicable to individuals, companies devoted to the care of the elderly, nursing homes, hospitals and insurance companies.

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## TECHNICAL ADVANTAGES AND COMMERCIAL BENEFITS

The use of this technology can benefit families with elderly dependants and companies that offer care services for dependent people. The main advantages of the platform are:

- There is no need to deploy sensors in the home or any other type of additional infrastructure to be able to locate the person, since this is achieved by means of the Wi-Fi signals emitted by the surrounding homes. This significantly reduces both the cost and the inconvenience.
- It incorporates machine learning as a fundamental feature providing a service with high value added and degree of innovation compared with other existing solutions.
- Patients enjoy greater autonomy thanks to its being a non-intrusive system that is linked directly to their caregivers .
- It is a continuous monitoring system which only issues warnings or alerts in cases that require special attention from the caregiver. This reduces both stress and absenteeism among caregivers.
- Relatives have access to all the data and not only to periodic reports.
- The system allows relatives and caregivers to reduce the number of trips they must make to the patient's home, with the subsequent savings this entails.

## STAGE OF DEVELOPMENT OF THE TECHNOLOGY

Validated at the experimental level within a laboratory setting. The system is being validated by means of a proof-of-concept project under real conditions of use.

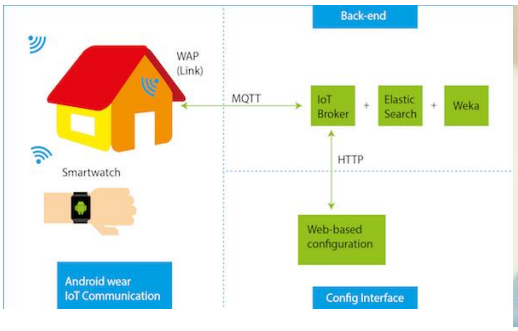
## INDUSTRIAL AND INTELLECTUAL PROPERTY RIGHTS

Software.

## COLLABORATION SOUGHT

The technology is being validated under real conditions. We are seeking partners to undertake the subsequent phases.

## RELATED IMAGES

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