Location Services - Making Buildings Smarter

Most people spend the vast majority, about 90% according to Forbes, of their day indoors, i.e. in artificial environments. At the same time, now more than ever, we are concerned about the impact that our lifestyle choices have on our health. As a result, we are starting to demand more from our indoor spaces, especially our working environments where we spend a large portion of our day.

Luckily, technological advances now mean that buildings can become ever more adaptive to our needs. Today's smart buildings are much more than shelter from the elements. They are built to make sure that the indoor environment supports our well-being while the building itself operates efficiently and is environmentally sound. As well as being adaptive, they are often also interactive. Users are encouraged to "communicate" with the building, for example via an application built on a digital twin of the real environment.

Smart buildings, typically large office buildings, provide a range of benefits to different stakeholders. Some of the key stakeholders are:

- Property owners - e.g. real estate companies
- Service providers - e.g. office management, cleaning and security companies
- Customers - e.g. companies that rent office or other spaces
- End users - e.g. the workers and other end users that utilise the space.

All of these stakeholders benefit from a smart building that runs smoothly. Location services are key to making this happen. So how are Location Services making buildings smarter?

Improving Security & Safety

Security and safety are important factors to consider in large facilities where people come and go every day. It is important to make sure that people are safe in both normal and unexpected conditions (e.g. emergencies). Location services are in a unique position to provide security and safety solutions by monitoring the environment while intervening minimally in the everyday processes of the building.

> " The global Smart Buildings market will reach **$36 billion** by 2020.

Zion Market Research
via Globe Newswire
https://www.globenewswire.com

Here are some examples of how location services can improve security and safety:

- ✅ **Access Control**
- ✅ **Visitor Management**
- ✅ **Automate Emergency Procedures**

One way that location services can be used to enhance both security and safety is through controlling access. So stopping unauthorised persons from accessing areas that they should not have entry to. Typically this is implemented by introducing trackable staff and visitor ID badges or keycards. The system can then automatically let authorised people in and lock unauthorised people out of specific areas. An added bonus of real-time location service solutions for these types of cases compared to other solutions is that there is no delay at the door when you enter an area you have access to. The system will identify the person approaching the door and unlock the door automatically if they have authorisation to enter. While this is a safety feature, it also has a positive effect on user experience moving through the building.

Location services can even be extended to provide more comprehensive visitor management. For example, in addition to blocking visitors from entering areas that they are not authorised to enter, the system can be set

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up to check that visitors are not left alone. In these cases, the system would send an alert to relevant parties if the allocated host cannot be found in the vicinity of the visitor. Similarly, when approaching areas that the visitor does not normally have access to, the system can check if they are accompanied by someone who does have access and let them in.

Location-based solutions can also improve safety in cases of emergency. For example, in cases where a building needs to be evacuated, a system set up at the designated entry and exit points as well as the evacuation assembly point can provide a headcount for evacuated people in real-time. Not only this, but because of the unique IDs of the tracked tags, it can provide information about who is still inside the building and where they are located so that rescue workers can find them efficiently.

Location services can significantly improve the safety of workers and the security of buildings by providing solutions in real-time. While providing added safety, they also improve user experience by creating a smoother flow through the building.

Improving Efficiency

Operational efficiency is a factor that affects all smart building stakeholders. For property owners, more efficient buildings are more profitable. For service providers, streamline operations are both more profitable and easier to run. For customers, efficiently operated spaces are easier to use, reduce costs and improve brand image. End users enjoy a well run and easy to use space.

Here are some examples of how location services can improve efficiency:

- ✅ **Optimise Spaces**

- ✅ **Optimise Operations**

- ✅ **Cost Savings**

- ✅ **Reduce Carbon Footprint**

One way in which location services can improve operational efficiency is by alerting service providers when they need to take action. For example, if the coffee machine is running low on milk or the printer is out of paper and/or ink. With the help of the alert, they can respond quickly to these needs, improving operational efficiency. Typically, sensors and perhaps cameras are used to keep an eye on the situation. However, another good way to do this is to engage the end users themselves to report any issues they notice. Making the reporting system easy to use will encourage end users to participate in the process. Integrating feedback systems into the location

"**Smart Solutions** could reduce total energy consumption by **5%-25%**

services means that when the service provider receives the message, they also receive the location of the issue, which allows them to respond more efficiently.

For property owners and managers, this same system provides the opportunity to simultaneously improve contractor management. The location-based system collects information about when service providers, so the contractors, are in the smart building and performing their tasks. This data gives property owners a better understanding of whether the service providers (including cleaning, security, maintenance, catering and postal services) are fulfilling their service-level agreements (SLA).

Location services can also provide vast amounts of useful data for optimising building use. For example, analysing the flows of people throughout the building during the day can help eliminate unnecessary bottlenecks such as elevators that are operating impractically. The data can also help property owners and service providers to fine tune and improve their operations to better service their customers during the day. Location services are a very powerful solution for showing the big picture, which can then be used to make decisions about possible improvements.

In addition to improving operations within a building, location services can also be used to optimise how the smart building itself operates. For example, turning off lights, air-conditioning or other electronic devices when they are not in use can significantly reduce power usage, which in turn can reduce both operational costs and the building's environmental impact. Depending on the system in use and the building itself, smart solutions could reduce total energy consumption by 5%-25%. For property owners, who are particularly interested in the reduced costs of operations, the 2018 Forbes Insights/ Intel survey provides good news: as many as 66% of those surveyed stated that building management technologies have produced a return on investment. The researchers are optimistic that this figure will rise as some benefits might take time to see. For other stakeholders, the positive environmental impacts of reduced energy consumption also play a part as having an office space in a more efficient building can also become a selling point for the brands that operate within it.

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Location services provide many opportunities to improve the operational efficiency of smart buildings. They can be used to automate processes within the building in addition to providing a channel for direct user feedback to service providers. They can even make the smart building itself more efficient. Location services can provide unique access to the big picture of how the smart building operates and what measures can be taken to improve efficiency.

Enhancing User Experience

User experience is often one of the core motivations for implementing smart building solutions. It is something that service providers and customers can offer to their end users to boost the feeling of satisfaction and well-being. Happier end users often boost motivation, productivity and brand image. When we consider that workers are the largest investment for companies, with salaries making up about 80% of the costs of knowledge work, it is no wonder that people matter to companies. Add that to the fact that happy employees take about 10 times fewer sick days and stay in their roles for twice as long and it becomes clear why companies are willing to invest in user experience.

Here are some examples of how location services can improve user experience:

✅ **Increase Happiness**

✅ **Improve Well-being**

✅ **Increase Performance**

✅ **Encourage & Accelerate Collaboration**

✅ **Improve Visitor Navigation**

One of the ways in which location services help enhance user experience is simply by making life easier for the end users. By giving users access to information, typically via an app, they can find a working printer, the colleague they're looking for, a nice quiet corner to concentrate or an empty meeting room for a brainstorming session. Access to this information removes unnecessary stress from the end user's day. It also helps workers be more productive. For example, in open plan offices, the average office worker loses 86 minutes per day due to distractions that could be avoided if the worker knew where to find a quiet space when they need one.

The same system can also be used to provide a whole range of other useful real-time information that workers can use to optimize their day, such as how crowded the canteen is at any given time or how many parking spaces are available right now. To provide a holistic service, other data can also be integrated so that users can get traffic updates, weather information and route suggestions in the same place.

While location services help end users move more seamlessly through their day, companies can use the collected data to optimise workflows and improve the usability of their space. By fine tuning their operations, companies can improve employee satisfaction and boost productivity. For example, the data may show that certain teams work closely together and therefore should be located physically closer to encourage further collaboration. Similarly, if certain workspaces are often left unused, it could be worthwhile to analyse why they are being avoided and make changes accordingly. Location services are optimal tools for this type of analysis as they provide decision-makers with actual space usage data to base their improvements on.

Location services can also improve visitor navigation in office spaces, improving the user experience for both the visitor and the person that they are visiting. Visitors can be provided badges that allow them access to where they need to go as well as navigational information via an app to help them get to their destination, be that a meeting room, cafeteria or waiting room. This would also allow people to find their guests just as easily as they can find their colleagues in the office, improving the user experience for both parties.

In addition to improving the day to day workings of an office, the same location service can also bring some added fun to the office by gamifying the space on special occasions. For example, the same application that helps employees locate their colleagues can be used to give them the chance to engage in an Easter egg hunt or track down Santa Clause who is giving out sweets. The system could also be used as part of well-being initiatives to get people moving during the day. For example, in a light-hearted, in-house competition to encourage people to move more, the system can provide the data for which team is most active during a set period of time so that they can be rewarded. These seemingly insignificant campaigns can significantly boost morale within a company.

"*Searching for **workspaces** or **collegues** could save as much as **8 minutes** per day.*

Intelligence and Emotion - Empathic Building
ISS World
https://www.fi.issworld.com/

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One further way in which RTLS solutions can improve user experience and well-being is by optimising the space for the needs of the current user. Location services can automatically adjust the lighting and temperature of spaces according to the preferences of specific users. These types of changes can also have significant effects on worker well-being and productivity. The system can also react to relevant external factors in real-time. For example, on a hot day, the system will cool the building accordingly and not just by pre-set season assumptions. Alternatively, on a quiet day when fewer people are using the space, the temperature will be adjusted accordingly, instead of using a standard all purpose setting. By adjusting automatically, the smart building can at all times keep the office space at between 21°C - 22°C, which has been found to be the optimal temperature to promote productivity. By creating adaptive environments, we can reduce employee stress levels, improve their overall health and in some cases even reduce the amount of sick leave taken.

"Better lighting can improve productivity by **up to 23%**

Wellbeing in the Workplace - The Influence of Lighting
299 Lighting - The Light Engineers
https://www.299lighting.co.uk

Location services offer many potential solutions for improving the user experience of buildings, leading to happier and healthier end users.

Location services provide the foundation onto which smart building solutions can be built. The technology is robust and versatile, meaning that it can be tailored to suit the needs of stakeholders. The same technology can even be extended and/or integrated into extensive smart city projects. Location services allow us to provide more human-centric services that improve user experience, operational efficiency as well as safety. Location makes things smarter.

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