UNIVERSITY OF
BIRMINGHAM

Human Computer Interaction

Unified Sports Booking System

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Abstract

If you currently want to book sports facilities, the only way to search is directly through the individual sports center's websites, or through direct communication. If someone is flexible in the location or choice of sport, they are required to search multiple locations to find the best compromise.

In addition to the difficulties of checking multiple websites, often each of these websites are unintuitive and difficult to use, requiring the user to know exactly when and where they want to use the facilities and often not giving clear information about other possible factors such as cost.

Here, we propose a new, unified interface for finding a time, location and the cost for playing any of a number of sports, at any of the available locations within a given distance or relative to a different location.

Contents

0.1 Current Booking Applications

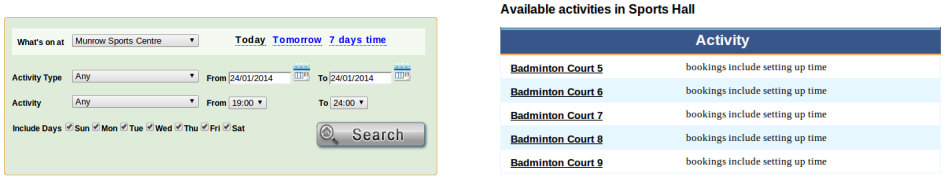
Our application will allow searching across multiple organisations, locations, times and sports to provide available bookings. There are currently no applications that allow searching across multiple organisations' facilities for available sports bookings. There are, however, web applications for specific organisations which:

- have multiple locations, each with many available sports to play,
- have a single location with many sports to play,
- have multiple locations with a single sport to play.

There are also web applications which allow for searching of different facilities but offer no information on available bookings beyond providing contact information for each facility.

0.1.1 University Of Birmingham Sport

The University Of Birmingham has an online booking system for numerous sports available to play at facilities at its campus in Edgbaston [5]. This site allows search by location, type of activity and time. Once the user has entered their search criteria, a list of "activities" are returned. The user then selects an activity and is shown a timetable indicating at what time this activity is available. The activity can then be booked directly on the website.



(a) *Search form* **(b)** *List of results*

(c) *Timetable of available bookings*

Figure 1: *The booking interface for University of Birminghan Sport*

Strengths

- The search form has tick boxes to filter out particular days of the week. A user may only know which days of the week they want to play a sport rather than exact dates. This feature gives the user a quick way to search for this.
- There are quick links on the form to change the date ranges to either today, tomorrow or 7 days time. When a group finishes playing a particular sport one week, they may want to

Figure 2: *Display when the 18:00 two hour slot is chosen. However, only one of two hours following 18:00 is available*

quickly see what is available at the same time the following week; these quick links speed up the process of finding these available bookings.

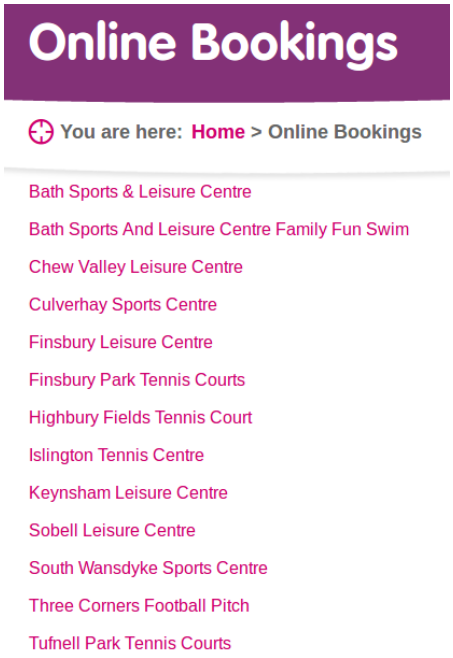
- It is possible to search solely by time, leaving all sport and location fields blank. If the user knows they want to play a sport at a particular time, but would like to have options on sport and location, the search form in figure 1a allows them to search this way.

Weaknesses

- The option to filter by "activity type" in the search form is actually a filter for location and many of the locations host a variety of different sports. Furthermore, the names of these locations, such as "Sports Hall", often offer no clear indication of which sports are available at a particular location. If the user wants to know what sports are played at a particular venue, they have select that venue and then see which options then appear under the "Activity" drop down box of the search form. This is confusing and unintuitive for the user.
- For many sports, such as badminton where there are multiple courts available for badminton across several locations, there is no way to simply search by that sport. The user is required to go to each court individually to see what times are available for that court. The user is unlikely to have a court preference and most likely just wants to know at what times they can play badminton; this system offers no quick and easy way to do this.
- The timetable results groups times into two hour slots but often each booking slot is one hour long. It will show 'available' for a two hour slot when at least one of those two hours is available. Therefore it is impossible to know if the exact hour a user wants to play is available without selecting the containing two hour slot as shown in figure 2.
- There is no indication of price until you select a booking slot for a particular sport at a particular time.

0.1.2 Aquaterra Leisure Centres

Aquaterra is a charity funded by Islington Council who manage several leisure centres and other sports facilities in Islington, London. They maintain a website [2] where users are able to book at each of these facilities. The booking home page shown in figure 3a prompts a user to select which of the locations they would like to make a booking at.



(a) *Aquaterra booking homepage*

(b) *Facilities available at Sobell Leisure Centre*

Figure 3: *The booking interface for Aquaterra Leisure Centres*

The interface for each of the locations varies slightly, but each will generally show a list of available activities at that location that can be selected to display a timetable of available booking slots within the following week for that particular activity. The price is displayed at this point and the booking can then be made directly on the website after choosing a preferred court.

(a) *Beginning of timetable showing available badminton slots*

(b) *Confirmation page for a booking slot showing price and choice of courts available*

Figure 4: *The booking interface for badminton at Sobell Leisure Centre*

Strengths

- If a user knows the location they wish to play at and the sport they wish to play, then they can see on one page everything that is available to them in the next week. Rows being coloured alternately and having the time displayed at both sides of the timetable makes it

easy for the user to navigate to a particular time slot at a glance.

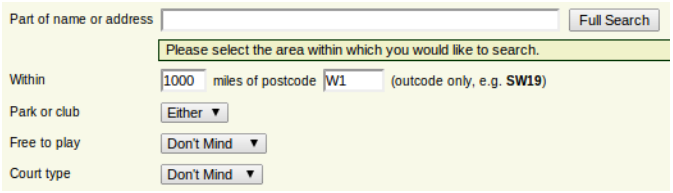
- The timetable for badminton in figure 4a indicates how many courts are available within each slot. If very few courts are available in a preferred time slot, it could indicate to the user that they need to make a quick decision as those courts may soon be booked by someone else. Conversely, if there are many courts available it could indicate to the user that they could delay making a decision on which time to book a court. Providing the user with this information early in the search process could be very helpful.

Weaknesses

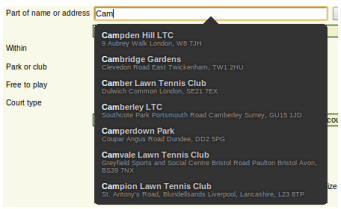
- When selecting a location from the page in figure 3a, there is very little indication to the user what sports are available at which location. Therefore if they want to play a particular sport but have no location preference, they are required to go through each option on the homepage to compare what facilities are available for that sport at each location. Furthermore, as each location's page has a slightly different interface, the user has to make sense of each page separately, slowing down their ability to compare information provided for each location.
- There is no indication of price until you select a particular sport at a particular time.

0.1.3 London Tennis

London Tennis is a website designed to help tennis players in London find partners to play with, as well as tournaments to play in and courts to play at. The court search feature in figure 5a allows a user to search for a court anywhere in London including options to search by cost of playing, location and type of court.



(a) *The search form for looking for a tennis court*



(b) *Drop down to predict input when typing a name of a court*

Figure 5: *The search form for London Tennis*

There is also the option to select courts from a map, as shown in figure 6. Users can filter out courts which are free or not free. However, there are no other interactive features on this map. Once a search is performed, the user is shown a list of courts matching their chosen criteria as seen in figure 7a. Once a court is chosen, the user is shown details about the court including exact location, type of court, price and weather predictions for the local area.

Strengths

- The user is able to show only free courts straight away without having to complete any other aspects of the search. This is in contrast to other sites we have seen so far and allows

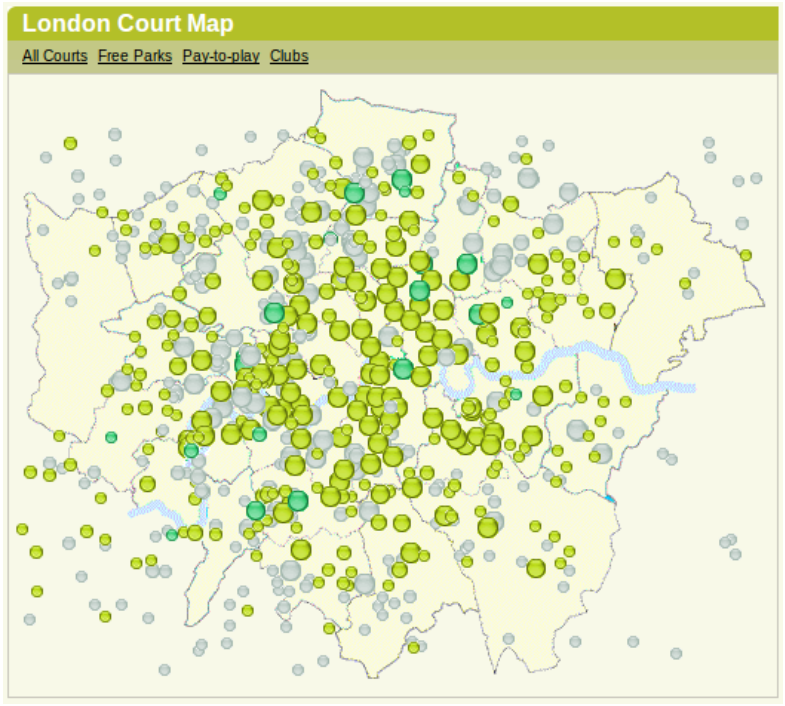


Figure 6: *All courts by location on a map with the ability to filter between free and pay-to-play courts*

the user to immediately filter by something that is potentially a deciding factor in choosing a court.

- The weather predictions are a useful addition given tennis is very much dependent on good weather.

Weaknesses

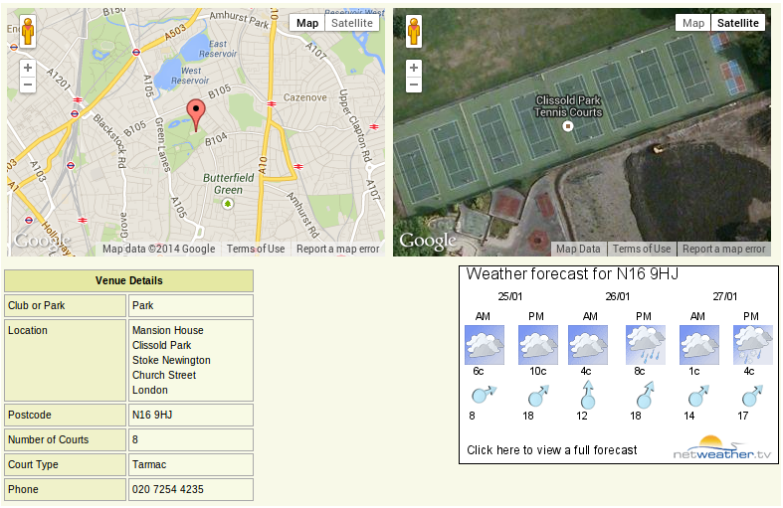
- The size of the map for searching in figure 6 is too small for the number of courts shown on the map, particularly given there is no option to zoom in to more detail on the map. Though the map does give, at a glance, an idea of where courts are concentrated in London, it is difficult to actually select a court due to how close the buttons to select each court are to each other.
- There is no information about opening times for any of the courts. Although London Tennis is primarily a service to find court locations rather than provide details about available bookings it would be useful to inform the user of when the courts are even open.

0.1.4 What we can learn

- It could be useful to add options to filter by day of the week in addition to buttons that quickly allow searching by times relative to today such as tomorrow or one week from now as this is possibly be one of the main criterias of the users search.

Club	Address	Postcode	Club or Park	Courts
Clissold Park	Mansion House, Clissold Park, Stoke Newington, Church Street, London	N16 9HJ	Park	8
Hackney Downs Park	Downs Park Road, London	E5 8NP	Park	3
Millfields Park	Millfields Road, Hackney	E5 0AR	Park	4
Spring Hill Park	Spring Hill, London	E5 9BL	Park	3
Springfield Park	Spring Hill	E5 9EF	Park	5

(a) *List of courts matching a search*



Venue Details	
Club or Park	Park
Location	Mansion House Clissold Park Stoke Newington Church Street London
Postcode	N16 9HJ
Number of Courts	8
Court Type	Tarmac
Phone	020 7254 4235

(b) *Details about a chosen court*

Figure 7: *The displays for results of a search*

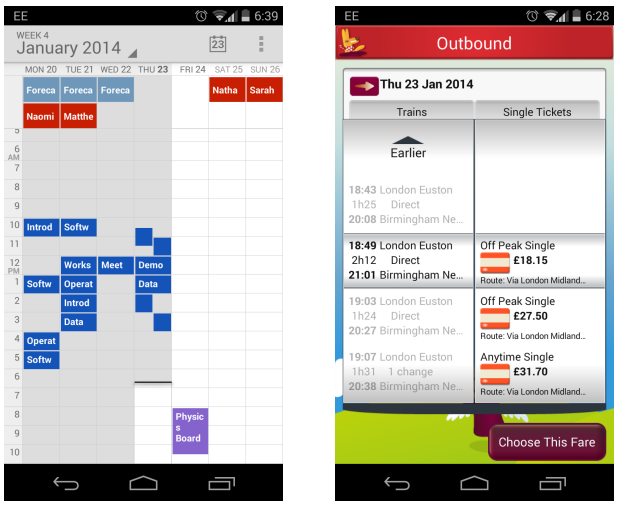
- The naming of options to filter by when searching need to be intuitive and unambiguous otherwise it is difficult for the user to know how to actually search for what they want.
- Using a timetable layout similar to figure 1c could create difficulties in clearly displaying all available options after a search is done. There may be far more booking slots to display in our app given that our search will be conducted over a greater number of facilities. The screen space available will also be smaller than University of Birmingham has on their website. Therefore we need to think of a clearer way of showing the user the results of a search.
- Price is likely to be a factor in a user's decision of what sport to play and where, therefore our application needs to either provide a filter to search by price or clearly indicate the price of a booking option as early as possible when displaying results to a user.
- If we are to use a map to display results of a search, it will be difficult given the potentially large number of results to display every option individually on the map, particularly if the map covers a large area. Therefore it may be better to group options together - possibly by colour, or different shapes or picture icons - in order to make it possible to read and navigate through the results.
- Weather could be an important factor when a user knows when they would like to play a sport but want to compare what sports are available at that time. When a user is looking at search results for outdoor bookings, it could be useful to display weather predictions for that time, particularly if the search is in the near future as predictions are likely to more accurate for the near future.

0.2 User Input

In order to present the user with useful information, our application will have to accept information from them to be processed. This is done by means of forms, text input and buttons. To maintain a clean, intuitive user interface, a simplistic approach is often taken to reduce the thinking time required to process information on a single screen. If more information is required, multiple screens are often used.

0.2.1 Timetables

A common set of information presented to a user which represents a considerable challenge, particularly on small screens, is a timetable of available or appropriate times. When too much information is displayed on a single screen, this can become confusing or impossible to read. For example, in figure 8a [3], despite a single hour being a common appointment length, the text for these slots is hidden entirely.



(a) *Google Calendar* **(b)** *RedSpottedHanky*

Figure 8: *When too much information is displayed on a screen, it can be hard to read and interpret, whereas condensing the information and splitting it so that only currently appropriate information is shown makes it much easier to understand.*

A common way to improve the readability of theses complex structures, which often contain a large quantity of data, is to have graded selection of that data. In other words, where there is an option to refine a search to reduce the data needed to be displayed, only display the immediately relevant information, but with simple navigation to other relevant data.

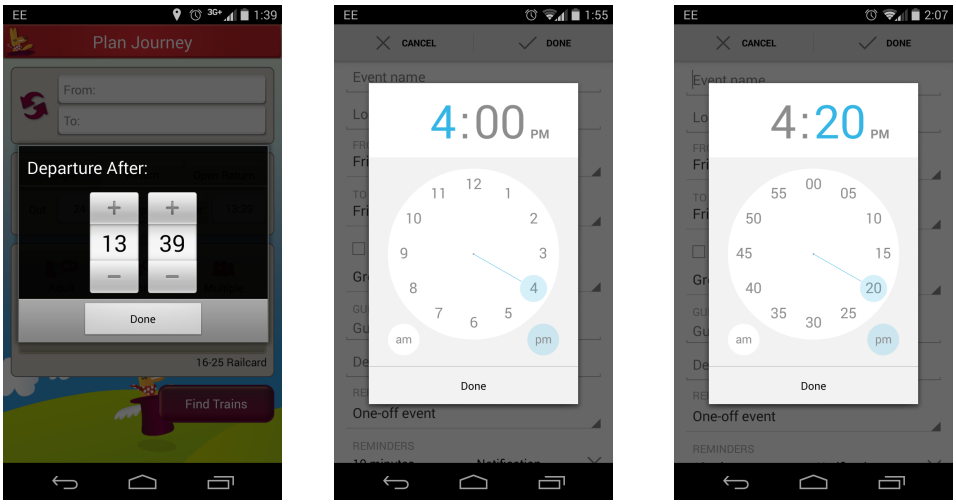
This method can be seen clearly in the RedSpottedHanky.com application, figure 8b when a user is searching for tickets for a specific date and time. Although there may be many trains within a narrow time gap, the application shows a small number of tickets with the option to move either earlier or later. Each ticket time is also associated with a number of options relating to ticket price. These are shown only for the currently selected ticket time.

0.2.2 Date/Time Selection

In order to reduce the search range, often a date and/or time selection dialogue is used. Figure 9 shows two methods this is achieved.

Figure 9a, on the right is an example, again from RedSpottedHanky [4], which shows the time selection associated with booking a train ticket. This design fails since the method of changing the time requires very close control if accuracy is required, and is time consuming if the desired time is far from the currently selected time. The movement is performed in single increments or decrements of the hours and minutes. This is despite the functionality described above which lets the user view and switch to other trains at nearby times.

Figures 9b, in the middle and 9c on the left are examples from Google Calendar which shows how the process can be made much more intuitive, simple and fast, through the use of separate screens with large and clear selection. This selection is much easier to navigate than the scrolling method used.



(a) *RedSpottedHanky* **(b)** *Google Calendar* **(c)** *Google Calendar*

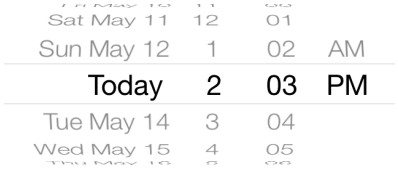
Figure 9: *The time selection for RedSpottedHanky requires the user to spend to much time selecting the time when larger increments could be used to smoothen the process. Google Calendar, on the other hand, allows simple and fast selection of the hours and minutes through separate screens.*

A combination of both of these is used in the stock iOS, shown in figure 10 [1] where a much easier to navigate scrolling mechanism is used. Though this can still cause the user to spend more time selecting the correct number, the fact that the used can "flick scroll" though the numbers means reaching a value that is far from the currently selected one is much quicker than the RedSpottedHanky application.

0.2.3 Forms

When entering information that is not limited to a small set of possible values, sunch as a name, location or arbitary number, a form must be used to accept the user input. Since touch screens rely of the user being able to navigate to to correct form section, the input must be of sufficient

(a) *RedSpottedHanky*

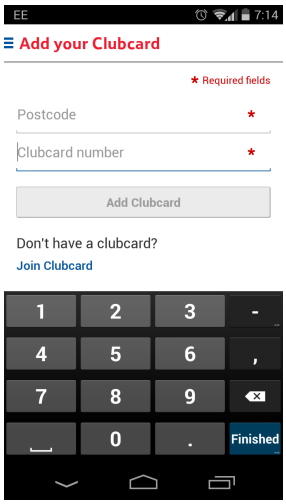


(b) *Google Calendar*

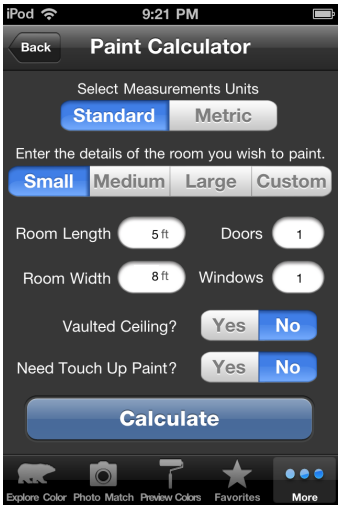
Figure 10: *Stock iOS date and time picker is easier to scroll through, but still requires more time than selecting the appropriate number.*

size to allow this movement easily. Firgure 11a show a simple form with two input boxes. Each has a clear border around it so the the target for interaction is easier to tap.

An important consideration that has been made here is to specify that, for the second set of text input, the data is strictly limited to digits. For this reason, the keyboard switches from a general purpose "querty" keyboard to a purely numerical version. Again, this assists the user, both by indicating that only the provided digits are acceptable, and making the input of those digits easier (often the numbers on a touch screen keyboard are only accessible by switching modes).



(a) *Large, easy to access text entry*



(b) *Crowded interfaces make entry more difficult.*

Figure 11

References

[1] Apple Inc. (2013). iOS 7 Date Picker. Retrieved from `https://developer.apple.com` 24-01-2014.

[2] Aquaterra Leisure (2013). Aquaterra Online Bookings. Retrieved from http://www.onlinebookings.aquaterra.org/.

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[4] RedSpottedHanky.com (2014). redspottedhanky. Retrieved from https://play.google.com/store/apps/details?id=com.redspottedhanky. Version 1.72.00 [Mobile application software].

[5] University of Birmingham (2014). Munrow Sports Centre Bookings. Retrieved from https://www.usbonline.bham.ac.uk/.