# Robo M.D.

## Home-care Robot for monitoring and detection of critical situations

### Status:

During the second period of the project the decision which robot to use to interact with the user was fixed. The Nao humanoid robot has been mounted on an iCreat wheeled platform. Using the wheeled platform instead of walking, the robot decreases the time to reach the user in an alarm case. Besides choosing the robot a question - framework between robot and user was designed. Simple yes/no questions, asked by the robot, are used on the one hand to assess the severity in a critical situation (for instance fall, heart attack) and on the other hand to get a general feedback via daily questioning.

### Falls in daily life:

Among the risks of elderly and disadvantaged people living alone at home it is worth caring about falls. Such an accident could have dramatic consequences especially if the person is not able to get up anymore by itself. Unfortunately, sometimes the injured person is not even able to call for help, nor anybody is present to provide help. In these cases, the immediate automatic detection and validation of such a critical condition would allow to decide to call for help, thus minimizing the consequence, possibly even fatal, of a fall.

Information: http://www.innovation4welfare.eu/

## Case Study Fall:

**1)** Monitored user: For monitoring, the user is equipped with the VS 100 device of the company Intelesens, which includes acceleration measurements. Measured data are transferred via Bluetooth connection to the main computer, where they are processed. If the fall is detected, the computer activates the robot in order to reach the person and to start questioning.
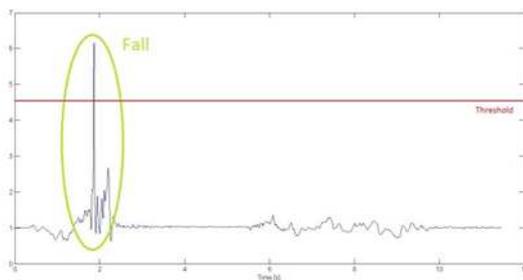


Acceleration signal during a fall

**2)** Measurements: During a fall the measured acceleration signal increases. Therefore fall detection can be implemented using a threshold-based algorithm. If the acceleration is higher than a given threshold, then an internal alert will be triggered.

**3)** Robot: In the event of a detected fall, the robot will find a way to reach the patient and will initiate a feedback protocol to confirm if the alert is true or false. The feedback protocol consists of prepared questionnaires for each alert type, composed of two to five questions each. The answers to these questions by the patient will indicate whether the alert is valid or not. The robot only calls for help from outside when necessary. Thus this protocol helps to significantly lower the number of false alarms and asking the right questions can also improve the user's acceptance.



Nao robot mounted on an iCreate platform

**4)** Communication: A typical dialog between robot and user can be:
Robot: "Excuse me, are you feeling all right?"
Patient: "No!"
Robot: "Have you fallen down?"
Patient: "Yes!"
Robot: "Do you need help?"
Patient: "Yes!"

**5)** Alert: In the case of a fall a neighbour or relatives can be informed to help the fallen person.

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