



FAROMIR – what users say

»FAROMIR can be a great support.

As a matter of fact the robot will not replace our work, I expect a great deal of work relief just yet though.«

*Angelika Steffl from residential management
in the nursing home Oberhausen*

»My mother has been suffering from Alzheimer's disease for several years. A relative can only delay a home stay by help of ambulatory care services, meals on wheels and personal care. For a period of 10 hours a day the patient is at home alone though. For these purposes there are social alarm systems. These systems presuppose, however, that the patient is able to activate an emergency system. My mother would not activate the system in the said three cases, for she would simply forget. Here I see a great potential for the use of the medical assistance robot.«

Klaus Stegemann, son of an aged mother

»The approach of posture analysis to recognize people's need for help promptly / in a narrow time frame improves the care situation of older people, especially at night. My mother-in-law would have been found by far more quickly after her fall from the toilet seat with the assistance robot system and would have had greater chances of cure accordingly.«

Dr.-Ing. Günter Pfeiffer, retiree



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Engineering*

Contact

University of Duisburg-Essen
Faculty of Engineering
Department of Mechanical and Process Engineering
Lotharstraße 1
47057 Duisburg

Prof. Dr.-Ing. Wojciech Kowalczyk
E-mail: wojciech.kowalczyk@uni-due.de

Prof. Dr.-Ing. Dieter Schramm
E-mail: dieter.schramm@uni-due.de

Prof. Dr.-Ing. habil. Gerd Witt
E-mail: gerd.witt@uni-due.de

Dipl.-Geogr. Thomas Nußbruch
E-mail: thomas.nussbruch@uni-due.de

www.faromir.de

For general questions about the transfer of research please contact the Science Support Centre (SSC).

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FAROMIR

**Functional Autonomous Robot
For Omnidirectional Motion In
Realistic Environment**

Autonomous Medical Assistance Robot

Functional Autonomous Robot For Omnidirectional Motion In Realistic Environment



Autonomous Medical Assistance Robot

According to a representative study of the FAZ-Institut eight out of ten respondents in the middle age group expressed the desire to become old in familiar surroundings. In the age group 70 plus this share is at 90 percent even higher. To meet these requirements there is need for technological innovations, among others a placing of intelligent communication technology in everyday life in a manner that both an intuitive support and an active responding to a need of help can be provided. The University of Duisburg-Essen has developed FAROMIR in a cooperative project which involves the chairs of Mechanics and Robotics, Mechatronics and Production Engineering in conjunction with the Innovation Factory. FAROMIR is an autonomous robotic assistance system which was mainly designed for the use in medical environments. It accompanies the elderly through their everyday lives and relieves caregivers and family members.

Camera System

- ▶ depth camera provides information per pixel in real-time
- ▶ insensitive / immune to shadow, hardly susceptible to moving backgrounds
- ▶ infra-red and color camera with 640x480 pixels and a frame rate of 30 fps

Gesture-based Interaction

- ▶ visualization and parameterization of the skeletal structure
- ▶ acquisition of up to three people simultaneously
- ▶ analysis of postures

Evaluation and Real-Time Monitoring of Body Silhouettes

- ▶ identification of postures
- ▶ detection of falls and need for help

Recognition of Emergencies

- ▶ alerting a central emergency station
- ▶ transmission of position data
- ▶ sending e-mails or SMS via WLAN or UMTS possibly with color screen

Communication with People in Need of Help

- ▶ responding to hand signals
- ▶ prospective speech recognition via directional microphone

Static Path Planning

- ▶ reading of an apartment floor plan
- ▶ formation of environment grid pattern
- ▶ integration of the potential field method

Dynamic Path Planning

- ▶ six ultrasonic sensors for omnidirectional monitoring
- ▶ integration of a compass module
- ▶ real-time monitoring of the distance

Sophisticated Charging Concept

- ▶ use of lithium-polymer batteries
- ▶ monitoring the state of charge
- ▶ self-charging mode

Innovative Design

- ▶ prospective multi-variant selection of design concepts
- ▶ omni-directional sub-section
- ▶ prospective autonomous re-erecting after falling over

