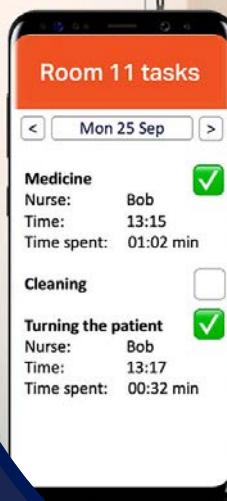




RTLS in Healthcare

A concrete list of use cases where **indoor positioning technology** makes daily healthcare work easier and more efficient.



RTLS = Real Time Locating System

The use of indoor positioning in healthcare is a growing trend.

Indoor positioning technology can ease many daily challenges in healthcare management and organization.

It's about rationalizing the work of the healthcare institution. Indoor positioning helps you focus on what's important; for quality treatment.

The indoor positioning system can also be installed in old buildings. Installation is easy, and UWB (Ultra Wide band) positioning devices do not interfere with sensitive hospital equipment at all, they are completely safe to use in hospital environments.

Indoor positioning reduces risk situations, improves occupational safety, and saves time and money. Iiwari also has the best location-based nurse call you've ever seen!



Indoor positioning makes the invisible visible, telling us with data what we don't notice in everyday life.



Reliable room location



Instant nurse call and alarm location



Real-time exit alarm



Automatic measurement of direct care



Nosocomial infection control

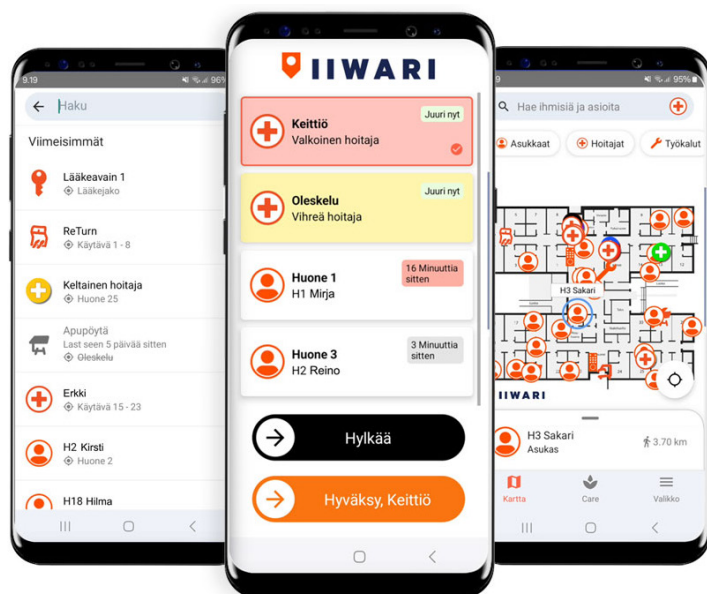


Easy integration and system installation



Wireless nurse call for phones

In emergencies, it is especially important to get help immediately on the spot. With the help of a locating emergency button attached to clothing or hanging around the neck, security guards or other nurses immediately know where the call for help is coming from and can arrive at the right place without delay. The awareness of the rapid availability of help increases the psychological safety and job satisfaction of employees.



[Watch the Iiwari nurse call system demo video in Youtube »](#)



Iiwari's Nurse Call System reduces communication and response time in emergency situations.

1. The resident's wristband has a button that the resident can press to call the nurse.
2. Nurses can also call each other for help with the button on their own tracking tag.
3. Nurses receive a notification of an invitation from the Iiwari Care application on their phones and see where the invitation is coming from.

Easy to use, developed together with nurses.

The **call is automatically acknowledged** when the nurse arrives.

A reliable system based on location.

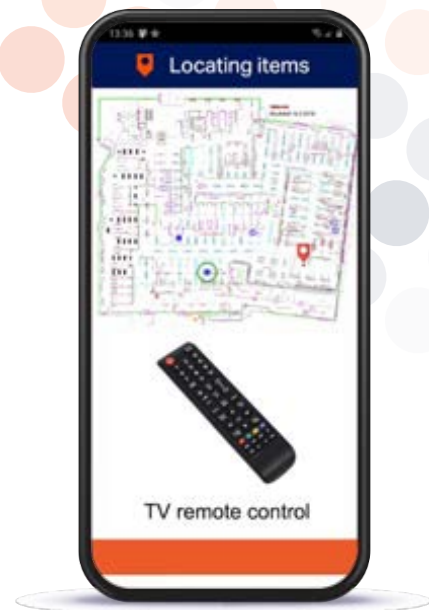
"This is the best nurse call system I have ever used. I have been in the industry for over 30 years. We can see where residents and colleagues are, and nurses can easily call for help if needed. I recommend this system everywhere. This is a good system!" – Marja-Liisa Tervo, Unit Manager at Lähde Nursing Home

Device location data makes work more efficient and improves patient safety

Searching for things unnecessarily can lead to dangerous situations and, at the very least, it results in a surprisingly large amount of extra walking every day, resulting in a significant amount of unproductive work. It can be about looking for a common TV remote control or a transportable hospital device or a device that gave a maintenance alert. A large hospital or nursing facility has thousands of portable medical devices around the facility. The positioning system enables real-time control and monitoring and provides reliable information about the location, condition and maintenance of medical devices.

Continuous monitoring of these thousands of medical devices significantly improves the facility's operational and financial efficiency and the staff's ability to continue providing high-quality care while maintaining patient safety.

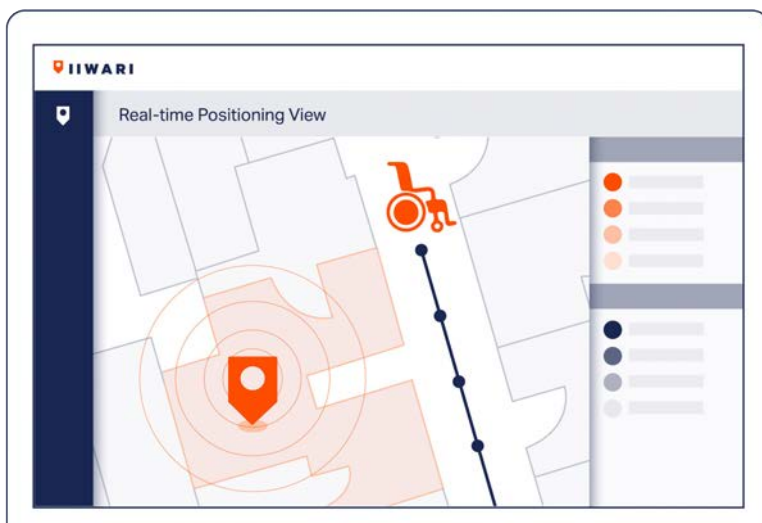
liwari's positioning system includes locators attached to medical devices and anchors mounted on walls or ceilings. The system tracks the location of goods, equipment and people in real time.



liwari's dashboard allows users to see the real-time location of goods/equipment/personnel, perform a searches or access reports.

Accurate digital equipment inventory management is essential to get the most out of limited resources. How many ventilators are there in the hospital? How many are in good condition? How many are in use? And where are they? What about beds or wheelchairs? Medical centers, hospitals, etc. manage complex operations, and with the help of positioning, they can be supported with a modern and compatible digital management system.

Many times these use cases of searching for goods are underestimated until the work time spent on them is measured. The working time spent on such a search in a year already means a significant amount of money, and it is starting to interest the management of the institution. Even such a small matter is related to patient safety; when the place of the goods is immediately known, the nurses' working time is not spent looking for the goods and they have more time for the most important thing, i.e. nursing work.





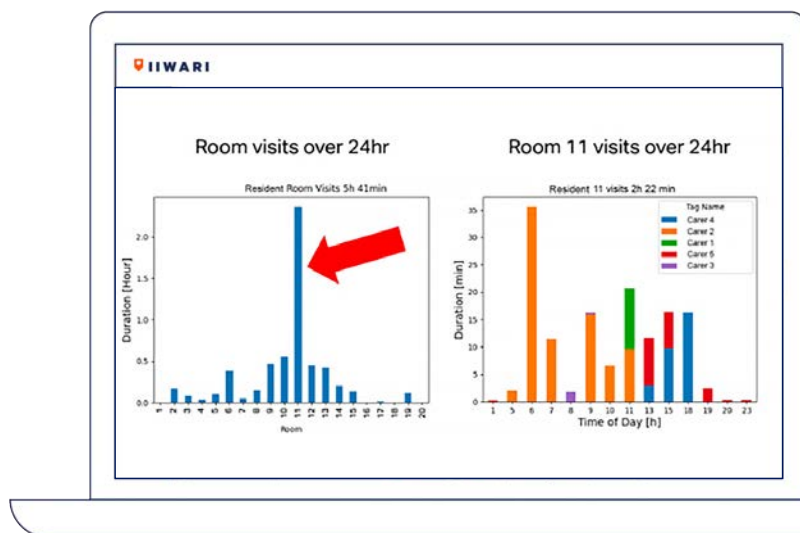
Technology as part of nurses to patient ratio

As healthcare legislation tightens, it is important to measure patients' actual treatment times and the determined nurse/patient ratio both in real time and in the long term. Data collected through RTLS is accurate and based on actual patient visits and actual, not planned, work hours. Noteworthy, e.g. in elderly care facilities, relatives are very interested in this information. Proving the frequency of treatment may also be necessary for the treatment facility from the point of view of legal protection.

Accurate data on work distribution without manual recording

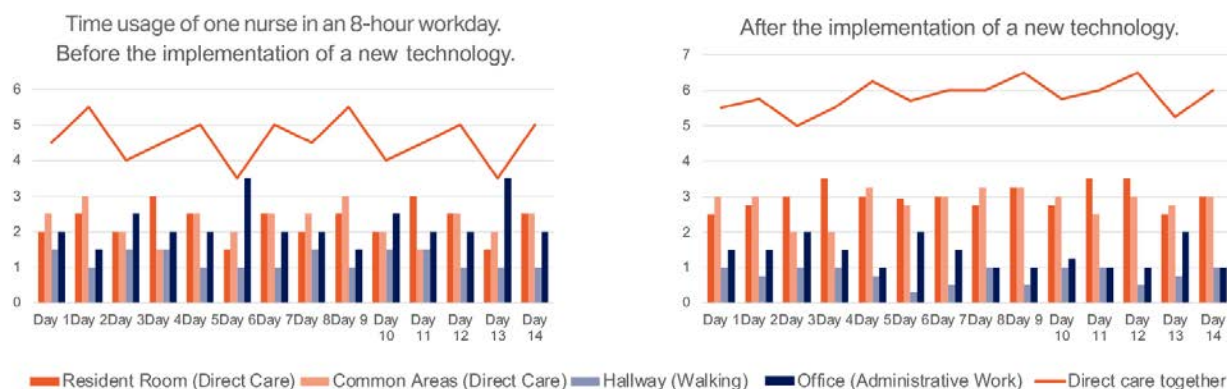
The location system automatically measures the interaction between caregivers and residents – without any additional intervention. It shows:

- How much time caregivers spend in resident rooms, hallways or offices
- The proximity of caregivers and residents in common areas (e.g. less than 2 meters)
- The stimulating interaction between residents
- The presence of caregivers in areas such as the dining room during shared activities
- The distance traveled by caregivers daily
- Which caregiver cares for the resident at what time and for how long
- What is the total care time for the resident



Accurate quantitative measurement of change in reforms

In nursing homes and hospitals, it is possible to measure the daily walking distances of caregivers and the ratio of direct care time to administrative work before and after the introduction of a digital service or other change. Location-based data provides irrefutable data on how, for example, reporting with an artificial intelligence solution changes the ratio of close care to administrative work.



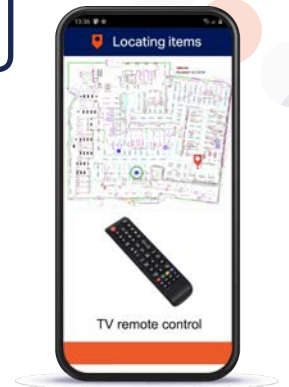
The figures in the graph are examples based on a study by the European Aging Network (EAN) (2023–2024) which revealed that European care workers spend **up to two hours** a day on documentation.

Several different target groups

There are several different target groups in healthcare, whose focus on the use of indoor positioning is different.

Nurses, maintenance workers

- Challenge:** Finding assets, assigned patients and colleagues
- Description:** Larger buildings can have dozens of rooms, hundreds of patients and thousands of items. It can be tedious for employees to find different items in their daily work.
- Examples:** A service worker is looking for a broken diagnostic device.
A nurse is looking for a colleague or shared equipment.
- Solution:** Tracking devices for key targets. Easy-to-use mobile user interfaces for staff that show the locations and status of targets, tasks and people.
- Target:** Minimizing the time spent on frustratingly searching for goods and equipment. Improving the facility's operational and financial efficiency. Increasing employee productivity, job satisfaction and motivation.



- Challenge:** How to ensure work and patient safety in emergencies
- Description:** In an emergency, help is directed to the right place automatically and quickly.
- Example:** A nurse faces a situation that requires a quick reaction and the help of colleagues.
- Solution:** Tracking tags with an emergency button for staff and patients. Nurses have a wireless nurse call system, i.e., status information about the entire facility on their mobile phones at all times. The emergency call is automatically acknowledged when the nurse arrives.
- Target:** Help is available at the touch of a button 24/7. Both occupational and patient safety are improved.



Healthcare unit managers

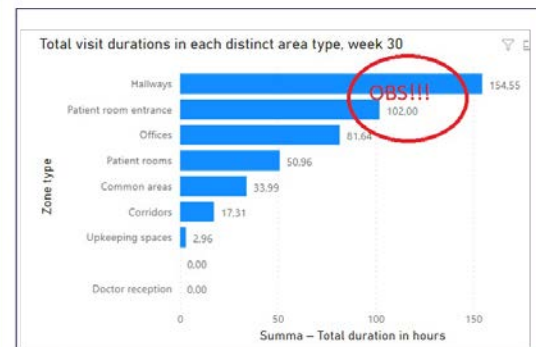
Challenge: Knowing employees' work focus

Description: Healthcare units are under constant pressure due to lack of resources. The desire is to treat patients as well as possible and to spend working time directly on nursing work instead of administrative work. The manager needs to know whether nurses are caring for patients or whether their time is spent on cleaning or other tasks.

Examples: An artificial intelligence-based reporting system is being implemented in the hospital. The challenge is to prove how much time the system saves for direct nursing work, which was previously spent on administrative work.

Solution: Employee and patient positioning automatically measures the distance nurses walk, the amount of direct nursing time (the proximity of the nurse and patient tag), and the time nurses spend, for example, in the office. The measurement is started before the introduction of a new digital service or other change, in order to obtain comparison data for the time after the change.

Location provides irrefutable data on how, for example, reporting with an artificial intelligence solution changes the relationship between close nursing and administrative work.



Work emphasis of users and user groups. The picture shows that employees spend quite a lot of time in the corridors walking between tasks. Should tasks or patient rooms be rearranged?

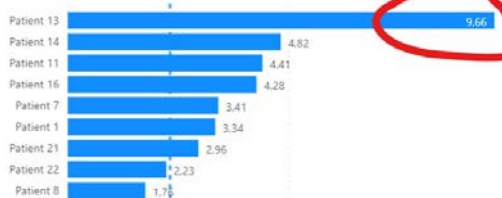
Challenge: How much attention does a particular patient or task receive? Is the work divided equally and is the billing fair?

Description: In order for things to run smoothly, the selection of tasks and patient rooms should be optimized.

Examples: Manager needs to know how much attention certain tasks and patients require and get in order to make wise tasking and personnel decisions. Measuring the amount of care a patient requires is also important from a fair billing perspective.

Solution: During the nurses' working day, automatic diary entries accumulate, such as entering/leaving the patient's room. Reporting of various tasks is semi-automatic, they are acknowledged immediately upon leaving the patient's room.

Patient visits by care-givers, duration in hours



Treatment time per week received by an individual patient.
Why does patient 13 require so much attention? What is happening?
Should tasks or patient rooms be rearranged?

The amount of care and maintenance work and the breakdown of personnel targeting an individual patient or facility. Here we may see an explanation related to the patient 13 mentioned in the previous example.
Is the personnel group division of the attention received by patient 13 correct?

Data-driven management is possible only after the current status is known and the root causes of the phenomena have been found from more detailed data.

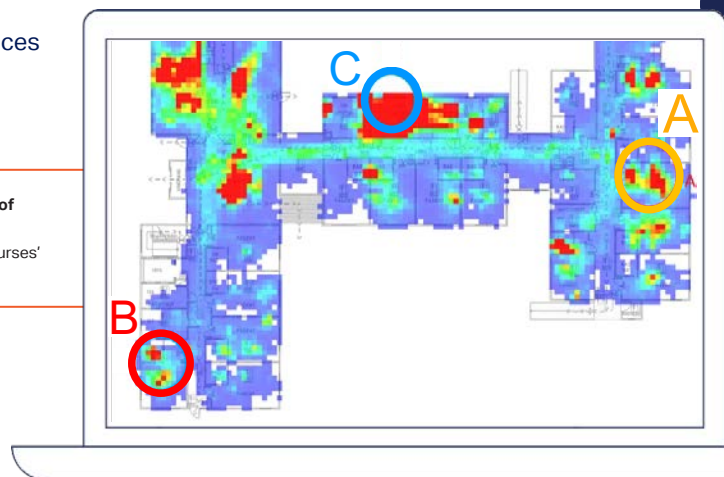


Healthcare unit managers

- Challenge:** See at a glance where all the work is focused.
- Description:** In order to understand the general focus of work, the site manager must have a good overall view of the site employee movements.
- Examples:** The unit manager should have an overall understanding of where there is the most activity and whether the work is distributed evenly among the different departments.
- Solution:** Trackers for the employees, effective user interfaces showing the focus of work.



Working time of nursing and maintenance staff in certain areas of the unit.
In the future, should patients A and B be placed closer to ward C (nurses' break room and office) to minimize the time nurses spend walking?



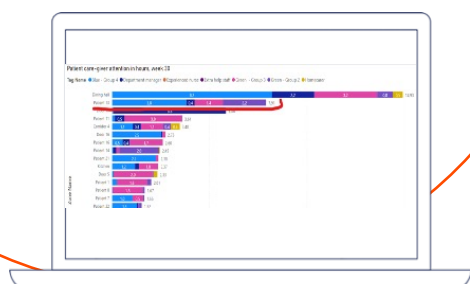
Healthcare directors

It is easy to compare the monitoring and performance of different units because the data can be grouped sensibly.

In case of planned or unintended changes in personnel, planning or implementation, the overall effect can be derived from the collective data of several sites at once.

Care-giver work-focus in hours, week 30

Site Name	2020-03-01	2020-03-02	2020-03-03	2020-03-04	2020-03-05	2020-03-06	2020-03-07	2020-03-08	2020-03-09	2020-03-10	2020-03-11	2020-03-12	2020-03-13	2020-03-14	2020-03-15	2020-03-16	2020-03-17	2020-03-18	2020-03-19	2020-03-20	2020-03-21	2020-03-22	2020-03-23	2020-03-24	2020-03-25	2020-03-26	2020-03-27	2020-03-28	2020-03-29	2020-03-30	2020-03-31	2020-04-01	2020-04-02	2020-04-03	2020-04-04	2020-04-05	2020-04-06	2020-04-07	2020-04-08	2020-04-09	2020-04-10	2020-04-11	2020-04-12	2020-04-13	2020-04-14	2020-04-15	2020-04-16	2020-04-17	2020-04-18	2020-04-19	2020-04-20	2020-04-21	2020-04-22	2020-04-23	2020-04-24	2020-04-25	2020-04-26	2020-04-27	2020-04-28	2020-04-29	2020-04-30	2020-05-01	2020-05-02	2020-05-03	2020-05-04	2020-05-05	2020-05-06	2020-05-07	2020-05-08	2020-05-09	2020-05-10	2020-05-11	2020-05-12	2020-05-13	2020-05-14	2020-05-15	2020-05-16	2020-05-17	2020-05-18	2020-05-19	2020-05-20	2020-05-21	2020-05-22	2020-05-23	2020-05-24	2020-05-25	2020-05-26	2020-05-27	2020-05-28	2020-05-29	2020-05-30	2020-05-31	2020-06-01	2020-06-02	2020-06-03	2020-06-04	2020-06-05	2020-06-06	2020-06-07	2020-06-08	2020-06-09	2020-06-10	2020-06-11	2020-06-12	2020-06-13	2020-06-14	2020-06-15	2020-06-16	2020-06-17	2020-06-18	2020-06-19	2020-06-20	2020-06-21	2020-06-22	2020-06-23	2020-06-24	2020-06-25	2020-06-26	2020-06-27	2020-06-28	2020-06-29	2020-06-30	2020-07-01	2020-07-02	2020-07-03	2020-07-04	2020-07-05	2020-07-06	2020-07-07	2020-07-08	2020-07-09	2020-07-10	2020-07-11	2020-07-12	2020-07-13	2020-07-14	2020-07-15	2020-07-16	2020-07-17	2020-07-18	2020-07-19	2020-07-20	2020-07-21	2020-07-22	2020-07-23	2020-07-24	2020-07-25	2020-07-26	2020-07-27	2020-07-28	2020-07-29	2020-07-30	2020-07-31	2020-08-01	2020-08-02	2020-08-03	2020-08-04	2020-08-05	2020-08-06	2020-08-07	2020-08-08	2020-08-09	2020-08-10	2020-08-11	2020-08-12	2020-08-13	2020-08-14	2020-08-15	2020-08-16	2020-08-17	2020-08-18	2020-08-19	2020-08-20	2020-08-21	2020-08-22	2020-08-23	2020-08-24	2020-08-25	2020-08-26	2020-08-27	2020-08-28	2020-08-29	2020-08-30	2020-08-31	2020-09-01	2020-09-02	2020-09-03	2020-09-04	2020-09-05	2020-09-06	2020-09-07	2020-09-08	2020-09-09	2020-09-10	2020-09-11	2020-09-12	2020-09-13	2020-09-14	2020-09-15	2020-09-16	2020-09-17	2020-09-18	2020-09-19	2020-09-20	2020-09-21	2020-09-22	2020-09-23	2020-09-24	2020-09-25	2020-09-26	2020-09-27	2020-09-28	2020-09-29	2020-09-30	2020-10-01	2020-10-02	2020-10-03	2020-10-04	2020-10-05	2020-10-06	2020-10-07	2020-10-08	2020-10-09	2020-10-10	2020-10-11	2020-10-12	2020-10-13	2020-10-14	2020-10-15	2020-10-16	2020-10-17	2020-10-18	2020-10-19	2020-10-20	2020-10-21	2020-10-22	2020-10-23	2020-10-24	2020-10-25	2020-10-26	2020-10-27	2020-10-28	2020-10-29	2020-10-30	2020-10-31	2020-11-01	2020-11-02	2020-11-03	2020-11-04	2020-11-05	2020-11-06	2020-11-07	2020-11-08	2020-11-09	2020-11-10	2020-11-11	2020-11-12	2020-11-13	2020-11-14	2020-11-15	2020-11-16	2020-11-17	2020-11-18	2020-11-19	2020-11-20	2020-11-21	2020-11-22	2020-11-23	2020-11-24	2020-11-25	2020-11-26	2020-11-27	2020-11-28	2020-11-29	2020-11-30	2020-12-01	2020-12-02	2020-12-03	2020-12-04	2020-12-05	2020-12-06	2020-12-07	2020-12-08	2020-12-09	2020-12-10	2020-12-11	2020-12-12	2020-12-13	2020-12-14	2020-12-15	2020-12-16	2020-12-17	2020-12-18	2020-12-19	2020-12-20	2020-12-21	2020-12-22	2020-12-23	2020-12-24	2020-12-25	2020-12-26	2020-12-27	2020-12-28	2020-12-29	2020-12-30	2020-12-31
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Relatives of the resident/patient

Challenge: **Will my loved one receive the care they need?**

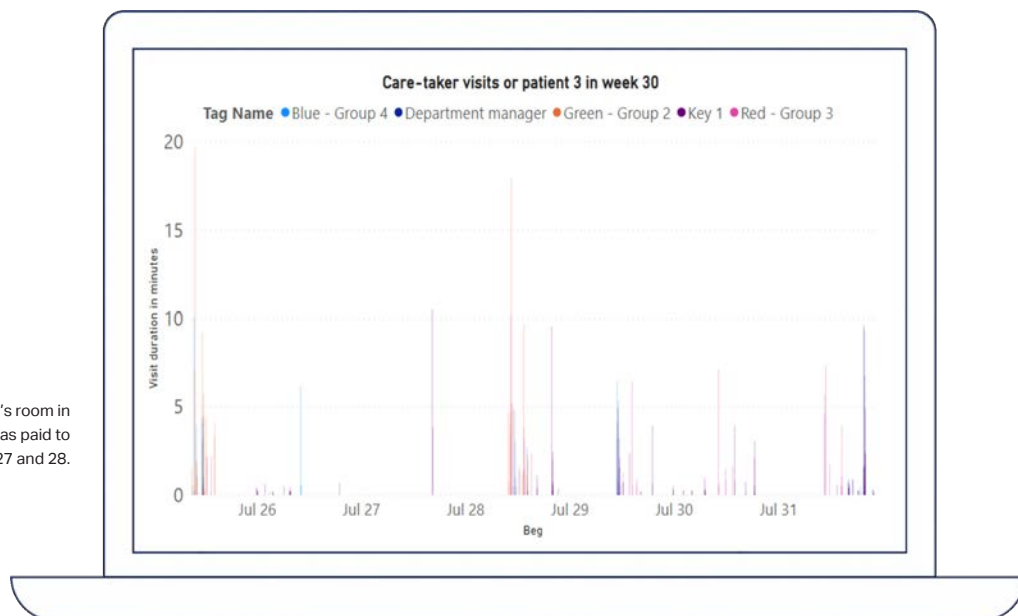
Description: By using indoor positioning, it is easy to prove to the patient and the patient's relatives that the patient has been given sufficient attention.

Examples: Data on the level of attention can be offered to relatives without asking. Reliable data on the frequency of treatment and the number of visits is also valuable from the point of view of the institution's legal protection.

Solution: Monitoring devices for workers and zone alarms that indicate the level of attention per patient.



The picture shows the nurse's visits to patient 3's room in week 30. It can be argued that too little attention was paid to the patient on July 27 and 28.

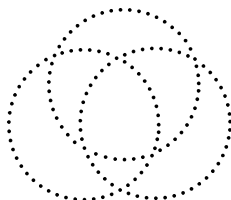
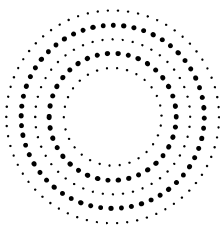


The data makes it easy to show how much nurses' time each patient gets.

Iiwari Indoor Positioning System

Our technology provides real-time visibility of people, assets and equipment in addition to powerful analytics and planning tools.

Working as a stand-alone or complementing your existing system it provides you with greater insight than ever before.



Signal Flow

The indoor positioning system is built by attaching the base stations to the ceiling or the walls. Tracked objects have a tracking tag that communicates with base stations using UWB (Ultra Wide Band) signals.

The network is designed completely around your particular requirements. We have installed systems in less than 1 business day, it's that easy.

Iiwari Tag

Iiwari tag is a small battery-powered device which can be attached to the tracked object or mobile phone and it communicates with the positioning network.

Base Station Network

Positioning network consists of master base stations and supporting base stations which exchange positioning signals with the tags.

Gateway

Gateway is the core computing device of the site. It manages the local positioning system and connects to cloud infrastructure with network connection. It collects positioning data and forwards it to our cloud infrastructure.

Iiwari Cloud

The data management system stores positioning data, takes care of data processing and manages all sites.

End User App

There is an easy-to-use user interface (Iiwari Dashboard) to visualize positioning data. A public API is available for your software development. Applications are developed according to the customer's needs.



The use of indoor positioning in healthcare is a growing trend.



We make the invisible visible!

Iiwari Tracking Solutions Oy, a pioneer in indoor positioning, has its roots in VTT and its extensive UWB research. Iiwari innovates cost-effective network solutions and products based on UWB technology for increasingly accurate and reliable indoor positioning.

If you want to know more about healthcare positioning solutions, don't hesitate to contact us.

Contact us »