

Context-Aware Physical Activity Recommendation Through Challenges

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The lack of physical activity is a phenomenon of this age. It negatively affects both our physical and mental health. Diabetes, heart-related diseases and cancer are just some of the diseases that are partly caused by the lack of physical activity. There already are some attempts to use smartphones and other technologies to help people exercise more [1,2]. However, more research in this field is needed.

We believe that personalized challenges can motivate people to exercise more and thus improve their health and the quality of their lives. Personalized challenges are physical activities we recommend to the user. A very simple example of such a challenge could be: “Can you walk 3000 steps in 3 hours?” or “Can you get to the nearest park in under one hour?”. Every challenge has several attributes such as concreteness, dynamics, length, category or score. Example of a challenge with high dynamics is a game where user has to “catch” a running creature like Yeti. Users can see moving image of the Yeti on the map and their goal is to get close enough a thus “catch” the creature.

We believe that there are some people who might consider such a challenge very interesting and funny but there are also others who might not like it. As we all know, people’s preferences differ significantly. There are some of us who prefer a large number of shorter and more focused challenges, but others might like longer and more dynamic challenges. We assume that the challenge tailored for a specific user can achieve higher acceptance rate and thus positively affect his or her level of physical activity.

We are already able to track users’ physical activity throughout their day with their smartphones, so no additional hardware is needed. Also, the recommendation and visualization of the challenges takes place in the phone application. The smartphones allows us to exploit contextual information [4], such as the user’s location, agenda or physical condition, in order to recommend challenges.

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Most of the activities we perform during our days have repetitive character. We usually go to and back from work at certain time-span or attend our dancing lessons at specific time and day. These repetitive activities form certain patterns of the user's physical activity and interests. Thanks to these patterns we are able to predict one's movements and habits [3]. We calculate probabilities for movements from location A to location B and it allows us to tailor concreteness of the challenge. For example, if we discover that the user goes straight home from work almost every Wednesday we can recommend challenge that takes place in the park near user home. However, if we discover that there are many places where user goes from work on Friday, we recommend challenge that is not bounded to a certain location. Another important thing is time for recommendation. For example, we can discover that the user leaves her office between 4 p.m. to 4:15 p.m. on Tuesday and thus assume that the ideal time for a challenge recommendation is at 3:45 p.m. just before she leaves the office.

The weather is a thing that affects our physical activity patterns a lot. However, while there are people who prefer sitting at home during the rain, there are also those who enjoy walking in rain with their umbrellas or raincoats. Our recommendation system learns these user-specific preferences and exploits that for better recommendation.

The certain category and form of the challenge is personalized for specific user according to previous implicit ratings of challenges in similar contexts.

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