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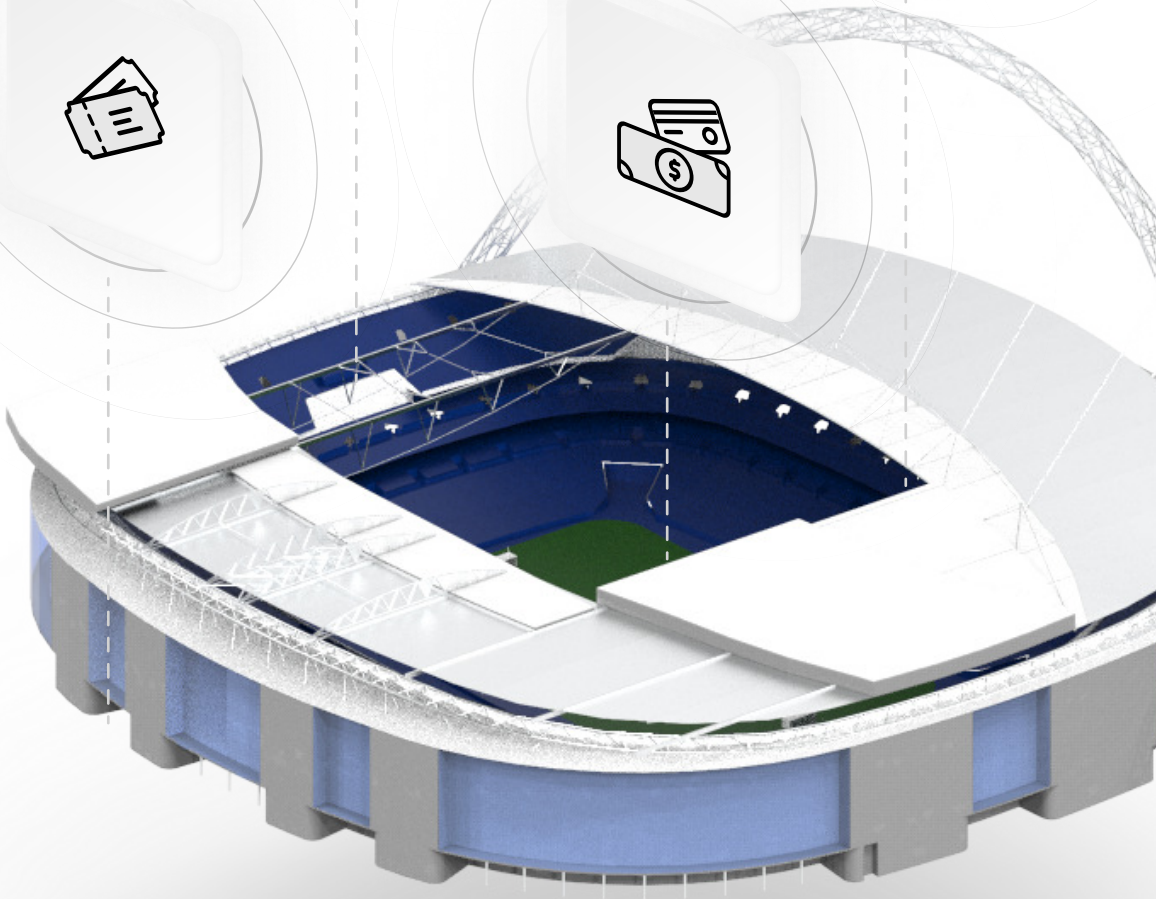

Touchless Stadium

4 Factors You Should Consider When Adding Contactless Biometric Identification to Your Reopening Strategy

A White Paper for Venue Management Executives and Stadium Owners

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The Reality

Stadiums are uniquely challenging places to reopen because they bring together thousands to millions of people into concentrated spaces.

And yet, they are the backdrop for immortalized moments of sports history or an unforgettable concert. Stadiums host cultural traditions and experiences like few other places can.

One of the biggest challenges in reopening stadiums is that traditional payment, entry, and staff management are inadequate for reducing virus transmission and keeping everyone safe.

Picture thousands of people touching the same door handles, payment tablets at concessions, clocking in to work on the same computer, exchanging IDs, and then proceeding to eat, touch their faces, and touch each other. Doesn't this look and feel untenable?

This image doesn't even acknowledge the reality of failing to keep stadium employees safe. Falling short of success means taking on a huge financial burden: as the virus spreads and employees need to stay home, companies will spend more than ever to pay sick leave and cycle through rounds of staff to keep the venue running.

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Contactless Biometrics

The good news is that there is a way to reopen. Using contactless biometric identification replaces the act of thousands of people touching the same surfaces, thereby reducing virus and disease transmission.

When used in conjunction with other health measures like a vaccine passport, temperature check, and rigorous surface disinfecting, a stadium has the capability to reopen safely.

Biometric identification is a technology that uses a unique, biological characteristic to identify a person(e.g. facial recognition, palm vein scan, iris scan, etc).*

Biometric identification technology works by linking a person's biological trait to a set of unique data. Then when a person's trait is scanned, their data is pulled up from a database to match the scan for verification.

This kind of identification is growing in popularity. According to One World Identity, the U.S. digital identity market is projected to increase to over $30 billion by 2023 from just under $15 billion in 2019.

Contactless biometrics are biometric modalities that don't require a user to touch or come into contact with a biometric reader in order to be identified. Fingerprints therefore, wouldn't fall under this category.

In this white paper, you'll discover some of the most foundational questions and considerations for how biometric authentication can enhance your reopening experience. Our goal is to provide you with enough information to start conversations and give you a simple framework for what biometrics could mean for the future of your venue(s).

*If you're interested in a deep dive of biometrics and different biometric modalities, please contact us and we can provide you with our ebook, **"Exploring Biometric Solutions"** .

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FACTOR 1

Biometric Modality

It's important to think about which modality would fit a specific venue best because each one has its benefits and drawbacks.

You also have to consider how certain factors would affect the availability of the biological characteristic being measured or people's comfort level with sharing it. For example, in some cultures face veils are worn so facial recognition wouldn't be an appropriate fit.

Below, you'll find an overview of some of the most popular touchless biometric modalities on the market today.

Palm Vein Scan

Developed in 2011, palm vein scanning uses near infrared light to create a unique image of the blood flowing through the vein structure of a user's palm.

Keyo is the only company currently building a consumer-focused network around palm-vein technology. We're replacing keys, cards, tokens, fobs, and tickets with a simple palm scan, as well as offering software that makes it easy to integrate palm vein into existing systems.

Upsides:

- Use of the palm vein reader is very fast: it involves a .2 second, contactless scan of a palm
- Easy and acceptable in diverse cultures and contexts
- Relatively more accurate than other similar biometric technologies
- The user has to choose whether to be identified or not by reaching out their palm (not passive). This makes the modality "privacy-by-design" by requiring a user's consent

Downsides:

- Limited by proximity
- The angle of the scan must also fall within a certain range and the scanner must capture the entire palm. Therefore, the user must be near the terminal, presenting her palm forward

Facial Recognition

It's the one humans typically use to identify each other, so there's a strong convenience factor. Newer facial recognition technology uses 3D scanners to register an image, making it viable under diverse lighting conditions and from various angles.

Upsides:

- Familiar
- High-end options provide significant security, especially in conjunction with other kinds of verification

Downsides:

- Possible infringement of user privacy and data due to its passivity (lack of consent)
- Information can be extracted from a 2D scan that a user may not want revealed (this can range from sexual orientation to medical conditions)

Iris Scan

Iris recognition is an automated method of biometric identification that uses mathematical pattern-recognition techniques on video images of one or both of the irises of an individual's eyes (whose complex patterns are unique, stable, and can be seen from some distance).

Upsides:

- Iris scanners use near infrared light to photograph the ridge pattern of the iris, a pattern both unique and complex enough to be quite secure
- Once registered, verifying iris information is quick and easy
- Iris scans can conveniently identify people wearing the naqab (burka) or other face veils
- Production and supply chains are already established

Downsides:

- Initial registration typically requires multiple scans, which can be uncomfortable or annoying
- In practice, the machines can be annoying to adjust for different heights
- Cheaper commercial versions can be fooled with a high-definition image
- Privacy & consent are questionable due to compulsory use for many people in certain countries and long-range scanners can be used regardless of people's knowledge or consent

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FACTOR 2

Guest Journey

The next key element to think about is how biometric identification will enhance the way your guest enters the venue, pays for concessions or merchandise, finds their seat, etc.

We'll walk you through a few steps of the basic guest journey with accompanying questions and thoughts to reflect on.

STEP 1

Account Creation/ Integration

How do you want guests to sign up for an account with the biometric system?

No matter the choice, it's important to think about ease. You want to make this experience as simple and convenient as possible, not only for the sake of logistics but for helping guests adjust to this new technology.

While there are many ways to do so, here are some to consider:

- Through a separate "biometric only" account. Ideally, this sign-up would be conveniently done on a mobile app or a kiosk at the stadium*
- Through an integration with an existing app or service like Ticketmaster

The benefit of an integration with a service that the venue already uses is that a person's biometric ID can be linked to their ticket and payment information. However, this integration isn't done by all biometric companies.

*Look for systems where there's an option for remote account creation. The less "signing up" there is to be done at the stadium, the smoother and quicker it will be to get people through the door.

STEP 2

Biometric Enrollment

What does it look like for guests to enroll their biological trait in the system you've chosen?

The guest will need to enroll their biometric data into the system you choose in order to be identified. This enrollment process needs to be smooth and quick. When you're talking with biometric ID companies, be sure to get a number on how long it takes on average for a user to get enrolled in their system. If their process takes 15-20 minutes per person, then reconsider whether that system is right for a venue.

The way companies enroll users varies. Some can offer remote enrollment, which would cut down on time at the stadium but relies on a person to do it on their own, which may lead to identification problems if they don't enroll correctly.

Many companies do enrollment at kiosks as well. If this is the route you choose, it's advisable to install multiple enrollment kiosks to speed up the process, as well as have employees helping people.

There's also the route of creating an incentivized program for people to enroll at the stadium before the event, so there's less traffic on the day of. The main point is, if thousands are trying to enroll simultaneously and it's cumbersome, there simply won't be enough time to get everyone through for the event.

Circling back to account creation: If the person created a separate account that's different from the ticketing system, there should be some feature that allows them to upload a payment method to their account if you're choosing to include contactless payment.

STEP 3

Entering the Stadium

What's the best way for guests to be verified and enter the stadium?

Depending on the company you work with, you may have the option to create the ideal access control experience by choosing where you want the biometric readers to be installed:

- Wall-mounted near a door
- Installed in turnstiles
- At a stand-alone kiosk

Think about traffic flow, the time per scan, how many guests will be at the event, where security is in relation to the entry, and the venue layout. It's better to find a biometric ID system that can be added to the venue as it is, rather than changing the venue itself. (It will typically cost much less to do so as well).

No matter how you set it up, the guest will scan their biological trait at the respective scanner/reader. Again, this needs to be low friction (meaning easy and quick).

After a positive scan or read, the customer can enter through the door.

*Something to consider: due to the fact that live events typically host thousands of people at a time, we advise that you avoid using 2 kinds of biometric verification and instead choose one secure, private, easy biometric ID system.

STEP 4

Paying for Food and Merchandise

When a customer is ready to grab something to eat or wants to buy some merchandise, they'll order their food/souvenir and scan their biological trait at the counter. When the scan is successful, their payment method will be automatically charged.

This function isn't necessarily the most common usage of biometrics, but it can be an asset for guests to continue experiencing a new level of safety once they're inside the stadium.

If you find that contactless payment is an essential part of the guest experience, we recommend working with a biometric company that can integrate multiple use cases into one biometric system.

If you think this functionality is optional and you're more focused on using biometrics for entry, there are many biometric companies whose specialty is access control.

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FACTOR 3

Staff Safety

It's possible for employees to return feeling safe and ready to serve the public again.

A way to reduce virus transmission is replacing a physical employee time and attendance system with a contactless one. While some HR software allows for an employee to clock in and out on a mobile app, a biometric system offers the advantage of accuracy and prevents time fraud.

A new way to clocking in and out of work

1. An employee approaches a door to start their work shift.

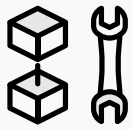
2. They scan or get their biological trait read for positive feedback.

3. The door, gate or turnstile unlocks and the employee enters. Their scan not only grants them entry to the stadium, it also clocks them in for their shift.

4. Once they are done, they scan at any designated clock-out terminal and are automatically clocked out.

This is a use case that can be handled in a few different ways:

- You partner with a biometric company that solves multiple use cases (employee record keeping and access control) with one biometric system
  - Their system may include a new HR software solution that works with their access control
  - If this is the case, the venue would need to accommodate this new HR software and a development team is needed to help this migration of new software
- You partner with a biometric company that in addition to the above, offers flexible integrations
  - They can integrate your current HR software with their access control system
  - No need for intensive development work



FACTOR 4

Integrations

As you'll have noticed, we've been using the term " integration" frequently throughout this white paper.

A simple way to understand what an **integration** is, is that it's a way of adding components (software program, apps, hardware) to a software system so that the components and system create a cohesive whole.

The goal of an integration is to add new functionalities by adding components that already include these functionalities instead of creating them from scratch (i.e. adding Ticketmaster to a biometric system instead of creating a new ticketing program).

Integrations are an important factor to think about when you're adding biometric identification to a stadium. They'll allow you to add biometric identification to a wide range of use cases - security, payment, ticketing, rewards programs, etc.

It's up to you to decide how much biometric identification you're wanting to use to reopen. If you're looking to craft an entirely new guest experience, you're going to need integrations to achieve that goal.

Elevating the Customer Journey

The potential for using biometric identification to transform the guest experience is endless.

- Consider how loyalty and rewards programs points can be assigned to a guest with every biometric scan
- Add a lottery system to reward a lucky guest with a gift because they were the 1,000th scan of the day
- Think about what games/special experiences were already in place at the venue, and how they can be updated in a new, contactless way

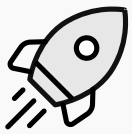
If you're considering integrations as a key piece of your reopening strategy, you need to communicate this to prospective biometric identification companies. Not all will be able to serve you in this way.

There's a spectrum of biometric identification companies' integration capabilities:

- **Very little:** these companies specialize in a single use case, like building security. Offering Integrations is not their focus
- **Limited:** integrations are available for use cases like security, time and attendance, and payment. However, it is likely that:
  - It will take a robust development team to make these integrations happen
  - You may end up having to use their software and apps in order to apply biometric identification to said use cases
- **Wide range:** these kinds of companies can offer integrations that fit into the venue's current technology. You can continue to use Ticketmaster, Stubhub, ABI Master Mind's Workforce Manager and other programs

One of the greatest advantages of using integrations is that it can make biometric identification a time and cost-saving tool for your entire reopening strategy. If you're anticipating that each user having a vaccine passport or any kind of "health pass" is essential to reopening, these programs can be added to a biometric identification system.

This addition would mean that when a guest scans their biological trait at the stadium entry, their vaccine passport would be attached to their trait and automatically appear for verification. Each user scan would redeem a ticket, verify a health standard and allow entrance.



The Future

We encourage those looking to reopen stadiums and large-scale venues to focus on the possibilities of designing a new guest experience rather than wishing to precisely restore what once was.

When installed and used with care, contactless biometrics can be an extremely helpful asset for strengthening health and safety protocols at live events.

No matter the biometric modality and system you choose, we can't stress enough the **importance of privacy and security around users' biometric data.**

It's critical that the company you partner with is compliant with all major privacy and biometric regulations, and that they'll make sure you stay in compliance. Additionally, it's important to communicate and be transparent with all users about how their data is stored and the security measures that are in place to protect it.

When reopening with a technology such as biometrics, you must earn and maintain the trust of the public- specifically that you will take care of their data (which can't be changed if stolen from them) and that they will be safe to enter the stadium and enjoy live experiences again.

About Keyo

We published this white paper to share information that stadium and venue management executives can't intuit on their own or lack access to. We want to help venues make responsible, informed decisions around using biometrics for their reopening efforts.

If you're looking for more one-on-one guidance, we're happy to help. Please contact us at **(888) 707.0056** or **hello@keyo.co**