inpixon Indoor Intelligence

WHITE PAPER

Better Healthcare Through Connected Technology

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Introduction

Amidst the shifting dynamics of the healthcare landscape, providers are increasingly under pressure to find ways to create an environment that is situationally aware, patient-centric, and works in real time. Once achieved, healthcare providers will be able to connect, communicate, collaborate and deliver care more effectively.

Over time, healthcare facilities have become larger and more complex with multiple services and departments spread across numerous buildings and floors. The complexity of today's healthcare campuses means that patients, staff and equipment are in a constant state of movement, and without effective means to guide people and locate critical resources, patients are left feeling anxious, confused, and irritated. This all-too-common scenario hinders the provider's ability to deliver critical care and creates an environment where they may potentially receive negative HCAHPS scores.

In response, healthcare providers are embarking on a pivotal journey to improve patient experiences while simultaneously managing dwindling resources and complex payment reforms. Inefficiencies in patient flow add another burden to already stretc.hed staff, diverting precious time from their primary functions while adding further inefficiencies to the care delivery system.

To succeed on this journey, healthcare providers need a more accurate understanding of what is happening in their facilities, how patients engage with their space, and what is likely to happen in the future. This requires accurate, up-to-date, indoor location data, and the ability to automate processes and respond to issues as they arise.

This white paper will explore how location awareness and indoor intelligence are the keys to enabling healthcare providers to create smarter, more efficient experiences that benefit patients and staff across the continuum of care.

Top Challenges Facing Healthcare Networks

The modern hospital exists in an era of lean resources. Hospitals cannot afford a loss in productivity, yet personnel waste valuable time searching for equipment, giving directions, and even getting lost themselves. At the same time, hospital administrators are realizing that a great patient experience is no longer a nice-to-have, it's a necessity.

To identify how healthcare providers can set themselves up for short and long-term success, we must first identify and explore their core challenges:

1. Enhancing patient experience

2. Improving operational efficiency

3. Translating data into actionable intelligence

Healthcare providers must overcome these obstacles in order to remain strong in a competitive market. So, how can this be accomplished?

These challenges share a commonality - they can all be converted into opportunities by leveraging indoor maps and location technology. The resulting indoor intelligence aids in transforming healthcare facilities into smarter more efficient systems by:

- **Collecting data from a host of connected objects powered by the Internet of Things (IoT)**
- **By merging indoor data with indoor maps**
- **By creating spatial awareness**
- **By delivering actionable intelligence**

Once achieved, healthcare providers are provided with the information they need to create connected systems that allow for enhanced communication, collaboration and automation.

Enhancing the Patient Experience

The Beryl Institute defines the patient experience as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care."

Enhancing and improving the patient experience is a top priority for healthcare providers, and it is becoming a race to meet the bar that is being continually raised with the increasing commodification of care delivery. Today, patients expect to be treated the way they would be in any other industry, and the delivery of healthcare is evolving into a more aware and patient-centric system to align with those expectations.

Patient-centric healthcare networks understand that a positive patient experience is dependent on more than a patient's consultation or procedure. When patients complete their satisfaction surveys, they are considering every touchpoint in their journey, not just the quality of care delivered. The patient experience now spans every interaction, including appointment notifications, directions to the hospital, the check-in process, navigating hospital facilities, the discharge process, and, ultimately, the journey home.

Studies show that 30% of patients facing long wait times leave before seeing the doctor, while 20% will change providers altogether following a long wait time experience.

To improve the patient experience, providers must take a holistic view of the continuum of care, identifying ways to integrate both internal and external systems. This is where location-aware IoT technologies can help, by creating an environment that supports a Real-Time Health System. Location-aware IoT technology makes it possible to integrate with both internal hospital systems (including patient information portals, scheduling systems, patient flow management systems, etc.) and external systems (mapping services, virtual parking systems, etc.) to deliver a more comprehensive experience for patients - before they even leave the comfort of their home.

Pre-visit planning can be configured to automatically notify patients of the status of upcoming appointments based on real-time information. For instance, when a hospital experiences delays, a notification is sent to patients informing them that their appointment is delayed and offers the option to reschedule. This type of proactive interaction prevents confusion in waiting rooms and reduces patient irritation associated with long wait times and lost hours.

Made possible by technology solutions, such as in indoor intelligence platform, data can be integrated with indoor maps, enabling hospitals to provide patients with instant access to route

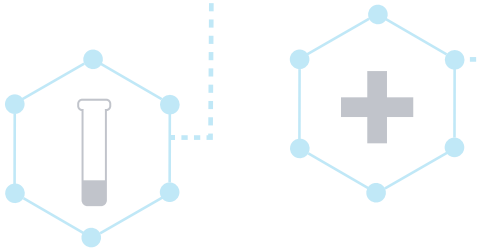
options guiding patients, guests and visitors from their front door to the closest available parking space at the entrance nearest their care venue, and right to their destination within the facility.

Self-service kiosks and map-enabled hospital apps can also be used to automate and streamline certain check-in and registration processes. Patient information can automatically be retrieved when a patient identifies themselves at a kiosk or alternatively enters a geofenced admissions area triggering check-in. In this way, healthcare can provide an experience much like that of checking in for a flight using an airport kiosk or airline mobile application.

Beyond the admission process, indoor intelligence technology can further the self-guided experience assisting patients through notifications and indoor navigation by displaying turn-by-turn directions from a user's location to their desired destination with supporting visual landmarks.

Improving a patient's experience naturally leads to better patient satisfaction scores, and with 30% of Medicare reimbursements linked to patient satisfaction ratings, it is crucial that hospitals strive to create a consistent, positive experience across the patient care continuum. By investing in technologies that help providers to put an emphasis on the patient's care experience and offer timely access to information and insights, healthcare providers will not only see improvements to their patient satisfaction scores, they are setting themselves up for success in a competitive market.

Improving Operational Efficiency



As hospitals face increasingly stretched budgets, time wasted on non-value adding tasks such as patient registration, patient check-in, assisting patients with directions, and searching for and retrieving equipment, all put undue strain on hospital staff. This takes valuable time away from their core duties, adding further inefficiencies to the system.

Compounding this challenge is the fact that hospital networks are often multidisciplinary, spanning multiple floors and even numerous buildings. Patients, staff and medical equipment are in constant movement throughout the facility, making them difficult to locate, potentially inhibiting access to the delivery of quality care and operational efficiency.

Hospitals can address this challenge by leveraging the situational awareness capabilities inherent in indoor location technologies. Location-sensing technologies that integrate with patient healthcare systems can be used to gather data critical to monitoring and improving patient throughput and capacity management challenges. Integrating clinical and business applications with a mapping platform effectively creates a more contextually aware hospital system. One that is able to sense, collect, and analyze the kind of patient data that can be used to improve hospital operating efficiency.

Using collected location data, hospitals can identify and address patterns of high activity and bottlenecks in the facility

Technology systems with an open, yet secure, architecture allow for seamless integration with Healthcare Information Systems (HIS). For example, when a doctor completes a consultation, closing that appointment in the HIS can be used to trigger a notification wherein instead of a nurse or healthcare worker having to fetc.h the patient from a waiting room, the notification is delivered to the next patient in the waiting area. Furthermore, the notification might be configured to provide directions to the consultation room. This series of triggered events helps utilize hospital resources more effectively, resulting in a reduction in patient wait times.

Using collected location data, hospitals can identify patterns of high activity and bottlenecks in the facility. Using this intelligence, they can coordinate better usage of treatment, equipment, and consultation rooms based on the needs of patients and staff availability.

With patient safety high on the priority list, the ability to track patients throughout the treatment process means staff can be alerted if a patient is lost or has entered a restricted area. This lifts a burden off hospital personnel, allowing them to focus on delivering patient care, unless an alert is triggered. The benefits of this added visibility translate to improved operational efficiencies, in addition to an enhanced patient experience.

Translating Data into Intelligence

Smart medical devices and IoT technologies are transforming the healthcare dynamic, making it possible for providers to grant patients and decision makers access to pertinent information and insights leading to better patient outcomes and experiences. The challenge is, with so many data sources, how can providers process, interpret, and share this rapidly multiplying data in a valuable and timely manner?

Courtesy of consumer technology, people have grown accustomed to the convenience and simplicity of having everything at their fingertips. They want easy and instant access to a wealth of information from numerous sources on their mobile devices and apps, and healthcare is no exception to this experiential trend. This is where situational awareness comes in. On its own, raw data is useful for analytics, but when combined with location-based data, it can be leveraged to create spatial awareness and actionable indoor location intelligence.

Indoor intelligence technology can remove points of friction for patients, visitors and staff, creating a more positive experience across the continuum of care. Mobile applications and interactive kiosks that leverage intelligent indoor maps reduce the complexity of indoor spaces and reshape the way people interact with hospitals. By combining business data with indoor spatial awareness, healthcare providers can create a familiar and engaging environment which translates to a seamless experience that anticipates where people are going and what they are looking for.

The same technology infrastructure can be used by healthcare providers to trigger the delivery of contextual content via mobile messaging based on a patient's location and profile. Mobile messaging can be used to provide patients and visitors with relevant and timely information such as targeted messages, appointment reminders, delay notifications, preparation guidelines, post-care instructions, and more.

By merging location information with healthcare data, providers are taking copious amounts of data made available through connected systems across hospitals, giving it spatial context, and leveraging it to improve patient satisfaction and outcomes.

Location-aware technology also has the potential, beyond helping patients and visitors, to benefit healthcare providers. Indoor location technology can be used to track and monitor the location of key assets, including mobile medical equipment, patient-monitoring devices or tagged patients and personnel, contributing to the cultivation of a real-time health system.

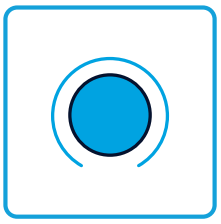
With an integrated indoor intelligence platform, hospital networks can also monitor the status of assets and building systems, such as refrigerators holding pharmaceuticals, vaccines and bone/tissue samples, or HVAC and lighting systems. Contextual notifications can deliver alerts to out-of-range equipment, wandering patients, or building systems requiring attention.

Over time, collected location data contributes a wealth of hospital management information which can be used to further predict trends so healthcare providers can make smarter, more informed, business decisions.

Omni-channel delivery systems (mobile, web, kiosk)

Dynamic navigation routes based on real-time data

Seamless indoor to outdoor navigation



Location-based services, including blue dot wayfinding, messaging, and geofencing.

Conclusion

Providing excellent patient care is no longer a nice-to-have - it is mission critical for healthcare providers. As hospitals compete for patients - patients who now have options in their choice of healthcare provider - the movement to deliver more efficient patient experiences has become imperative.

Indoor intelligence technology offers hospitals an engaging and patient-centric solution to optimize the patient experience, while simultaneously improving crucial operational efficiencies.

By merging hospital information with location data, patients have access to personalized and efficient care facilitated by real-time notifications. It also helps healthcare networks better utilize resources and enables staff to focus on the delivery of core services to achieve greater efficiencies in operations, and helps minimize operational costs.

The cultivation of situational awareness within healthcare facilities is integral to improving both care delivery outcomes and patient experiences, and it all begins with adopting indoor intelligence technology to see beneath the hospital's surface.

Let's talk about your goals.

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