Description of the Challenge

The challenge posed by DomusVi (Geravi, SAU) is entitled: ***"How can we improve the prediction and prevention of falls in care homes with a technically and economically sustainable solution aimed at scalability?"***

Background

Whether they live at home or in residential care, one of the **most significant risks to the health and well-being of older people are falls**. People in residential centres are mostly frail and with varying levels of dependency, which makes them a particularly vulnerable group. Not only is the risk of falls higher in this group of people but suffering a fall can have a major impact on the physical and psychological health of a resident.

DomusVi provides specialised care for older people and people with disabilities and mental health care to 37,000 people in almost 200 centres. It also provides support at home to 109,000 people through its specialised home care units (home help and telecare service). DomusVi has worked and continues to work on different ways to **reduce falls and the associated risks**. In addition, they have their own platform for residential centre management (RCM), including the management of social and health interventions, as well as the socio-health records and case histories of residents. This platform stores data such as:

- Assessment scales (proprietary and standardised): health, cognitive, psychosocial, mobility, etc.
- History of vital sign readings (pulse, blood pressure, weight, temperature, blood oxygen, etc.).
- Reports from social and health care professionals (social work, medicine, nursing, therapists, etc.).
- Diagnoses and care plans.
- Medication.
- Records of major events (falls, ulcers, blood tests, etc.).

After the assessment, **individual care plans** are drawn up, which in certain cases include therapeutic activities aimed at reducing the risk of falls.

Furthermore, **technological solutions** that use sensors have been implemented to detect falls and to be able to react as quickly as possible, such as bracelets with fall detection, movement sensors, pressure sensors, etc. DomusVi works with a variety of models and manufacturers, as these sensors are integrated into the call systems used by the centres, which are equally as diverse.

They also carry out **preventive actions** such as therapy and exercises to reduce risks, depending on the assessments carried out on the residents. However, even with the implementation of the measures discussed above, there is still room for improvement in fall prevention/prediction. The solutions implemented so far, while proving very useful, have some limitations.

Therapies are preventive and scalable measures, but we need to identify the individuals at risk to get the most out of these measures. Identifying a fall risk is not always easy as it can depend on many factors.

In terms of technology, fall detection wristbands are reactive tools, allowing for faster reaction times, minimising the consequences of falls and subsequent recovery. In-room sensors do allow for risk detection before a fall occurs, but have limitations in terms of both effectiveness and scalability (more effective solutions have very high costs).

For these reasons, we want **to go a step further in predicting and preventing falls in care homes**.

Additional information:

Interested parties

The **main stakeholders involved in this challenge**, and which therefore represent all of the interested parties to be taken into account when presenting the solution, are **older people**.
These people will be mainly residents with grade one and grade two dependency levels, which account for approximately 50% of the residents of the centre where the pilot will be carried out. They may be either public or private users and normally undergo four or five medical interventions per month. They also take five or more medications on a regular basis, some of which may increase the risk of falls. The risk of suffering a fall also increases with age and is higher in women than in men.

It is important to note that although only 20% of falls usually have consequences, it is important to act on falls in order to reduce both the number of falls and the percentage of them that have consequences.

Along with the people in care homes, another of the main stakeholders and beneficiaries of this opportunity are their **families**, who expect the best care to ensure the well-being of their relatives. Moreover, family satisfaction is directly related to the care provided and falls have a very negative impact on the health of residents.

Another relevant stakeholder is the **public health system**. Falls can sometimes lead to hospitalisation, which not only has a negative impact on the well-being of residents, but also entails costs for the healthcare system. Reducing the number and severity of falls will help to reduce the associated costs for the health system.

Professionals who work in care homes are also important stakeholders. A solution that enables better automatic detection of fall risks can help optimise their efforts and reduce the mental workload associated with these risks.

Needs

DomusVi needs **to find a scalable solution that enables fall risk prediction for the people living in its centres in order to carry out preventive actions to reduce the number of falls**.

The main need is therefore for the solution **to help reduce the number of falls in care homes, as well as the percentage of falls with consequences, with a preventive and predictive approach rather than a reactive one**. Reducing the number of falls will improve the health and quality of life of residents and consequently the quality of services and customer satisfaction. Furthermore, one of the most important aspects of the solution DomusVi is looking for is that it should be scalable.

The pilot will take place at the **DomusVi Ribera centre**. Located in the centre of **Bilbao (Old Quarter)**, the centre has a total of 191 beds in 70 double rooms and 51 single rooms over five floors. If the solution is successful, the aim of the challenge will be **to implement it in the over 140 residential centres operated by DomusVi**. **Heterogeneity between centres** (in terms of size, structure, organisation, etc.) **is another challenge in terms of scalability**.

This scalability can be achieved in a number of ways. If the solution requires the deployment of devices, these should be low cost (or with reducible costs depending on the scale). Solutions could also be proposed that make use of the systems and tools available to DomusVi as much as possible. Due to the large number of DomusVi facilities and residents, there is already a large amount of technology and data available for analysis (described in the "Background" section). In this regard, the solution must always comply with personal data protection legislation.

The solution should also contribute to the improvement of satisfaction among families with services and alleviate the mental burden and work-life balance issues associated with hospitalisation due to a fall.

As an additional benefit, the improvement in care will help to reinforce DomusVi's image as a leader in the elderly care sector, not only as an innovative company, but also in terms of the quality and personalisation of its care to the needs of its residents.

Objectives

As a guideline, the following table includes the functional needs required, classified as a requirement or weighted according to their level of importance, with three being the lowest level and nine the highest:

Variable	Functional need	Weighting
1. Solution predicts the risk of falls	*1.1 It enables the calculation of a specific risk of falls for each resident*	*Requirement*
	1.2 The calculation of fall risk takes into account multiple variables related to the resident	*8*
	1.3 It notifies/alerts professionals of the detected risk to support decision making	*Requirement*

	1.4 Analysis detection is done in real or semi-real time (e.g. on a daily basis)	*8*
2. The solution provides decision support tools	*2.1 It allows professionals to identify a set of preventive interventions to be applied depending on the risk*	*7*
	2.2 It allows preventive interventions and the rules for their implementation to be defined by professionals (depending on the risks identified)	*7*
	2.3 The implementation of these rules will result in automatic proposals for intervention according to the resident's characteristics and the level of risk detected	*5*
	2.4 The solution makes it possible to report recommendations to the professionals via the most appropriate channel (they decide which ones to implement and adapt the care plan accordingly)	*5*
	2.5 Knowledge of fall-related issues that provide new perspectives on possible interventions would be valuable	*3*
3. Integration with existing systems	*3.1 The solution must be able to receive data from existing systems (from the RCM platform at the very least)*	*Requirement*
	3.2 The solution receives information from various monitoring devices available on the market	*3*
	3.3. The solution must be interoperable to allow for further integration in the future	*Requirement*
4. The solution must be easily scalable	*4.1 The design of the solution ensures that its implementation in a growing number of centres does not entail a proportional increase in costs*	*Requirement*
	4.2 The solution must be flexible, so that it can grow or adapt to the needs of the centres (changes of residents, rooms, etc.)	*8*
5. The solution must comply with legislation regarding privacy and data security	*5.1 GDPR compliance*	*Requirement*
	5.2 Data must always be stored and transported securely	*Requirement*
	5.3 It must allow for the creation of different data access profiles and functionalities	*9*
	5.4 Compliance with the National Security Scheme	*3*
6. The usability of the solution must take into account the	*6.1 Any element of the solution involving interaction with residents' needs to be simple and take into account older frail people*	*5*

characteristics of the individuals involved	*6.2 The user experience (UX) of the solution for professionals must take into account the characteristics of the workers involved (health and social care professionals)*	*5*

Scope

By means of the pilot project developed between the winning company and DomusVi, **the viability of the proposed solution will be validated in a real environment and with real users**.

The aim of the pilot is to demonstrate that the **solution is able to reduce the number of falls and the percentage of them with health consequences, by predicting fall risks in order to plan and implement preventive interventions to reduce the risk of them occurring**. The pilot will be carried out in the **DomusVi Ribera residential centre** with **a budget of €20,000**. The number of residents participating in the pilot will depend on the selection of the types of people mentioned, but it is estimated to be between ten and 20 users approximately. If the results of the pilot are satisfactory, the aim is to extend this innovation to all the group's centres.

DomusVi is the leading company in Spain in the care home sector. They currently have 140 centres serving over 18,000 people. In addition to the residential centres in Bizkaia, they have another seven in the Basque Country, and centres in all Spanish provinces (except Ceuta and Melilla).

Example: use case

Begoña is 83 years old, a widow who lived alone in her home until suffering a fall in the bathroom a few months ago that affected her hip and reduced her mobility. Her family, concerned about her worsening condition and the risk of another fall, decided that it was best for her to be admitted to a care home, where she would be given the care she needs.

On admission to the residence, the centre's social and health care professionals carry out an initial assessment, including a complete medical evaluation and the use of different scales to evaluate risks. By recording all this information on the RCM platform, the tool identifies Begoña's risk of falling and suggests some preventive interventions that may reduce the risks involved. The care home professionals create a personal care plan, taking into account the risks identified by the tool and incorporating some of the interventions it proposes (including personalised exercise sessions and a plan for regular reviews of certain biopsychosocial parameters).

After a few months at the centre, Begoña has experienced some changes in her everyday behaviour patterns. The tool regularly analyses the RCM data recorded. From the analysis of vital signs measurements and behaviour (getting up time, participation in activities, etc.) the tool detects a change in Begoña's risk of falling and the care team at the care home receives a notification alerting them to this change. As a result, and based on the tool's recommendations, the professionals decided to modify Begoña's care plan, carrying out more ongoing monitoring and stepping up the care she receives. After three months of following the new plan, Begoña's risk of falling drops again.

At the same time, one of the people on Begoña's floor, Aitor, has been diagnosed with a new condition, which requires a change of medication. This new medication is identified as a factor that may increase the risk of falls. When recording the new pharmacological plan on the RCM platform, the team's medical team receives a notification warning of the increased risk of falls, suggesting some changes to Aitor's care plan to mitigate this risk.

Thanks to the new tool, when analysing end-of-year care indicators, these show both a decrease in the number of falls per resident in the centre, as well as a reduction in hospital admissions and the duration in days of these admissions.

References

DomusVi Ribera Care Home: www.domusvi.es/residencias-ancianos/bizkaia/ribera

The Geria-TIC Project, with the participation of DomusVi to improve issues related to urinary incontinence, fall prevention, and the sleep quality of older people. www.geriatic.udc.es/

The SAFEinBED Project, a DomusVi and Gradiant project, aimed at developing a system that, through continuous, non-intrusive, and privacy-friendly monitoring, prevents serious injuries in people at high risk of suffering a fall, developing a pressure ulcer (PU), or suffering an episode of agitation or delirium. www.gradiant.org/proyectos/safeinbed/

Interventions for fall prevention:

- Improving balance and preventing falls in older people www.domusvi.es/residencias-ancianos/a-coruna/san-lazaro/noticias/mejorar-el-equilibrio-y-prevenir-caidas-en-personas-mayores
- Talk on fall prevention www.domusvi.es/residencias-ancianos/sevilla/alcala-de-guadaira/noticias/charla-prevencion-de-caidas
- Prevention of falls DomusVi Alcalá de Guadaíra www.domusvi.es/residencias-ancianos/sevilla/alcala-de-guadaira/noticias/prevencion-de-caidas-domusvi-alcala-de-guadaira
- Medicines and risk of falls in older patients: intervention through the community pharmacy, idus.us.es/bitstream/handle/11441/143782/GIL%20GAGO%2C%20EMILIO.pdf?sequence=1&isAllowed=y