Jogging over a Distance

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Abstract

Jogging is a healthy activity and many people enjoy jogging with others for social and motivational reasons. However, jogging partners might not always live in the same location, and it may be difficult to find a local jogger who runs at the same pace, we found through a survey. "Jogging over a Distance" allows joggers to socialize and motivate each other while jogging in geographically distant locations through the use of spatially distributed audio. We hope our approach encourages active and future joggers to jog more often, while simultaneously supporting their social friendships.

Keywords

Jogging, running, social support, mobile phones, Exertion Interface, physical, sports, active, exhausting, social interaction

ACM Classification Keywords

H5.2. Information Interfaces and presentation (e.g., HCI): User Interfaces.

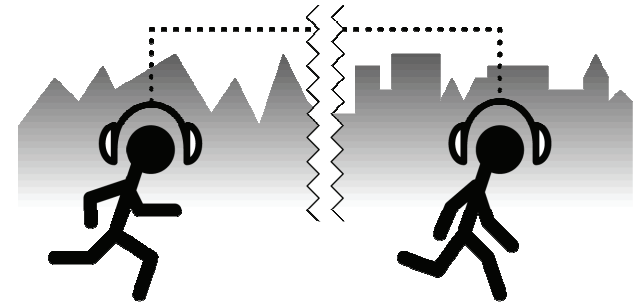## Jogging

We have found through the use of surveys and Internet forums that joggers often run with others [8]. Out of 77 responses, 57% replied that they run with at least one other person. The top reasons for running with others were socializing, motivation to run faster, motivation to participate, and to have fun. We discovered that many

social joggers value the ability to have conversations with their partners and use their exercise sessions as a way to stay in touch with their friends. One respondent noted, *"About twice a month I run with some of the girls I went to college with. It's a great time to chat and catch up! Even though we see each other and chat regularly, we always seem to talk more openly while we run."* Another participant gave an example of the benefits he received from running with a partner: *"I ran on Sunday with another runner, and she wanted to add a little more distance to the route. We talked about it as we ran and agreed where to run. I ran more than I would have if I ran by myself. After the run, I was glad that I did the extra mileage. Also, my running companion ran faster than I would have in the early part of the run (I actually had to ask her to slow down a little for the first mile), and I think I pushed her at the end of the run. It was mutually beneficial."* For one competitive runner, social jogging motivated him to jog on non-competition days. He explained, *"Well, I go faster when I'm by myself, but I don't have nearly as much fun, and I wouldn't do it. I don't go out by myself normally. If I didn't have a group I was meeting somewhere I probably wouldn't bother. I'd just be miserable. So, yeah, it gets me out."*

A frustration participants have with social jogging is finding the 'right' jogging partner: one who can meet them at the same location and who jogs at roughly the same pace. This challenge of finding a partner resulted from people moving away or, through training, becoming faster than their jogging partner. One jogger explained that he only has one friend whom he could run with, but his friend moved across the country and *"now I know of no one my age who runs the way I do… many run longer and a lot run shorter... I still wish I*

knew people to run with to shake things up a bit." Another recently re-located runner stated, *"I run alone, [but] I wish I could find a couple of people to run with but haven't had much luck in finding a running partner since I moved two years ago."*

Figure 1. Jogging together although geographically apart?

Jogging over a Distance

One possible solution that facilitates finding social jogging partners is to enable people to jog with remote friends and other remote joggers [Figure 1]. With Jogging over a Distance, jogging partners could live in opposite parts of the world, yet share the experience of jogging together. By meeting at the same time in separate locations, long distance friends could become, or stay, social jogging partners.

Mobile Support

We want to support the social communication between joggers which the participants found encouraging, and therefore opted for a solution featuring an audio connection between the joggers. An audio interface suits a mobile, outdoor environment: it is simple, lightweight, and allows users to visually focus on their
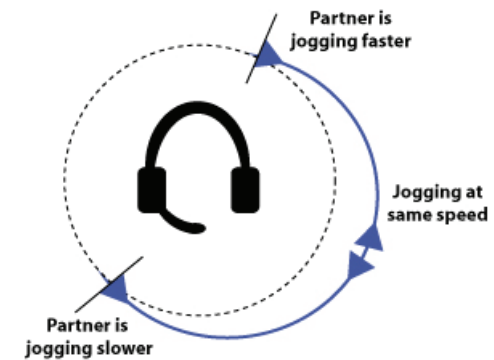
environment. Furthermore, an audio interface supports outdoor running; unlike treadmill based systems, our system is wearable and un-tethered.

Supporting Sense of Presence through Pace Awareness
We were interested in the experience joggers would have if they would communicate with a remote partner through an audio channel only, and therefore asked 18 volunteers to go running at the same time, but in opposite directions, equipped with a mobile phone and a Bluetooth headset. (More details in [8]). We were intrigued by how much of a sense of presence the audio conveyed to the participants: they not only mentioned hearing the other person's voice, but also the wind, the noise of the footsteps depending on the ground surface, and the breathing of the remote jogger, which they amounted to a social and enjoyable experience.

Knowing how fast they and their partner were going was important for half of the participants. For one participant, this kept her running. She explained, "*There's some pride that you don't want to stop. I thought about stopping a bit today, and that would have been easier, because [my partner] wasn't there, but I didn't know if she could tell over the phone, so I didn't try*." One participant suggested each partner could carry a pedometer and then verbally tell each other their speeds, which he felt would greatly improve his experience.

We decided to build a prototype that further pushes the idea of jogging "together" with geographically distant jogging partners by creating a prototype that not only supports conversation but uses the audio to communicate pace. Similar to jogging side by side and adjusting pace with one's partner, the Jogging over a

Distance prototype transforms the conversation into spatialized audio to simulate hearing one's partner in front, to the side, or behind. We are evaluating whether this pace information can contribute to an increased awareness of the other person's presence, hence creating a shared sportive experience.
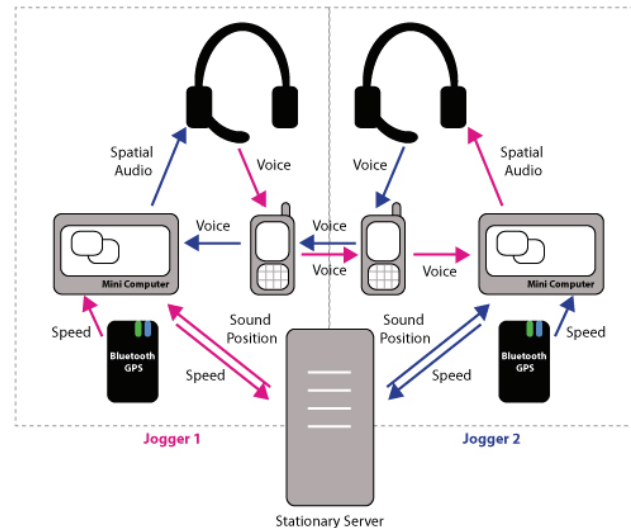

Figure 2. Bird's eye view of spatialized sound.

Experience
Each jogging partner puts on a pair of headphones and wears the lightweight prototype in a small backpack. While each partner jogs, speed data is collected and used to position the audio of the conversation in a 2D sound environment [Figure 2]. As one jogger speaks, their partner hears the localized audio and is able to detect whether the other person is going faster, same pace, or slower, and thus is in front, to the side, or behind, respectively. Similar to a collocated setting, the audio cues runners when to speed up or slow down in order to "stay" with their partner. The joggers can discuss running routes, motivate each other to keep pace, or simply listen to the environment noises of the other location. For joggers with differing athletic abilities who would like to have the experience of

running together, a baseline pace variable can be adjusted that allows each runner to push their own personal pace rather than try to run at their partner's speed. Thus, the system allows joggers to do something that is not possible when running side by side - challenge their individual pace while running with friends who run at different speeds.

Figure 3. Technical implementation.

Technical Implementation

The prototype consists of two identical systems, each with a miniature computer, a Bluetooth GPS device, a wireless modem, a mobile phone and a headset [Figure 3]. Each system is carried in a small, close fitting backpack while the user jogs. Speed and time data is collected from the GPS device, and sent to the computer. The computer then transmits this data wirelessly over a 3G network to a server, which

calculates the speed difference. The server determines where each jogger is running in relation to his or her partner. A sound position value is sent to each computer. As each jogger talks, their voice is picked up by a microphone and sent to their partner's phone. (We initially used VoIP technology, but found the lag and reliability insufficient for our purposes.) The incoming audio is then sent to the computer, which uses the sound position value received from the server to transform it into spatial 2D audio experienced through the jogger's headset.

Target Audience

Jogging over a Distance targets social, casual joggers who enjoy jogging with others and like to converse during their runs. Not all joggers talk during their exercise: 6% of our surveyed joggers who run with others replied that they do not talk while running, and some enjoy the tranquility of running alone. However, the design of Jogging over a Distance is based on feedback from participants who claim they jog with others for social and motivational reasons.

Jogging over a Distance is not aiming to replace the traditional social "jogging together" experience, but rather provide the "next best thing" if the partners are geographically distant. Furthermore, the prototype has the potential to help joggers who would like to jog with others, but are not able to find a fellow runner that runs at the same speed.

Related Work

Investigation of the social factors in motivating people to jog, or to exercise in general, has been described by McElroy in [6]. Commercial products and research prototypes have been designed to use audio to

motivate individual users' when walking, jogging, and running, including the *Nike/iPod Run* [2], *MPTrain* [9], and *Melodious Walkabout* [5]. The *Nike/iPod Run* is an MP3 player that tracks individual exercise performance and stops the music to verbally report on progress. Users are able to monitor their speed and distance on the go, without looking at a display. *MPTrain* is a mobile device that monitors heart rate and speed. Depending on progress, the device selects music with a particular tempo to encourage the user to slow down, speed up, or keep pace. *Melodious Walkabout* is a headphone based system that assists joggers finding their way by using directional audio. It plays music files to guide the wearer in the right direction using GPS data. A device which incorporates the user's activity to affect their audio is the *Are We There Yet?* system [1], which modifies the playback speed of audio books according to how much travel time remains for the user.

Prototypes using social interaction to encourage walking and jogging include *Houston* [4] and *Chick Clique* [10]. *Houston* is a mobile phone application that monitors step count and displays it alongside the step count of friends. *Chick Clique* is a similar mobile phone application for sharing step count. This social peer pressure approach focuses on teenage girls and uses instant messaging to keep the social group connected and aware of their progress. A project combining social interaction with an audio interface to motivate physical activity is *Actively Mobile* [3]. This work focuses on designing a mobile phone that a user can operate while exercising, with supporting conversations between joggers as a resulting benefit.

Relevance to the Research Community

Jogging over a Distance is a novel demonstrator in the area of "Sports over a Distance" [7]. With this demonstrator, researchers can learn about spatialized audio supporting distributed social interactions in a mobile environment. It also has potential to generate results on how people perceive spatialized sound in a sportive setting, and how an audio-only interface can be used for social means. While our demonstrator utilizes the motivational benefits known from collocated social jogging, it seems plausible that this interface concept can be used to address other contexts and sports.

Commercial Status

Jogging over a Distance is a new demonstration that has not been shown publicly before, nor have commercial efforts been undertaken.

Context of Work

Jogging over a Distance is an advanced prototype based on user feedback from an initial study on the social interaction between geographically distant participants. The initial prototype used conventional mobile phones and headsets to support remote joggers with a social "jogging together" experience. Based on the feedback of the participants, we aimed to increase the sense of presence of the other person, and suggest a context-aware audio channel that reacts to the relative speed between the participants.

Future Work

We want to conduct a comparative study to measure whether spatial audio delivery has an effect on the perceived presence of the other person. Furthermore, we are interested in investigating if a greater sense of

presence can serve as a motivational tool to encourage people to run faster, further or/and more often. The results of this research can inform future designs that aim to support social interactions between geographically distant participants in a mobile setting.

Conclusion

Jogging with others is enjoyed by many, but finding the right jogging partner, as indicated by our participants, can be difficult. Our solution, Jogging over a Distance*,* enables joggers to run with remote partners as well as those who run at differing speeds. Through the use of pace data influencing spatialized sound our prototype aims to create an experience similar to running side by side with someone, even when jogging in different locations. We believe our prototype support joggers' desire for socializing and motivation to keep pace although the jogging partners can be geographically apart.

Acknowledgements

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