

Short Report

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Challenges and Opportunities in Designing Experiences for Advanced Amateur Sportsmen

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Abstract: While new technologies supporting the experience of sports appear every day, we still do not have a full understanding of how to design technology that augments the experience of physical exercise. As more and more users practice sports in western societies, interaction design must learn to readdress the practical, social, physical and psychological aspects of sports. In this paper, I reflect on my past studies in the nascent field of designing interactive technologies for advanced amateur sportsmen. I share the practical challenges involved in augmenting experiences of training and race day performance. I discuss issues of qualitative experience, community, motivation and temporality to highlight where current sports technologies are insufficient. In particular, I focus on the experiences of those already involved in training routines and place less emphasis on beginners or those who need to be convinced to practice sports. I then discuss reasons for the difficulties involved in developing sports technologies and propose potential solutions to those difficulties to identify ways to move interaction design for sports forward.

Keywords: HCI for sports, running, interaction design, physical activity, essays

Yet, are these technologies designed with the user in mind? How can we understand the experience they offer and learn how the user experience of sportsmen can be improved through technology? In this brief report, I reflect on my past design efforts in augmenting the sports experience and attempt to identify the key challenges that lie ahead for designers interested in engaging in building interactive systems for sports. This essay is organised as follows. First, I present four practical challenges for current sport technologies that surfaced from my research work. I then look for reasons why addressing these issues is a challenge to the interaction design community. Finally, I propose new potential ways forward to design sports technologies that may help stimulate development in the area.

Key issues	Ways forward
Embracing the qualitative experience	Focus on field studies
Helping build sports communities	Working with sports psychology
Supporting motivation management	Embracing sports ethnography
Designing for temporality in sports	Using concepts from kinesiology

1 Introduction

Designing for sportsmen has received more and more attention in the Human-Computer Interaction (HCI) community for some time now. Notably, researchers at the CHI conference have been running in search of breakthroughs in sports technologies since 2013 [7] and Genevieve Bell's revered keynote in 2010 [1] clearly indicated that not enough attention was directed to supporting those engaged in physical exercise. Concurrently, the commercial world has contributed with a multitude of mobile applications for training (e.g. Runkeeper or Nike+) and numerous gadgets that are designed to support those physically ac-

2 Challenge: Number-Driven Sports Technology

A typical training application experience is rather simplistic. Most applications relay on the same principle: GPS position data is used to record the route of the workout and the movement of the user. Numerical metrics are always treated as most important (see Figure 1 for an example). While, indeed, pace figures are quite important for runners, bikers and cross-country skiers (especially for the advanced ones), most applications pay little attention to other aspects of the experience. In contrast, our research has shown that many users pay much attention to what cannot be described by numbers [6]. For example, when reminiscing a run, many runners reported meeting other

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runners as a key thing to remember. Others reported the pleasure of knowing their physical environment very well and not having to think about navigation (“treading trodden trails”). Recently, some efforts have been made in capturing the more qualitative facets of a workout experience. For example, Runkeeper allows for taking photos mid-run to be saved with the activity record or even uses basic experience sampling at the end of a workout in the form of smileys. In our work on fostering motivation for runners [6], we observed that the running experience was multifaceted and the account provided by common workout applications was too much of a simplification. Running applications failed to capture the experience of the surroundings or the weather on a given day, which users considered an important part of their impression of the workout. Further, many recognized that keeping a training journal was an idea that was hardly implementable together with a fast-paced life and thus believed that providing textual descriptions of how one felt after training was ineffective.

Consequently, it can be observed that more design efforts are needed in order to capture the essence of the sports experience and enable users to effectively reflect on their activities. Future work should consider incorporating new sensing modalities and supporting extensive storytelling (i.e. building reminiscence tools that support telling the complete story of a training session). One direction I explored in my work is using life-tracking cameras for reminiscence [10]. While we observed some positive results, there is still potential for sports technology to embrace reflection.

3 Challenge: Embracing the Temporality of Sport Experience

A quick look at common sports tracking applications reveals that they offer a very unified experience irrespective of the sport practices, time of day or any other contextual cues. Yet, in real practice, routines vary daily. High-volume training, recovery periods and race days affect the needs of sports. Surprisingly, while race-day running shoes are easily available and marketed as indispensable to the ‘serious runner’, race-day smartphone applications are a rarity. In our work, we looked at how climbers, skiers and runners managed activity-related information [12]. We found that their needs changed according to the activities scheduled for a given day. Furthermore, special requirements existed for special occasions. Skiers collected more video data when the snow was fresh and particularly beautiful. Climbers took photos and made diary entries when



Figure 1: The Runkeeper post-workout analysis view. Current sports application offer a number-centred experience with little potential for qualitative reflection. Thus, users are guided to focus on numbers rather than telling the story of what happened in a training session.

climbing a given ascent for the first time. Runners wanted to share more information on race day and required less support for a recovery run. These observations suggest that sports technology should offer more customised experiences based on contextual cues. Emergent interfaces should attempt to blend into how a given day is planned and augment the desired activity instead of providing the same approach to multiple types of activities.

4 Challenge: Insufficient Support for Communities

Everyday training is not a lonely task, despite the set of features that current sport technologies provide. First, many amateur sportsmen are members of training groups and part of an active community. Yet, little technical support

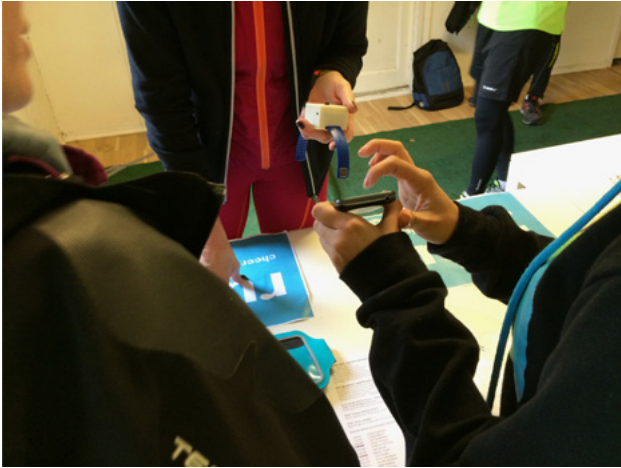


Figure 2: RUFUS enabled supporters to communicate with runners remotely using a dedicated wearable device, a smartphone application and web platform.

is offered for those groups. Community members often use and appropriate generic tools like forums or Facebook groups to coordinate activities. In our work, we studied a high-intensity exercise group that resorted to developing their own exercise support technologies. Without a design background and using crude and mostly analogue technologies, the group developed a complex gamification system that provided motivation and coordination. As lead users begin to innovate, we can see great potential in improving the user experience of sport communities.

Furthermore, not only other runners are excluded from the technology-supported sport experience. Current sport support technologies seem to forget about those staying at home when the athlete leaves for a training session. Those involved in sports are always part of families or other social constructs. Yet, current interaction with supporters is very limited and mainly implemented through passive live positions broadcasting. While research has explored making physiological data available [3], current practice is very limited. For most, the social experience of a close one practicing sports is the 20 seconds when they pass by during a race.

Having focused on the supporter experience, we designed new systems to enable supporters to have a more active role in training. We built RUFUS [11] – a wearable device that enabled two-way communication between a runner in a race and their supporters (see Figure 2). While it is a preliminary effort, it did show that supporters were willing to be more involved and they reportedly understood more about the runner. Concurrently, runners not only felt supported during the run, but they believed that the system enabled their everyday training efforts to be

better recognised. With numerous projects showing that in-run communication is possible and desirable, it is time for commercial systems to embrace the supporter perspective and build tools that enhance participation.

5 Challenge: Understanding Motivation

Sports motivation is a very complex construct that is not sufficiently supported by current technologies. Mobile applications mainly offer very simple goals (e.g. ‘run 40 kilometres this week’) or provide very basic gamification experiences. While those starting to engage in physical activity can benefit from multiple apps that offer games and exercise plans, advanced amateurs are usually left with raw statistics. A notable exception here is ‘Zombies, Run’. This interactive storytelling experience that enables players to run away from zombies that can be heard in the runners headphones provides enough immersion to attract even the fastest runners during rest periods [5]. Yet, designers of current sports support technologies, mostly ignore the complex motivations of advanced amateurs that enable to maintain a training schedule and improve their results.

We found that sources of motivation were very diverse, including togetherness, the festival atmosphere of races, the need for inner peace or competition. In our work, we conducted interview studies with runners to see how maintained motivation was crucial in long-term training routines and how digital tools did not support the users in juggling the practicalities of organising work and family life, social commitments and training. A clear area for design intervention emerges out of this lack of support. Future applications should embrace the intricacies of motivation and provide support for intrinsic and extrinsic motivation, on a social and individual level.

6 Opportunities: Addressing Diversity

One might wonder why current sports technologies are still not providing the services users apparently desire. An increasingly larger population is practising sports regularly and sport event participation is at an all time high, so the market for sports technologies is growing as well. Concurrently, research takes more and more interest in advanced amateur sportsmen. This would make one expect that interactive technologies should be rapidly improving.

The analysis below, however, presents a rather opposite assessment.

The difficulties of understanding users and conducting studies with sports technology may provide an explanation. Firstly, physically active individuals, while seemingly similar as they enjoy the same activities, are a very diverse group. Traditional design tools, e.g. personas, which aim to identify users groups and types, may not be fully effective. Further, the diversity in performance styles, training goals and motivations requires a very customisable experience that may in turn require extensive resources to build. That may be why sports tracking applications rarely offer additional features for advanced users.

Secondly, studies that address sportsmen in a holistic manner are simply difficult and expensive. In my experience, understanding not only the performance issues of a single runner, but also their social environment that supports the running is a long and resource-intensive process. Perhaps, there is a critical mass of empathy that the interaction design community must gather before we can truly engage with amateur sportsmen. In other words, the understand phase [8] of the design process for sports technologies is particularly complex and offers an array of opportunities for in-depth research and design-driven development.

7 A Way Forward

What can be done to make sure that future sports technologies embrace the advanced amateur experience and bring satisfaction to more sportsmen? New design explorations will definitely happen given the rising market and there will be evolutionary progress. However, there are conceptual goals that can be addressed to catalyse the upcoming innovation. Here, I propose some directions that may stimulate further development in user-centred technologies for sports.

Focusing on field studies and understanding technology in a larger context may lead to addressing some of the aforementioned shortcomings of sports technologies. Designers must bravely attend and volunteer at races, observe trail race repacking points, wait on top of climbs and conduct inquiries when the snow is great to truly understand the sportsman experience.

Further, more engagement with fields usually not associated with interactive technology is needed. Despite focusing on professional athletes, sport psychology may offer many useful insights [2]. We used the sports motivation scale (which is a psychological measure) to aid in

evaluating an interactive system for running [11]. Sports ethnography contains many accounts of how individuals and groups experience sports and may help in immersing oneself in the world of amateur sports. We successfully used Shipway's [9] work in sports ethnography to drive our design-oriented inquiries [6]. Kinesiology provides insights about how a sportsman's body is affected by training and, together with physiological sensing, can be used to help users reflect on their activities. These insights were recently used by Hassan et al. [4] to build a runner posture correction device. These work show that interaction designers engaging with other sport-related disciplines can produce highly innovative artefacts that have the potential of helping develop consumer-market technologies.

8 Conclusion

In this paper, I shared some of the practical challenges I encountered in designing innovative interactive technologies for sports. I discussed the importance of the qualitative experience of sports, the need to foster communities, addressing the role of supporters, exploring the different facets of motivation and designing for the socio-temporal aspects of training. I suggested that the large diversity of users and the large resources needed for conducting studies were key issues troubling current sports technologies. I then proposed focusing on fieldwork and interacting with other disciplines as possible ways of generating conceptual contributions that can drive sports technology forward in a more user-centred direction.

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Bionotes



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