
CrowdWalk: Leveraging the Wisdom of the Crowd to Inspire Walking Activities

Tiago Ornelas

Madeira Interactive Technology
Institute, University of Madeira
tiagoornelas89@gmail.com

Evangelos Karapanos

Madeira Interactive Technology
Institute, University of Madeira
e.karapanos@gmail.com

Ana Caraban

Madeira Interactive Technology
Institute, University of Madeira
ana.caraban@gmail.com

Rúben Gouveia

Madeira Interactive Technology
Institute, University of Madeira
rubahfgouveia@gmail.com

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Abstract

Despite the initial premise of activity trackers, recent work has questioned their long-term efficacy in supporting behavior change. This paper makes two contributions. First, we present a study that inquired into individuals' ways of incorporating physical activity into their daily routines – and specifically, the “why, how, when and where” of physical activity. Secondly, we present *CrowdWalk*, a mobile app that leverages the wisdom of the crowd to produce location-based “walking challenges”, and thus attempts to assist behavior change through highlighting opportunities for physical activity.

Author Keywords

Activity tracking; self-quantification; behavior change; persuasive technologies; crowdsourcing.

ACM Classification Keywords

H5.2. User Interfaces: Evaluation/methodology.

Introduction

With the premise of helping individuals attain healthier lifestyles, personal health informatics tools such as activity trackers have been considered the “golden pills” of today. Yet, despite their initial premise in altering individuals' lifestyles, recent studies have questioned their long-term efficacy [3,4,5,9], with a

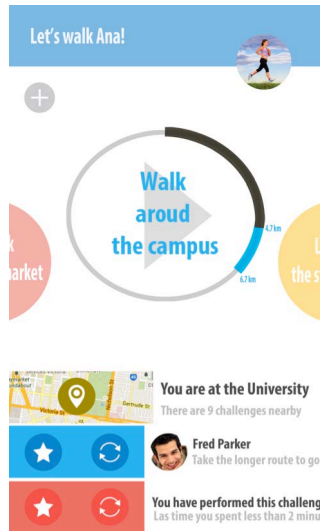


Fig. 1 *Crowdwalk* leverages on wisdom from the crowd to provide walking activities. When proposing challenges, the app gives precedence to walking activities performed more often near the user's location.

recent survey finding that over a third of U.S. consumers to stop using their activity trackers within six months of acquisition [1].

We argue that activity trackers are limited since they seek to increase physical activity levels merely by confronting users with quantified data. They assume that by helping individuals to monitor physical activity, they will be encouraged to attain a healthy behavior by reflecting on historical data, neglecting how to lead users from intention to action. As a result, the impact of activity trackers wears off over time: *"There's definitely the idea that collecting data is useful, but after a while, you figure out that numbers are just numbers"* [4].

In this paper we present *CrowdWalk*, a mobile app that leverages the wisdom of the crowd to produce location-based "walking challenges", and thus attempts to assist behavior change through highlighting opportunities for physical activity. We first present a study that sought to understand the walking activities individuals incorporate into their daily routines when attempting to be more physically activity, and conclude with the design of *CrowdWalk*.

Study

To build *Crowdwalk*, we wanted to first understand the "how, where and when" of physical activity. To overcome this lack of knowledge, we conducted a survey to understand at which point individuals find opportunities to walk during daily lifestyles.

Participants and Method

A total of 65 participants (mean age=37, 46% male) successfully completed an online survey. All

participants owned an activity tracker such as Fitbit, Jawbone Up or Nike Fuelband. They were mostly from the USA (46%), India (25%) and Australia (11%). They were recruited through Mechanical Turk and were rewarded with 0.30 euros for their participation. Responses were screened for quality by the first two authors.

Participants were asked to identify one "walking activity" that they embedded in their daily routine after adopting the tracker. We asked them to narrate it in detail as to when and where it takes place, their motives for performing it and the challenges they face (if any) in keeping up with it, as well as a number of closed questions relating to the estimated distance of walking activities and their frequency.

Findings

Data was analyzed using affinity diagrams. All in all, twenty-seven distinct activities were identified. The vast majority (91%) was performed at least once per week, while 57% were performed on a daily basis.

DAILY WALKING ACTIVITIES CONTRIBUTE ON AVERAGE 2 KM
Walking activities were mostly short in distance, with more than half (59%, N=38) reaching a maximum of 1km. The second most popular group (15%, N=9) were activities that covered approximately 5 km in length, followed by walks of 1-2km (15%, N=9), 2-3km (6%, N=3), 4-5 km (3%, N=2) and 3-4 km (2%, N=1). All in all, walking activities that were performed daily, increase walking distance on average by 2 km.

MOTIVATION FOR WALKING: MORE THAN HEALTH

As expected, 61% of individuals responded that their primary motivation for performing walking activities

Fig. 2 Users are allowed to submit unlimited walking activities tied to a specific location. When adding a walking challenge, users are presented with a list of venues around their location.

was to improve their health condition over the long term, such as losing weight, counterbalancing sedentary behaviors and compensating for consumed calories. However, we found another 35% to relate to non-health motives, but rather to the situated benefits from physical activity such as *boosting one's energy (13%) and enhancing her mood (8%)* as well *relieve stress (8%) and taking a break from work (6%)*. Finally, another 4% of responses tapped to economic reasons for performing the walk activity.

PURPOSEFUL SUBOPTIMIZATION TO INCREASE WALKING

Rather than adding new walking activities to their daily routines, we found individuals often to sub optimize existing routines as a means to increasing their physical activity levels, such as when doing household chores: [P2] *"I always try to make several trips ... when I'm doing chores. I do this several times a day, so it adds up to quite a bit of walking"*, parking the car at a distance, e.g., [P7] *"I park there with the conscious intent of being able to walk further to get exercise"*, going for lunch to a distant place, e.g., [P11] *"I go to the far end of the campus to get food ... I also get a little exercise. I feel good about doing this"*, or including walking as part of one's commuting, e.g., [P5] *"I try to walk some stations instead of using the tram"*.

WHAT MAKES WALKING ACTIVITIES SUSTAINABLE? LITTLE EFFORT, INSTANT REWARDS & MANY OPPORTUNITIES

All in all, we found walking activities to be sustained in daily routines due to three main reasons: (1) they do not require much effort, which makes them easy to perform, e.g., [P27] *"It was easy to sustain as it is not a long walk"*, (2) individuals attain instant rewards from these activities, such as feeling better or healthier and achieving set goals, motivating them to continue, e.g.,

[P28] *"This is sustained because I'm seeing results"*, and (3) the variety of opportunities arising on individuals' daily routines makes them to be easily adopted at different locations and daytimes based on individuals' preferences and schedules, e.g., [P18] *"I am a teacher so I ensure that I actively walk around the classroom monitoring students, I try not to sit down during the lesson"*.

Implications for design

All in all, the study highlights the importance of task and location compatibility in building sustainable walking habits, while it highlights a breadth of motives for walking that go beyond the *health* and *competence* narratives that dominate today's discussion on activity tracking. We believe that tying activities to places will provide a number of benefits. First, tying activities to places enables the creation of moments of choice [6]. Over time, users are expected to link specific parts of a routine with actions through the creation of if-then scenarios (e.g., whenever I enter the building, I take the stairs) [7], thus supporting the process of habit formation. Cues in the physical environment (e.g., the entrance of the building) should gradually become visible reminders powerful enough to activate the alternate path (i.e., taking the stairs) at a subconscious level [8]. In this sense, *CrowdWalk* should serve to provide only the initial triggers and inspire alternate paths, until these become habituated activities.

Crowdwalk

CrowdWalk is a mobile app that infers users' location and presents a list of walking activities that can be initiated from one's current location. For instance, as users enter a building *CrowdWalk* may suggest taking the stairs. When entering a supermarket, users may be

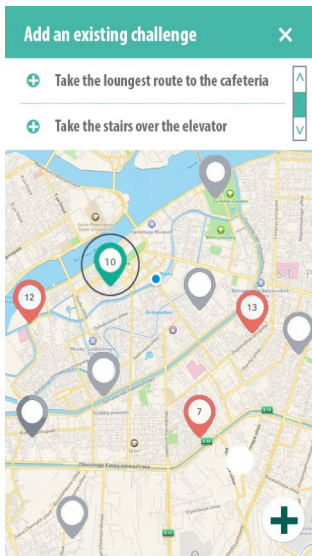


Fig. 3 *Crowdwalk* provides nearby walking activities. Through the map, users can browse and visualize existing challenges and meet the walking activities that will better suit them.

challenged to leave their shopping cart behind while walking back and forth to gather shopping items.

Activities are generated by users (see Fig 2) and are proposed base on their proximity and popularity. They are displayed within an “activity indicator circle”, depicting general information on an activity (such as name and description) as well as its contribution towards goal completion (e.g. walking around the campus will contribute an additional 2km towards your 15km daily goal, see Fig 1). Additional tips and comments are displayed, either provided by users (e.g. sharing experiences on a certain walking activity) or by the system (e.g. tips on the how to complete a certain walking activity). Users are further presented with a map view (see Fig 3) pinpointing the concrete location of an activity that reassures them of the accuracy of their location inference and allows browsing nearby activities.

Conclusion and future work

Individuals often struggle to move from the intention of attaining healthy lifestyles to the set goal. Long-lasting behaviors are hard to achieve, and despite the initial premises, effects of self-monitoring have been found to wear off with time [2]. With the design of *CrowdWalk*, we aim at fostering an alternative approach to the dominant narrative of quantification. Although *Crowdwalk* records user’s walking distance, the goal is not to evaluate performance, but rather to raise awareness on the frequency and contribution of individual walking activities. Our future work aims at deploying *CrowdWalk* in the wild with the goal of assessing the quality and quantity of walking challenges generated by users and the impact these have on physical activity and habit formation.

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