

## User Matching System for Activating Sports Tourism Based on Hybrid App

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### Abstract

*In this paper, we propose a user matching app based on hybrid app and a utilization plan to promote sports tourism in line with the growing trend of sports industry scale. The proposed app categorizes sports facilities across the country into regional, sports, private and public sports facilities to support reservations and matching. The proposed app applied a matching system in which matching scores were given according to the preference of events, places, and users by user net matching algorithm. Users can enjoy sports as a team or individual through the suggestion app even if they do not have any clubs or friends to which they belong. It can be used to improve tourism content services and establish tourism industry policies by analyzing data generated while using a user matching system.*

**Keywords:** Hybrid App, Sports Tourism, KTO, RTO, Tourism Content, Matching System, Tourism Policy

## 1. Introduction

The size of Korea's sports industry increased from 68.35 trillion won in 2015 to 74.69 trillion won in 2017. Therefore, the number of businesses and workers in the sports industry is also increasing [1]. The sports industry is creating added value through sports-related products and services, and is rapidly becoming an important business content with the rapid growth of the information and communication field. In particular, the sports industry is creating a new business value through the convergence of ICT, artificial intelligence, big data, VR/AR, etc. in the 4th industrial revolution. Therefore, the Korean government is establishing and enforcing the sports industry promotion policy to create jobs with advanced science and technology applied through information and communication media. [2]. However, research on Korea's sports matching system is limited to specific sports.

In this paper, we propose a hybrid app-based user matching app for activating sports tourism and how to utilize it for sports tourism in accordance with the growth trend of the sports industry. The proposed app collects sports facilities of local governments and private sports facilities in one place and subdivides them into sports categories. And you will be able to form new teams for each event or join existing teams. The team leader is matched by either booking a sports facility for the opposing team to challenge or applying to the

opposing team. In other words, with this app, you can support personal match matching, team building, matching, etc., and even reserve sports facilities at once. Also, you can enjoy sports alone without a club or friends. The proposed app applied a matching system in which a matching score is assigned according to the item, place, and user preference by the user net matching algorithm. The proposed app in this paper presents six ways to use it to promote sports tourism. First, the manager of the app can activate sports tourism by holding sports events by selecting sports with active matching. Second, through sports events, Sponomics can be fostered where sports and cities grow together. Third, the proposed app can be applied to the tour course as a sports experience item for the existing sports tourism course. Fourth, real-time reservation is possible using the proposed app, and user-matching system can be used to provide mobile oriented sports convenience to relieve the inconvenience of the existing reservation system. As a result, local and private sports facilities may be activated Fifth, the sports activities of users can contribute to the revitalization of the local economy by purchasing sporting goods and food items. Sixth, data generated while using such a user matching system can be analyzed and used to improve tourism content services and establish tourism industry policies.

## **2. Related research**

Hybrid apps have several meanings. First, it means to provide a structure in which applications running on various platforms can be created through one implementation process. And it means to provide a method to increase application implementation efficiency by mixing technically native language and general-purpose language supported by all devices. Recently, it is often defined as a hybrid app that implements an application using web technologies such as HTML, CSS, and JavaScript used to compose web pages based on web kits and web views, and creates this app as a native app. If the hybrid app provides only the functions provided by the web using only web technology, there is no difference to distinguish it from the web application. However, the hybrid app framework on mobile provides a separate API that enables the use of mobile functions by using not only the functions provided by the web, but also the extensibility provided by web kit. Therefore, it is possible to control location information, geomagnetic sensor information, and various notification devices through GPS. The definition of the hybrid mobile app framework is as follows. It provides a separate API for accessing mobile-specific functions while enabling web technology to be used for mobile development, and serves to generate the source code created using this as an executable app on the same specific mobile operating system as the native app. The main reason why the hybrid mobile web framework has recently attracted attention is the standardization of web technology. In other words, standardization of HTML5 and CSS3 is rapidly progressing in an effort to implement the same web technology on all devices employing desktop PC, mobile, and other embedded OS. In addition, the speed of adopting standardized technologies in each browser or mobile is also progressing very rapidly. The standardization that allows HTML5, CSS3, and JavaScript to access native resources on mobile or application devices can be referred to as "standard web technology". It can be said that the development of the standard web technology is promoting the emergence and development of the hybrid mobile app framework [7].

## **3. Proposal System**

### **3.1 System configuration**

In this paper, we propose a hybrid app-based user matching app for activating sports tourism and how to utilize it for sports tourism in accordance with the growth trend of the sports industry. The proposed app collects sports facilities of local governments and private sports facilities in one place and subdivides them into sports categories. And you will be able to form new teams for each event or join existing teams. The team leader is matched by either booking a sports facility for the opposing team to challenge or applying to the opposing team. In other words, with this app, you can support personal match matching, team building, matching, etc., and even reserve sports facilities at once. Also, you can enjoy sports alone without a club or friends.

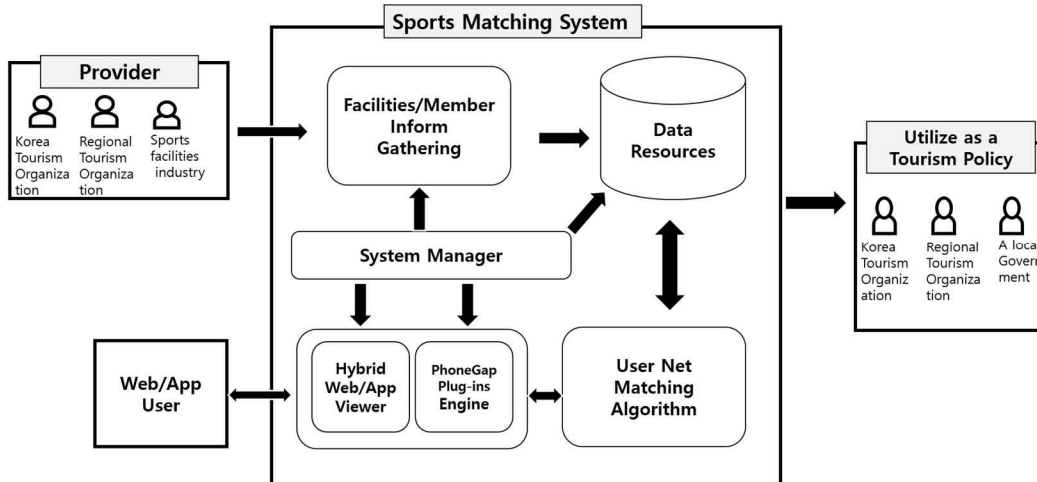


Figure 1. Sports Matching System Diagram

The following is the configuration diagram of the sports matching system. The provider consists of Korea Tourism Organization, Regional Tourism Organization, and Sports facilities industry. Provider provides Sports Matching System location, operating hours, facility information and usage status to Sports Matching System in real time.

- **Hybrid Web/App Viewer, Phone Gap Plug-ins Engine:** Allows users to send and receive necessary information using a hybrid app viewer.
- **System Manager:** The person responsible for the management of the use of the sports matching system and can read and modify the information of the system. It is responsible for allocating user accounts and passwords, setting security access levels, and allocating storage space. It also prevents unauthorized access and viruses.
- **Facilities/Member Inform Gathering:** Collects and purifies data so that the information provided by “provider” can be used smoothly in the system.
- **Utilize as a Tourism Policy:** Transmits the data of the sports matching system to Korea Tourism Organization, Regional Tourism Organization and A Local Government. Here, after identifying the most popular facilities or events from the data received, it is used as a tourism policy. □

### 3.2 Operation process

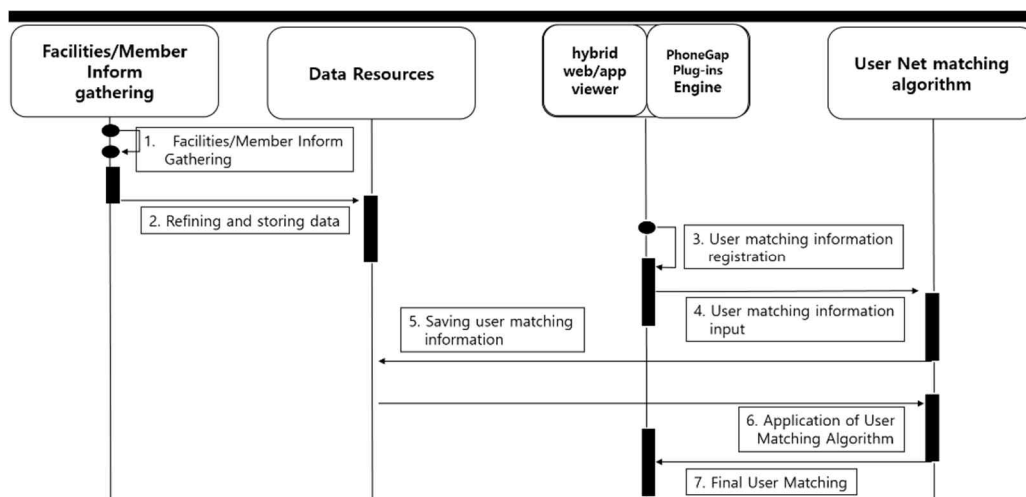


Figure 2. Operation process

First, Gathering sports facilities and member information. Second, Refining and storing data in data resources. Third, User registers user matching information in the hybrid app viewer. Fourth, User matching information is input to the algorithm. Fifth, User matching information is saving in a data resource. Sixth, Application of user matching algorithm. Seventh, Final user matching result is displayed in a hybrid web/app viewer.

### 3.3 User Net Matching Algorithm

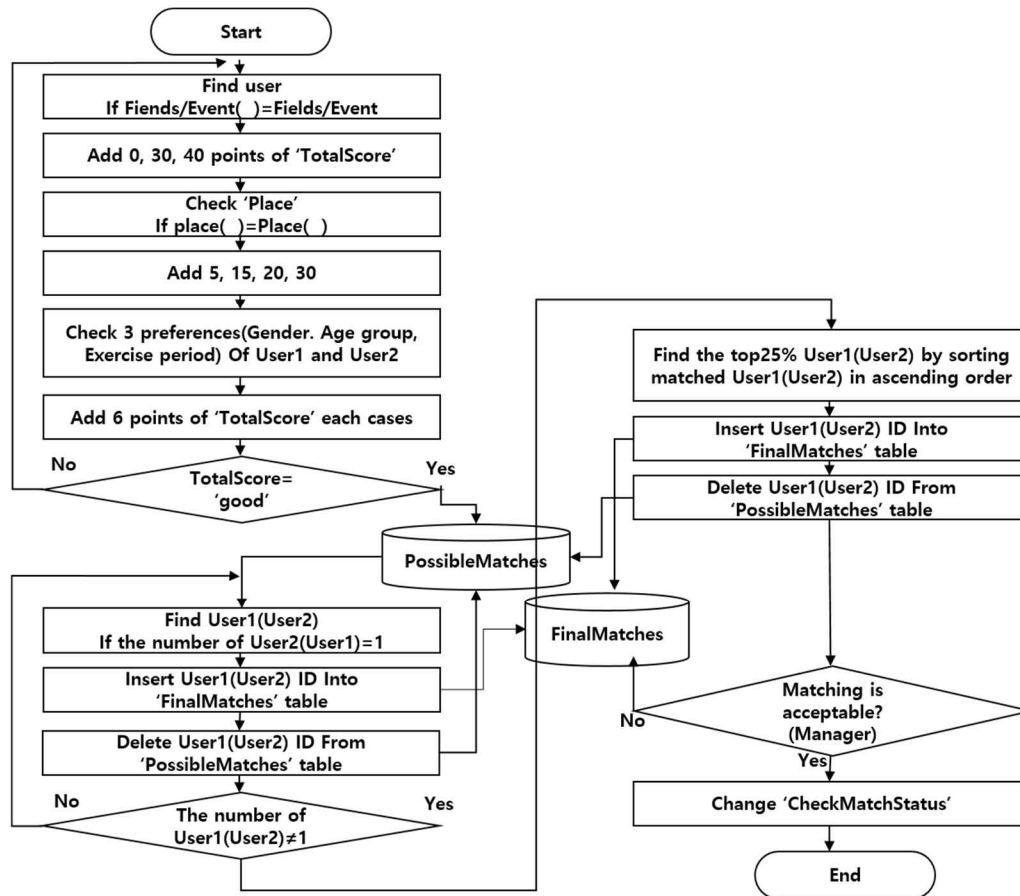
User Net Matching Algorithm gives matching score according to the preference of place and event. The matching scores to be given are given in Table 1 and Table 2. Gender, Age group, and Exercise period are each awarded 6 points depending on whether they match.

**Table 1. Hope place**

Score	User 1	User 2
30	Hope place 1	Hope place 1
20	Hope place 1	Hope place 2
15	Hope place 2	Hope place 1
5	Hope place 2	Hope place 2

**Table 2. Event**

Score	User 1	User 2
40	Event 1	Event 1
30	Event 2	Event 2
0	Event 1	Event 2
0	Event 2	Event 1



**Figure 3. User Net Matching Algorithm**

The matching algorithm assigns a matching score according to the event, the desired place, and the user's preference. Table 1 and Table 2 give the matching scores. The order of the algorithm is to find the users who selected the event first, and add 0, 30, and 40 points to the total score based on the scores in Table 1. In addition,

the users who selected the location are added 5,15,20,30 points to the total score based on the score in Table 2. and, the user's 1 and user 2's gender and age-based athletic careers are checked, and if the information of user 1 and user 2 in each case matches, 6 points are added to the total score. If the total score is not 'good', repeat this process from the beginning and if it is 'good', register it in the PossibleMatches table. Then, if the number of users 2 is 1, user 1 is find. Then, insert User1's ID into the FinalMatches table and delete User1's ID from the PossibleMatches table. If the number of users 1 is 1, proceed from PossibleMatches again. If not, the number of matched users is sorted in ascending order to find the top 25% of users. The user1 ID is inserted into the FinalMatches table, and the user1 ID is deleted from the PossibleMatches table. Finally, the matching algorithm is achieved by the administrator checking the results of the algorithm.

#### 4. Application example

The bellow Figure is proposed the app interface in this paper. It is a hybrid app-based interface and a user matching system is applied. The structure of this system is as follows.

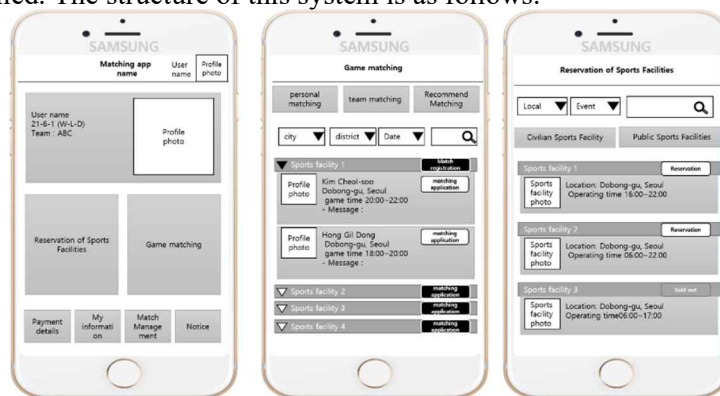


Figure 4. Suggested app interface (1, 2, 3)

- (1) Is the main screen of the proposed app. Users can enter and manage personal information through the app, and reserve sports facilities or match users.
- (2) Is individual and team matching and recommendation matching using the user net matching algorithm of this paper can be performed.
- (3) Is you can check real-time information of sports facilities by category and make a reservation.

#### 5. Results

In this paper, through the system of the proposed app, it is possible to play sports without a club or a friend belonging to it. In addition, it provides information of sports facilities to users and enables real-time reservation and match matching. The proposed app in this paper presents six ways to use it to promote sports tourism. First, the manager of the app can activate sports tourism by holding sports events by selecting sports with active matching. Second, through sports events, Sponomics can be fostered where sports and cities grow together. Third, the proposed app can be applied to the tour course as a sports experience item for the existing sports tourism course. Fourth, real-time reservation is possible using the proposed app, and user-matching system can be used to provide mobile oriented sports convenience to relieve the inconvenience of the existing reservation system. As a result, local and private sports facilities may be activated Fifth, the sports activities of users can contribute to the revitalization of the local economy by purchasing sporting goods and food items. Sixth, data generated while using such a user matching system can be analyzed and used to improve tourism content services and establish tourism industry policies.

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