NEWS LETTER

# PREACT TO LOWER THE RISK OF FALLING

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## CAN WE LOWER THE RISK OF FALLING BY COMBINING AI AND HUMAN SKILLS?

Falls are never a good thing, and not at all when it is our senior citizens who fall. Falling is a significant expense for our healthcare system, but a fall does not only come with physical damage. Falls also come with psychological “injuries”, which are most often the fear of falling, and many older people use the armchair and being inactive as the soloution.

It is not healthy for our bodies to be passive, no matter what age we are. But fortunately, inactivity can be turned into an active lifestyle whether you are 25 or 65.

With PRECaiSE, the vision is to create a tool that helps to flag when to start a exercise intervention, as there are typically several indicators that a citizen is fallthreatened. It is a project with great potential, as many of the existing solutions implemented after a fall or the citizen’s level of function has fallen significantly.

PRECaiSE is an ambitious project that uses AI-Machine Learning and locally collected data during the project period. For PRECaiSE to succeed, a wide range of competencies is needed, which is also represented in our consortium. There are eight partners in PRECaiSE, with five end-user organisations, two business partners, and one research organisation.

**Co-founded by the AAL Programme.**

PRECaiSE

AAL PROGRAMME

## AALBORG MUNICIPALITY

Aalborg Municipality has 119,862 inhabitants, making it the third-largest city in terms of population and the sixth-largest in terms of area. In the Administration "Authority and Rehabilitation", Aalborg Municipality handles tasks concerning granting services such as personal help and care, practical help, exercise, rehabilitation, aids, and nursing home services for the elderly.

Camilla Fibiger Smed is head of visitation and works on the strategic level with the project, and Rikke Elmstrøm is a Team Leader and works on the practical execution of the project.

We represent the Visitation Support and Care department with a citizen base of approx. 2,500 citizens who have a lasting need for help at home. We work with long-term and continuous rehabilitation efforts, including DigiRehab, which enables citizens, in a strengthened way, to live a partially independent and meaningful everyday life with the help of several compensatory types of benefits and aids.

We have worked with DigiRehab since 2016 with great success and therefore contribute with great experience to the project both practically and organizationally.

Aalborg Municipality would like to be more proactive in the future regarding the timing that we offer physical exercise for our citizens. We want to intervene earlier and not primarily because of a drop in function level, and we, therefore, see potential in the AI solution. In addition, Aalborg Municipality is interested in experiences from the other countries/partners involving volunteers or relatives in exercise activities.

## National Institute of Health and Science on Ageing

INRCA are the Italian leading public Institute in gerontology and geriatrics, devoted to improving quality of life of elderlies. INRCA objectives are focused on successful ageing, the promotion of health and prevention. Social gerontology is one of the most important research fields, developed in both national and international spheres, as we cooperate with universities and other research institutes. The Unit of Rehabilitation Medicine has long experience of treatment protocols for the risk of falling, has an advanced clinical movement analysis laboratory investigating the parameters that regulate the posture and movement, and a robotics gym. The Unit Centre for Socio-Economic Research on Ageing (CRESI), conducts interdisciplinary gerontological research largely financed through EU funds, as well as by public and private Italian and international sources, with high skills in disseminations by means of scientific publications on international journals and books, but also through consultancy work for public and private organizations and various outreach activities.

Cristina (CRESI Unit) is a senior researcher in the field of social gerontology. Extensive experience in coordinating research projects. From 2010 in charge of the Laboratory of longevity and third sector, aimed at involving volunteering and third sector organizations in projects promoting older people's health.

Flora D'Ambrosio is the acting director of the Unit of Rehabilitation Medicine. he has the responsibilities of intensive rehabilitation in hospitalization of elderly patients with orthopaedic/neurological disabilities; rehab on an outpatient basis; rehab consultancy. Applied clinical research: definition, identification, implementation and evaluation of clinical pathways and rehabilitation protocols.

Danilo is a research assistant at INRCA (CRESI Unit) and PhD candidate at the University of the West of Scotland. His research focuses on clinical exercise, healthy ageing, falls 'prevention and adapted martial arts. Danilo graduated with a MSc in Physical Activity for Health Prevention and Rehabilitation at the University of Rome "Foro Italico", after spending a one year research internship in Denmark to investigate the benefits of physical activity in later life. Danilo is a member of the scientific committee for the journal "Ido movement for culture" and a visiting lecturer at the Volyn University in Lutsk.

## ON SITE FOUNDATION


It is our mission to develop and strengthen local communities by creating spaces that promote people meeting each other and socialising. We support neighbourhoods, residents associations, local governments and entrepreneurs in improving urban public spaces.

In particular, we specialise in creating space solutions dedicated to senior citizens. Our priority is to increase mobility and act on behalf of ageing in the place in the home. We combine the potential of our consultant team of sociologists, architects and designers and we always work in harmony with the space and its users. We work with:

- Residents
- Local government
- The business community

Our partner and practical inspiration is the New York–based organisation Project for Public Spaces. The Foundation is a member of the Placemaking Leadership Council, an international community of placemakers led by Project for Public Spaces.

In PRECaiSE Marta and Magda are representing the On Site Foundation.

## OSLO MUNICIPALITY

Oslo is divided into 15 districts, where Sagene is one of them, and has a size of close to 45000 inhabitants.

In Oslo there are multiple projects regarding fall prevention and mapping the risks for falling among elderly. The cost for society after a hip fracture and the impact for the individual with 25% death rate is significant. Oslo have a strong focus on implementing welfare technologies solutions, so that the citizens can live more independent, safer and longer in their own homes. Bydel Sagene has participated in several studies regarding welfare technology and distance tracking. and for example diabetes.

The projects in Oslo and in particular Bydel Sagene, focus on service development, gains, and a general competence boost for staff and citizens.

The “home-based services” department in Bydel Sagene, deals with everything from applications to execution of services in the homes of the inhabitants. The applications can concern everything from aids, nursing homes, community care apartments, user controlled personal assistance, transport service cards and health care. 250 employees organize and execute everything from multidisciplinary rehabilitation in citizens homes, healthy life centers, physiotherapy, activities for persons with dementia, home nursing care, practical assistance which includes help regarding everyday practical tasks around the house and personal care. Mia Wedegren, the assistant leader in Sagene Home-based services is project manager of the PRECaiSE project.

Bydel Sagene and DigiRehab carried out a trial of DigiRehab in 2020, which means that Oslo has experience from the implementation, which can be brought into play in PRECaiSE.

For Bydel Sagene and Oslo Municipality, it is interesting to find out how Artificial intelligence (AI) can benefit the Norwegian citizens to maintain the service level we have today. It is also important to learn from other countries and to get inspiration from other ways of thinking about home care, volunteers and next of kind.

## THUISZORG MET AANDACHT

TWB Nederland is the most important home care provider in the West Brabant region (285,000 inhabitants). In recent years, a conscious effort has been made to provide care across the full breadth of the home care spectrum, for example domestic help, guidance, generalist and specialist district nursing.

As an organization, we want to contribute to this research to improve the self-reliance and health of our end users, so that they may need less care in the long term and professional care remains accessible and affordable, now and in the future.

## DIGIREHAB

Since 2014, DigiRehab has provided tailored physical training to citizens in-home care in a large number of municipalities in Denmark. Experiences from more than 12,000 training courses with DigiRehab shows that seven out of ten citizens in-home care become significantly stronger and more self-reliant after training 2 x 20-30 minutes a week for 12 weeks. In addition to Denmark, DigiRehab is also present in Norway, Sweden, Germany, and The Netherlands. DigiRehab is used by social and healthcare workers and is designed by skilled physiotherapists. The representatives from DigiRehab are:

- Niels, CEO, manages the business development,
- Michael, responsible for developing DigiRehab's solutions
- Mette, implementation specialist
- Emma, consultant, works with the daily operation of the PRECaiSE-project.

  It is not only Denmark that experiences challenges around the growing number of elderly and fewer resources to take care of them. Despite cultural and structural differences across Europe, there is one thing we all have in common; our bodies, how they get weaker when we are inactive and how the body responds to physical exercise. DigiRehab contributes with a monitoring system, DigiPrehab, which ensures high quality of data collected for the AI model, and for the elderly to have e tailored exercise program.

## ROOS HEALTH LABS

ROOS health aims at accelerating the transition in health. There activities consist of management consulting, concept development and business generation. They have great experience in the realm of digital health.

ROOS health has a strong focus on digitization within the healthcare sector and has worked closely with DigiRehab regarding implementing physical training for the elderly in national and international projects, where ROOS health has been responsible for communication in collaboration with DigiRehab. With significant experience in implementing technologies in general, they contributes to facilitating and broad understanding of cultural differences between the partners in PRECaiSE.

Arend Roos is the project manager at PRECaiSE and steers the ship in the right direction. In addition, Irma van Diepen is also involved in the project and has extensive experience working in several areas of the health sector and in clinical research.

**AARHUS UNIVERSITY**


The Department of Electrical and Computer Engineering (ECE), Aarhus University, oversees research and development in the current project. The work is being led by Associate Professor, PhD, Christian Fischer Pedersen (CFP) and Research Assistant, Christian Marius Lillelund (CL), both located in the Signal Processing and Machine Learning (SPML) section in ECE.

The department was established on 1 January 2021 at the Faculty of Technical Sciences at Aarhus University. Electrical and computer engineering are closely related technical science disciplines focusing on research into hardware and software technologies that play a vital role in defining modern society, its digitalisation and human behaviour therein. The department focuses on research and development activities in the fields of communication and networks, control and automation, photonics, signal processing, software and IT systems, robot technology, medical technology, health technology, electrical energy technology, and acoustics and sound technology.

CFP received an MSc degree (Electrical and Computer Engineering), an MSc degree (Mathematics and Computer Science), and a PhD degree (Signal Processing) from Aalborg University. He was part of the AI for rehabilitation (AIR) project and lead the development of the predictive models in the former project.

CL received an MSc degree (Computer Engineering) from Aarhus University and was likewise a part of AIR, where he worked with data processing, model development and evaluation.