UbiSports Project Proposal

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Figure 1. This is a sample figure

ABSTRACT

TODO ALL Short description of your project idea. What is the problem, how do you plan to solve it? **Feel free to add sections / subsections to the document.**

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; See http://acm.org/about/class/1998/ for the full list of ACM classifiers. This section is required.

Author Keywords

sports technologies; ubiquitous computing; navigation; city exploration; endurance sports; motivation

LATEX STUFF

$$AFormula = \{1,2,4,7\} \quad Y = \{3,5,6,8,9,11\}$$

and the Relation

$$\mathscr{R} = \{(a,b) \in D^2 | a \neq b \wedge c = a + b \; with \; c \in Y\}$$

A reference [2]

- A
- simple
- list

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INTRODUCTION

TODO DING
Introduction of problem, motivation and goals.

MILESTONES

TODO MARC
Milestones you want to reach.

EQUIPMENT

TODO ALL
Which equipment do you plan to utilize?

RELATED WORK

In the following section, we will examine previous work done on the topics of route planning, (urban) exploration and motivation in sports and sightseeing. While the former two will give us an overview over different approaches to navigation and goals in exploration, the latter will help us design our prototype in order to motivate users to explore the area as well as complete their training routine and become better athletes.

Route Planning

Route planning has become a very hot research topic in mobile HCI because of the rise of smartphones, smartwatches and other wearables. Pedestrian navigation is particularly interesting because it is much more diverse than the regular turn-by-turn navigation used in car navigation systems.
McGookin and Brewster have done an analysis on how runners navigate the environment and presented a novel navigation system for runners [4]. Their main finding was that there are two types of running practices. Familiar location running is characterized by loops (i.e. circuit tracks) and runners usually plan the route beforehand but only use their mental model of the environment while running. On the other hand, unfamiliar location running is not in a loop but in back runs (i.e. runners go from A to B and then the same way back to A). This is a problem, because unfamiliar location running is mainly used "as a way to explore the environment and identify places to later visit". Our approach will address this problem by giving the runners the opportunity to explore new areas and at the same time see as much as possible by not running the same way back again.
In order to provide a good running experience, the route has to be selected carefully. There are many approaches that not

only work on distance or time to calculate a route but also take into account other factors. Stolfi and Alba noticed that most navigators used the same route leading to traffic jams [10]. They proposed a system that uses traffic data to re-direct cars in order to spread traffic more evenly leading to a better traffic situation. For instance, they improved travel times by 18% and greenhouse gas emission by 14%.
Katayama et al. took a similar approach and navigated visitors of events using body-worn sensors in order to avoid congestions and other problems that are difficult for event managers [3].
There are web mapping services such as Strava (www.strava.com) and Komoot (www.komoot.com) that also provide information about the surface of the track in order to better plan the route. For instance, cyclists can easily identify off-road streets and plan their route accordingly.
As an extension to those online services, Daiber et al. have proposed a concept of pioneers to support mountaineers in their route planning. The idea is that you can select a number of friends of experienced mountaineers called Pioneers. The user will see the routes they have recently taken and can incorporate them into their own route planning [1].

Exploration

As already identified by McGookin and Brewster, exploring the environment is an important motivational factor for runners [4]. In familiar location running, the main objectives are to meet a distance, time or place target rather than enjoying the environment. However, when the user is in an unfamiliar location, these objectives are reversed. They find that this is mostly the case on holidays, however, we want to find out whether we can get athletes to take unfamiliar routes and explore areas of cities where they have been living for a longer period of time as well.
Robinson et al. have implemented an approach where they encourage people to explore the area by giving different haptic feedback when they can take alternative routes [8]. They could show that people reach their target with only low-resolution haptic feedback and providing users with alternative path awareness is also beneficial.
In the same way, O'Hara could identify discovering and exploring new places as one of the main motivations in geocaching [5]. The targets geocachers are looking for are often hidden in special places that are particularly beautiful but also abandoned places such as factories or hospitals.
There has also been a movement called urban exploration movement where people go to and explore abandoned places [6]. The growing interest in geocaching and urban exploration shows that people care about the environment they are living in and want to find out more about it. To support this, Quercia et al. have build a system to determine aesthetic qualities of a city [7]. They used this data in a navigation system where users are guided through particularly beautiful, happy or quiet areas.

Motivation and Design

When designing our system, we must not forget about what motives people to do sports in the first place. It is important to provide a way to explore the city as motivation but this alone will not encourage athletes to use our system in their regular training routine. We will try to incorporate several motivational factors into the design of our system.
Vallerand et al. have identified three psychological needs which are the reason why people take part in sports [11]. Those needs are the need for autonomy, competence and relatedness [12]. The need for competence is satisfied by giving the athletes regular success and not make them fail all the time. Some competition is good but overall the training climate should be mastery-oriented and not highly competitive. The need for relatedness is satisfied by providing means for athletes to cooperate, share and do activities together. Giving the users some freedom of what they want to do satisfies their need for autonomy [11].
In a similar fashion, Ross and Iso-Ahola have identified knowledge seeking and social interaction as the dominating motivation force in sightseeing. The take-home-message from their research is that it is important to teach users something while they are exploring and at the same time give them the opportunity for social interaction [9].

EVALUATION & TESTING

Testing and Evaluation will be a key part of our project. We will split this into three parts.

First Part

The first part starts soon. Therefore we will find five to ten athletes that participate in our study. If that works we will work together with the triathlon squad here in SaarbrÃijcken. Each athlete will give us the permission to get their tracked Strava activities for research purposes. We collect the data for about ten days or two weeks and want the participants to write a training diary in this time. The advantage with the triathletes would be that they do training frequently also in winter.

Second Part

The second part of the study will be around February. Then we will tell the participants, which product we are working on and give them admission to our web tool. Now they will do the same thing as before but with our software. This time the goal is to make them familiar with the tool and have them use it. After the had an introduction to the tool the participants start another ten days or two weeks this time using the software and writing diary also concerning the software. Our hypothesis is: Our tool will help athletes to get to know new places in a city.

Third Part

The third part will be the evaluation. After our software finally works we can now also calculate the âĂIJblack map that fades awayâĂİ with the gathered data from part one. So we can easily compare the two maps from part one with part two and do this with each athletes. To get more feedback we will also conduct semi-structured interviews with them or give them questionnaires of about two pages. Then we can also avoid complications like if an athlete was ill in one of the two parts or had other reasons not to use our software often we can consider this in the evaluation Then we can see whether the athletes could discover new areas by looking at the two maps and either support or reject our hypothesis.

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