DESCAMPS**TECHNOLOGY**

Multisensing Artificial Intelligence for Elderly Care

Humans prevail. Not technology.

When we think of technology for elderly care, the first idea that occurs to our mind is fall detection. When people have fallen, it is often too late.

Taking care of our parents and grand-parents means of course responding to emergencies. But the real care consists of all the daily attentions, as changing a light bulb, renewing a TV subscription or perceiving that a new hand grip is needed in the bathtub.

We do not like to be in need of help. **Privacy** and **dignity** make us conceal these new issues that alter our daily life. We'd like to ask our elders without being inquisitive. We'd like to know when care must be provided even if our helping hand has not been called for.

This is what we do.

Our systems are **accurate** in detecting the glitches in the delicate clockwork of life habits in total privacy. **No camera, no microphone**. They remain invisible. This is the condition for being present during the most intimate moments of our life. Artificial intelligence is there to provide a decent distant to our kind-hearted questioning.

We detect the harbingers of **incontinence** through more frequent toilet usage at day and at night.

We detect the need for **bathroom adaptations** through degraded and less frequent hygiene routines.

We detect **failing appliances**, because calling for a plumber or calling phone support lines can be tricky.

We detect visits, especially irregular ones and prevent **scammers** taking advantage of ages.

We detect **sleep apnea**, heavy snoring and provide useful insights on the sleep quality and **bed mobility.**

We detect long absence from homes that could be the **sign of loss and dementia**.

We detect the **lack of cooking**, because shopping and preparing meals becomes difficult.

We detect **damaged heating equipments**. Too cold, too hot, too much CO_2 from a portable combustion radiator, lack of aeration against virus spreads.

We detect faulty TV or broken internet connections, because this is their major mean of staying **related to the world**.

We detect **carers regular interventions**, because we want to be sure of a good service.

And yes, we also detect falls...

Our systems have already been installed in many institutions and single elderly households. We have thousands of anecdotes from daily life. All are unique, but all tell the same story. They tell the story of little snags becoming huge problems.

In one case, we have prevented hospitalisation for intestinal perforation by detecting much more frequent toilets visits without defecation. This was in fact a close call. It began with Covid confinement and a change of cooking habits. Toilets routines became erratic from none at all to once every hour, without success. Our A.I. has detected all these changes. The tactful intervention of the carer, negotiating the shame and decency limits, avoided a real emergency.

Our A.I. and sensors are not the central point. The carer is the key actor in this story. We only provide insights and warnings on the patient activity that would have remained undetected.

Humans prevail, not the technology. This is why we have designed our system to be as discreet and private as possible. Privacy and data security are paramount. Ease of installation and affordability is always in our mind. By design.

As manager of elderly care services and institutions, these stories are your daily bread. We will help you in gathering insights around the clock, including very private life aspects. We are an additional sense for your carers team, allowing them to concentrate on important tasks, being sure that subtle changes do not go unattended in the haste of daily care.

No magic. Just hard work.

We have developed sensors unique to the world.

One of our device contains sixteen sensors measuring all the meaningful physical parameters of a home, like temperature, humidity, CO_2 concentration, light, motion, noise, vibration or air pressure.

Each sensors is enhanced through A.I. For instance, the motion sensor not only detects motion, but as well its direction, speed and distance. It makes the difference between someone passing by or sitting on the couch. The light sensor distinguishes sunlight from artificial light. The sound detector cannot record voice, but identifies sounds like a dog's barking or a washing machine.

Another sensor is an infrared radar. It detects human silhouettes. This is not an infrared camera and its resolution forbids face recognition or detecting nudity. It knows if someone sits, lays down, walks or has fallen on the floor. It can also detect fever.

These sensors provide data every 10 seconds. This is a key factor for being able to identify any life event in minutes. Instant alarms are also generated.

Besides, all measurements are synchronous. This may appear as a detail but is capital for multi sensing artificial intelligence as it provides a vast and coherent playground for our data scientists.

Both sensors are enclosed in a 5 by 5 centimetres boxes, with flat surfaces of any colour. They come as portable devices hanging on the walls or sitting on the night table with their brackets.

The same sensors exist in socket form for permanent installations. They are as simple to install as power sockets or switches. A low power option is available for wet environments like bathrooms.

A single sensor is enough for a room of 5 by 5 meters. They can be placed on walls, ceilings and corners. They need to be in view of the volume they sense.

This represents a large amount data. These are processed on site by our A.I., as the ultimate privacy insurance. If you do not want data to be wandering in the cloud, make them stay at home and be treated locally.

Our engineers are experts in optimising data processing, as those used in the car or aeronautic industries. We do not believe in Big Brother systems but rather in local and dedicated brains, not bigger than a circuit breaker in the electrical cabinet.

We are also specialists in house physics. For instance, we have gathered and understood the environmental parameters affected by a shower or a bath and we can tell the difference. Temperature, humidity, sound and CO_2 of thousands of home events have been fed into our learning algorithms. This is why our A.I. is able to identify them with good accuracy. We have repeated the learning process in many homes, dormitories and bathrooms.

As carers, you will never have to deal with complex mathematical analysis. We provide all the insights on a user friendly dashboard with simple charts, easy to understand.

Our system can run on its own or feed its findings to existing systems. We use only open sources formats understood by most applications.

For a 500 hundred beds establishment, a computer of the size of a standard PC is required, that can sit in the house keeper office. We compressed data transmission as much as possible and our sensors will not weigh on your WiFi infrastructure. All transmissions are securely encrypted and no hacking is possible.

We have designed our sensor such that their price always remain lower than the costs of their installation. We are not sensor vendors, but an A.I. company that uses data from its proprietary sensors. In some of our business plans we do not even sell the system but rent them as part of our service.

In practice.

Sensors must be installed in front of the zone where activities should be detected. The Ambient16 is our device with 16 senses. The infrared radar is called the Heatmap32.

Ideally, in a room with several beds, one Ambient16 and one Heatmap32 should be installed at the bed head. Being placed close the guest will help the A.I. detect the source of events, even between close beds.

For a single room, the placement is more relaxed. The infrared radar can be placed at the corner of the room for a full view. The Ambient16 is working well when placed sideways.

Among all configurations, the bead head placement provides the best results. In most of our present installations, the bed head is fitted with an electrical duct for power sockets, bed lights and other supplies. This is a perfect place for installing our sensors.

As for the bathroom, safety norms will most of the time lead to a ceiling installation. The Heatmap32 should be installed in a corner in view of the whole room for detecting fall. The best placement for the Ambient 16 is over the toilet seat, but any placement is totally suitable in a small bathroom.

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At home.

Our mobile sensors are easily installed within minutes in any household. They connect to the local network or the 3G network. Our App helps the helpers in exactly knowing the habits of the person. Less hygiene, insomnia, unusual absence, all event that could raise a question are detected, day after day.

Our systems are essential assistants to homecare services. They are the discreet and benevolent sixth sense that will keep a eye on your patients.