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Spanish researchers design rooms with sensors that help dependent people

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Researchers of the Department of Signal Theory, Computer Networks and Communications of the University of Granada, led by José Carlos Segura Luna, are working on a project with researchers of Telefónica I+D to develop a system for locating dependent people in their environment, so that their stay and safety can be guaranteed by using intelligent environments.

This is a Project of Excellence of the Andalusian Ministry of Innovation to spread the results obtained in a previous collaboration between both groups.

A model room with the implemented computing system has been developed in Telefónica I+D office in Granada. This room has an electronic system that detects the almost exact location of a receiver moving around it. It is a system that works by means of several fixed reference sensors (placed on the ceiling), a sensor-receiver that moves freely, and a computing system suitable to receive and process all the information. The possibilities it offers are many, such as the option to open the doors when the receiver gets closer to them or brakes the wheelchair where the patient sits if s/he gets closer to a dangerous area.

'The prototype has produced excellent results regarding the effectiveness to recognise the moving object, and we are now working to optimise the design of the different devices and improve the variables it can control', Segura explained. These good results are due both to the use of a location system made up by the devices existing in the market and used to locate objects and their movement. 'The equipment developed is more accurate, cheaper and is much less affected by the noise compared to the reference location system'.

TELIAMADE (location technologies in environmental intelligence applications for dependant people) is the name of this new collaboration phase and it also includes Granada-based company ICR (Ingeniería y Control Remoto S.A.), which has vast experience in wireless communications and networks. The operation of the system is expected to be expanded by increasing the range of spaces where it can operate by implementing other communication methods, such as the ZigBee language, (technology similar to Bluetooth) or GPS, which will allow installing this technology in large buildings, with many rooms, and in open spaces respectively.

Therefore it is planned to combine the different location techniques, such as the detail capacity of the communication link (using the ZigBee link), GPS (when the receiver is in open spaces) or a positioning system based on ultrasounds (when the exact position is required). According to the required action and the conditions of the receiver, the system will integrate all the information on the different techniques it has.

Another objective of the project consists of optimising the use of all the tools. The use of the wireless link jointly with the location technique control will allow reducing the cost of the location system installation and reducing the consumption of the elements (reference nodes and element to be located). This will allow feeding the system and each element having enough autonomy.

The prototype, which is to be improved, is being tested by means of a pilot study in a hospital in Rome, thanks to an international project of Telefónica I+D with that Italian hospital. In this case, patients have in their wheelchairs the sensor-receivers installed and their movements are fully controlled, thus guaranteeing their safety by braking the wheelchair if they get close to dangerous places such as staircases, and opening the doors when patients get too close to them.

This new tool can be very useful for social services such as tele-care health, because all the information on the movements and activity in the homes the system receives will be remotely controlled. In that respect, new possibilities of the sensor system are being studied at TELIAMADE, so as to get and provide information on different variables such as temperature and acoustic signals, in order to get to know the exact location of patients and their health.

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