Preface to the Proceedings of the Workshop “New Trends in HCI and Sports” held at MobileHCI ‘22

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Preface to the Proceedings of the Workshop "New Trends in HCI and Sports" held at MobileHCI '22

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Abstract

The contemporary digitalization of the sports experience brought new challenges for the HCI community. HCI researchers started exploring how mobile and wearable devices could support the physical, social, and environmental aspects of sports, while technological transformations like the metaverse, inbodied technologies, and AI have recently paved the way for augmented humans, esports, new forms of sociality, and new ways to engage the sports audience. In this preface, we present the papers accepted to the workshop Net Trends in HCI and Sports, held in conjunction with MobileHCI '22, which precisely attempted to deal with the recent advancements in technology used in the sports domain.

Keywords [1]

Sports, E-sports, Exergames, Superhuman sports

1. Introduction

In the last 15 years, digital technologies have become essential in many aspects of sports practices, from training and performance assessment to sharing the sports experience with friends and audiences. The importance of the human body in sports and the different contexts where they can be practiced has led Human-Computer Interaction (HCI) research to pay particular attention to how mobile and wearable devices are used during sports activities.

By and large, HCI explored areas in the sports domain as diverse as the support for learning new motor skills or improvement of physical performance through augmented feedback [1]–[7], increase in

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motivation to do sports [8], [9], reflection processes on the data extracted from the body through wearable [10] and personal informatics/self-tracking data visualizations [11]–[13], augmentation of the communication between partners performing a sport together [14]–[16], and understanding of the key features of outdoor sports, which target the pleasantness and the challenges of the environment [17]–[22].

More recently, the field of HCI & sports has further moved forward under the push of new technological developments and unexpected events that impacted people worldwide, such as the COVID-19 pandemic and climate change. On the one hand, technological developments have widened the HCI and sports research domain, opening it up to augmented humans [23], esports [24], inbodied interactions [25], new ways to engage the audience using Artificial Intelligence (AI) [26], and new forms of sociality in virtual reality and metaverse. On the one hand, events like the Covid-19 pandemic and climate change either foster the indoorisation and individualization of sports, as we can see in the spreading of home training systems and the building of indoor skiing facilities to face the lack of snow in the mountains or encourage practicing sports outdoors and taking advantage of the 'restorative environment' of nature [27].

The workshop on "New Trends in HCI and Sports" precisely tackles all these recent transformations, placing itself within the established tradition of workshops on HCI & Sports. The first workshop addressing this topic was presented at CHI in 2014 [28] with the "HCI and Sport" workshop, which was then followed by workshops focused on outdoor/mountain sports, i.e., UbiMount 2016 [29] and 2017 [30].

With this new workshop, we attempted to map the current trends for portable technologies for sports and trace future directions for HCI research in this field. The workshop hosted an invited speech by m.c. schraefel, with the title "Interactive Tech Design for Sport as Human Problem Solving & Practice rather than Training", in which she highlighted that team sports - when played - bring together everything that makes us human: in this perspective, there are opportunities for HCI to (i) better support how the sport is about whole body problem solving, (ii) build translational effects from field to the office, and (iii) better incorporate for all into daily life - not least daily work.

2. Papers accepted to the workshop

We accepted six papers tackling recent challenges in HCI and sports, showing the vitality of the field.

Miki Jauhiainen and Michael Jones, in "Using machine learning to classify volleyball jumps", show how inertial measurement units (IMUs) can be used to train a random forest classifier to classify different jump types in volleyball correctly. They obtained accurate jump-type classifiers, which outperformed similar approaches by achieving higher accuracy on a wider set of jump classes. The feature importance analysis indicated that none of the single features used were significantly more important than the others.

Pavlos Bitilis and Niki Chatzipanagiotou, in "Digitalizing the Football Experience: A study on Electronic Performance and Tracking Systems (EPTS) from the perspective of football athletes and training staff" investigate how professional football athletes and training staff make sense of the use of electronic performance and tracking systems in their everyday training and work. The authors conducted ethnographic research with Greek professional football athletes and staff that use wearable EPTS in their daily training and work. The research findings show that EPTS has radically changed both professional football athletes' and training staff members' daily football routines by strengthening trust among each other while also reshaping their identities and, thus, improving football clubs' performance overall.

Tao Bi, in "I See What You See! Towards Augmented Joint Visual Attention between Beginner and Instructor Surfers", reflects on the challenges of identifying when and where to catch the best wave in surfing through an autoethnographic study. Based on the study findings, the author proposes a speculative design solution based on Augmented Reality and gaze-tracking goggles to foster beginners' and instructors' joint attention to waves, allowing the former to follow the instructors' directions and the latter to understand where the beginners are looking.

Lijie Yao, Alaul Islam, Anastasia Bezerianos, Tanja Blascheck, Tingying He, Bongshin Lee, Romain Vuillemot, and Petra Isenberg, in “Reflections on Visualization in Motion for Fitness Trackers”, reflect on their past work on “visualization in motion” that is the understanding of how to design visualizations for fitness trackers that are used in motion, and how this is relevant in sports activities. The authors also present a systematic review of sports categories in the Facer App to understand what type of data current sports smartwatch faces (i.e., home screens) show to wearers and how this data is represented.

Bettina Eska and Jakob Karolus, in “Supporting Sportspeople in Gaining Bodily Insights Through Reflective Feedback”, propose to design reflective feedback in systems that allow sportspeople to monitor their exercise sessions. The authors leverage mobile and wearable sensing devices to support users in actively reflecting on their exercise activities. This “reflective” feedback allows users to gain deeper bodily insights and facilitate an inherent understanding of the meaning and purpose of their physical activity. From the authors’ perspective, reflective feedback potentially enables more profound learning methods leading to increased retention of movement forms in the long run.

Finally, Bastian Dänekas, Tanja Döring, Tjorven Schnack, Georg Volkmar, Robert Porzel, and Rainer Malaka, in “Insights from two Studies on AI-based Learning in Strength Training”, present two exercise execution systems assessed in two separate studies. The former is built using supervised learning and addresses a push-up exercise, while the latter is created through unsupervised learning methods dealing with a 'military press' exercise. In both studies, classifiers rating person-dependent exercise execution achieved much better results than classifiers rating exercise execution for the entire participants' population. The authors also suggest that the classifiers could be optimized and tailored to the individual athlete by using AI methods.

3. Workshop Chairs and Organizers

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Amon Rapp, University of Torino (Italy)
Ashley Colley, University of Lapland (Finland)
Florian Daiber, DFKI (Germany)
Michael D. Jones, Brigham University (U.S.A.)
Felix Kosmalla, DFKI (Germany)
Stephan Lukosch, University of Canterbury (New Zealand)
Jasmin Niess, University of St. Gallen (Switzerland)
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4. Program Committee

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Tianhao He, TU Delft (The Netherlands)
Ren Manfredi, University of Trento (Italy)
Siiri Paananen, University of Lapland (Finland)
Chaofan Wang, University of Melbourne (Australia)

5. List of the papers included in the workshop proceedings

Miki Jauhiainen and Michael Jones, Using machine learning to classify volleyball jumps

Pavlos Bitilis and Niki Chatzipanagiotou, Digitalizing the Football Experience: A study on Electronic Performance and Tracking Systems (EPTS) from the perspective of football athletes and training staff

Tao Bi, I See What You See! Towards Augmented Joint Visual Attention between Beginner and Instructor Surfers

Bettina Eska and Jakob Karolus, Supporting Sportspeople in Gaining Bodily Insights Through Reflective Feedback

Lijie Yao, Alaul Islam, Anastasia Bezerianos, Tanja Blascheck, Tingying He, Bongshin Lee, Romain Vuillemot, and Petra Isenberg, Reflections on Visualization in Motion for Fitness Trackers

Bastian Dänekas, Tanja Döring, Tjorven Schnack, Georg Volkmar, Robert Porzel, and Rainer Malaka, Insights from two Studies on AI-based Learning in Strength Training

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