Place-based Services Platform that Enhances User Satisfaction from Sports Tourism to Daily Life

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Enjoying sports as spectators is increasingly facilitated by smartphones, which provide information such as game schedules and performances of players/teams and enable facility reservations, ticket booking, and so on. This information and these services are usually provided by means of applications installed on smartphones, but this necessitates users to operate certain processes, such as installing these applications in advance. As a result, the number of users has not grown as much as service providers expected. Addressing the need to improve convenience, Fujitsu has developed a place-based services platform that makes information/applications automatically ready for use on users' smartphones according to the time, place, and occasion. Applying this technology to sporting event viewing may enhance spectators' viewing experience. In addition to sports tourism, which combines sports and tourism around sporting event viewing, we expect this technology to be applied also to new areas where many companies will become involved. This paper describes the application of the place-based services platform for enhancing convenience at spectator sporting events.

1. Introduction

As major international sporting events will be consecutively held around 2020 in Japan, the utilization of ICT in the sports industry has been gaining much interest.[1] Until now, the sports industry has used ICT mainly for the management of team employees, athletes, and fans, for websites disseminating information, and for electronic commerce sites selling tickets and goods. Now, with the holding of the major international sporting events having been decided, much broader utilization of ICT is expected, for example for the modernization of stadium and arena systems, and the provision of services for spectators both in Japan and overseas, including services that support sports tourism, which combines sporting event viewing and tourism. A requirement for these various innovations is that they continue to be used even after the events are over.

In recent years, in addition to web apps and social media, services for spectators are increasingly being provided as apps for smartphones to offer spectators better services that can be tailored to specific places or teams, leveraging the ubiquity of smartphones as indispensable devices in everyday life that allow direct interaction with users.

In this context, to realize a human-centric ICT world, Fujitsu has developed a place-based services platform that securely distributes smartphone apps as needed based on user circumstances.[2] This technology gives users quick access to apps when and where they need them, based on the GPS location information of their smartphones, the current time, and the attributes of the smartphone user, among other things.

This paper describes the current state of ICT in relation to spectators of sporting events, the technologies of the place-based services platform, and actual cases of application in the sports industry.

2. Current state and challenges

2.1. Current state of ICT for sporting event viewing

The use of smartphone apps for viewing of sporting events has been increasing in recent years. Levi's Stadium in the U.S. offers various services both inside and outside the stadium through its Levi's Stadium

app,[3] a smartphone app for spectators that allows them to purchase electronic tickets, make parking reservations for the day of the sporting event, order and receive food and beverages from their seat, check restroom crowding conditions, receive navigation assistance within the facility, replay parts of the game, and so on. Other apps such as the MLB Ballpark app[4] offered by MLB.com to Major League Baseball fans in the U.S. and the M App offered by the Chiba Lotte Marines,[5] a professional baseball team in Japan, allow users to purchase tickets, check game progress, and find the way to their seats in the stadium in conjunction with beacon guidance, among other things.

These apps aim not only to increase the repeat rate of spectators but also to increase the amount of consumption in the stadium and thereby improve profitability. They are designed to make the sporting event viewing experience better by allowing users to purchase tickets in advance and increase the convenience of the various services available at the sporting event location. However, simply focusing on the experience of individuals with smartphones does not take into consideration creating a sense of unity among all the spectators present in the stadium and boosting the atmosphere at the event.

Further, these apps are each designed specifically for the services at given stadiums, and they are not designed to provide information about services in the vicinity of respective stadiums. To provide services that combine sporting event viewing and local sightseeing, like sports tourism, information about sightseeing spots and app management functions are needed.

2.2 ICT challenges in the sports industry

Major international sporting events are attended by many people from home and abroad. These visitors not only watch sporting events but engage also in sports tourism by visiting nearby tourist attractions and the like, and appreciate appropriate information and guidance allowing them to enjoy a more fulfilling experience. Furthermore, businesses hope for the revitalization of the regional economy as the result of such events. The sporting event watching experience being of paramount importance, services offered at the stadiums that host sporting events need to be made more convenient and provide a new type of sporting event viewing experience that is more enjoyable and exciting.

Rather than the spectators having to search for services to use, services should be made available to them according to the situation without requiring any time and effort from spectators. To this end, services should be delivered fairly and promptly to all spectators, or optimized services should be delivered on an individual basis to each spectator. Further, after the events, services should remain available for use as a social legacy. Discontinuation after international sporting events of the various apps offered there, and users deleting their apps, would mean the loss of a large number of users as well as social infrastructure development opportunities. To prevent such losses and to build these services into a new service infrastructure for the future, it will be important following the end of events to switch the content to apps that provide information and services that users need in their daily lives, thereby ensuring continued use.

In so doing, the following aspects need to be considered.

1) Ability to provide various types of information and apps according to date and time, place, and personal attributes
2) Multilingual support
3) Services designed as push-type services whose use is prompted by the service provider rather than pull-type services whose use is initiated by the user on an as-needed basis
4) Ability to be continuously used through the updating or replacement of information and apps
5) Ability to deliver multiple services via a single app

3. Provision of value through place-based services platform

The place-based services platform developed by Fujitsu is a cloud-type service that automatically delivers optimal information and launches apps for the convenience of smartphone users through the combined use of time, place, occasion, and user attributes (**Figure 1**).

In the place-based services platform, a conceptual field representing a specific situation such as time and location is called a place. Specific situations of smartphone users present in a given place (where the status of the user automatically becomes "checked in") are defined in advance as rules in the place-based services

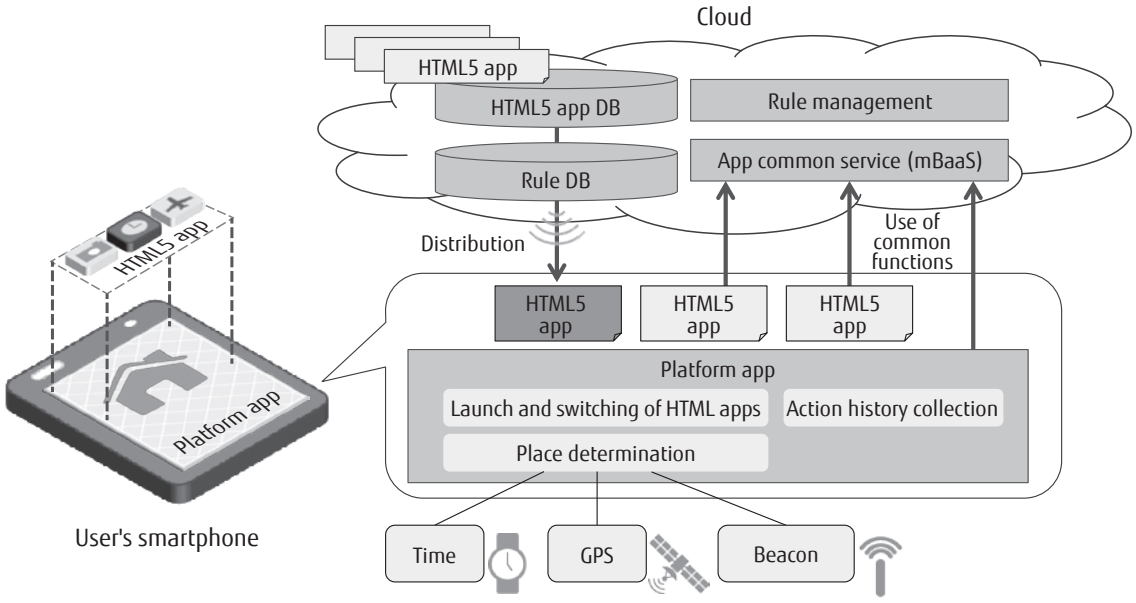

Figure 1
Outline of the place-based services platform.

platform. For location detection, the GPS information of the smartphone, the location information provided by beacons at the site, or the like, is used. A specific HTML5 app is linked to each place. Once it is determined that a platform app, described later, has checked in at a given place according to the defined rules, an HTML5 app designed for that place is automatically installed to the user's smartphone and becomes available for use. By not requiring users to actively install and launch apps as in the case of pull-type services, this system makes it easy for users to use suitable apps according to the situation.

The place-based services platform is composed of the following functions, as shown in Figure 1.

1) Place-based services platform app

The place-based services platform app (hereafter, platform app) is one of the apps to be installed on users' smartphones (Android/iOS). The HTML5 apps for each place run on the platform app. The platform app has a function to identify places based on rules and also a function for switching HTML5 apps according to the place, thereby providing effortless app use to users.

2) HTML5 apps for content on platform app

HTML5 apps are apps that run on the platform app and actually provide services to users. It is possible to create also apps with functions similar to those of native apps by linking static web content and cloud-based services.

3) Rule management

Rule management is implemented as a function that uses rules defined by a combination of time, GPS data, beacon data, and the like, and HTML5 apps, and communicates with smartphones to control the delivery of services. Rule management also has a mobile backend as a service (mBaaS) function that provides common functions for operating the various HTML5 apps. Through the release of this function to the service providers of HTML5 apps, users are able to make flexible use of the services of multiple service providers on the platform app.

4) Collection, management and analysis of action history

This is a function to collect, accumulate and analyze the usage history of the platform app and HTML5 apps from users' smartphones. The attributes of users can also be extracted by analysis and this data used for the targeted distribution of given HTML5 apps to users with specific attributes.

Through the use of the above functions, it is possible to solve the challenges of ICT for spectators

mentioned earlier. Content designed for the events at each stadium can be push-delivered to users according to their situation. For example, content translated into various languages can be prepared and displayed according to the language setting of each spectator's smartphone. Moreover, in conjunction with digital signage, lighting equipment and display equipment in the stadium, it is possible to boost spectator engagement in ways never experienced before, such as cheering battles involving all the spectators in the stadium, cheering along with spectators at public viewing areas away from the stadium, and organizing games that create a sense of togetherness in the audience.

Further, by bundling a large number of content service providers using the place-based services platform, spectators can use various services according to the time, place, and occasion simply by installing the platform app once. Following the conclusion of the events, continued use of the services is possible by replacing their content with content for sightseeing and residents.

4. Cases of application of the place-based services platform

This section introduces actual cases of the application of the place-based services platform.

1) Frontale Stadium service (experiment)

The place-based services platform was applied for an app for spectators watching official matches of Kawasaki Frontale, a J-League (Japan Professional Football League) football team, at Todoroki Stadium in Kawasaki City, Japan. This experiment was conducted to detect spectators in the stadium through the use of beacons and Wi-Fi access points, and use this information to provide a participatory game. In the participatory game, the shaking motion of smartphones was detected and the number of shakes was tabulated in the cloud. A video showing mascot characters competing according to the number of shakes was shown on a large screen. Through this experiment, we demonstrated a new way to boost the engagement of spectators through smartphones by conveniently providing a target app to all spectators who showed up at the stadium.[6)]

2) "B.Ouen" official B.LEAGUE fans app

The place-based services platform was applied for the "B.Ouen" (*Ouen* means cheering) fans app for the B.LEAGUE FINAL 2016–17 games held by the Japan Professional Basketball League (B.LEAGUE) (**Figure 2**). This app allows users to select the team that they support and make the screen light up with their team's color by shaking their smartphones. At the opening ceremony of the B.LEAGUE FINAL 2016–17 games held at the 1st Gymnasium of the Yoyogi National Gymnasium, the spectators were asked to use the application. In the darkened gymnasium, the spectators used the "B.Ouen" app, shaking their smartphones lit with their team's color, filling the gymnasium with

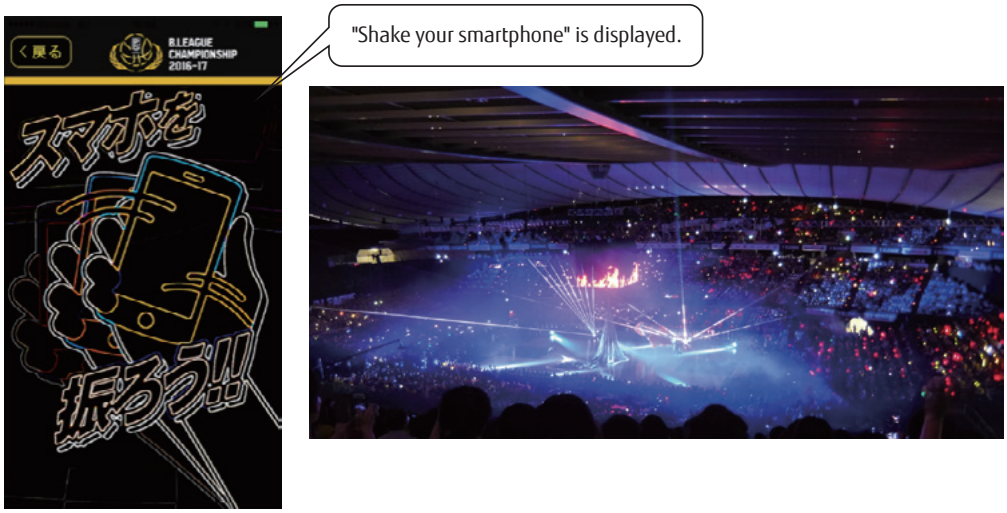

Figure 2
B.Ouen fans app and scene of its use.

light in a vast spectator participation type performance. This too is a new way to boost spectator engagement through smartphones.[7] Provision of a fans app with similar functions is planned for the 2017–18 season.

3) "Discover TOYAMA" official app of the Toyama Prefectural Tourism Association

The Toyama Prefectural Tourism Association is introducing a smartphone app that is offered to tourists visiting the prefecture, as an example of the application of the place-based services platform in fields other than sports (**Figure 3**). The app grasps the location of tourists with GPS and beacons, allowing the efficient delivery of services such as content and coupons at sightseeing locations. A system under which several municipalities and tourism operators participate as content providers in Toyama Prefecture has been created. Further, the cloud-based part of the service is able to grasp and analyze the movements of tourists, allowing continuous delivery of optimal content based on the analysis results.[8]

5. Conclusion

This paper described how the decision to hold major international sporting events around 2020 in Japan has drawn attention to the current state of, and challenges in regard to, services for sporting event spectators using their smartphones, and the place-based services platform that push-delivers suitable services based on the time, place, and occasion—and provided examples of the application of that platform. The use of the place-based services platform that provides smartphone apps to spectators not only allows the delivery of a new sporting event viewing experience that involves the active participation of spectators, but also makes it possible to conveniently use and provide various services aimed at sports tourism and subsequent legacy use.

Going forward, we will further refine the functions being offered and study in greater detail different types of use and solutions, with the aim of offering the place-based services platform for use beyond 2020 and making it an enduring part of the social infrastructure.

Figure 3
Discover TOYAMA app.

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