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# Fitster: Social Fitness Information Visualizer

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**Abstract**

We present Fitster, a social visualization interface that supports fitness motivation among busy people struggling to exercise. Among our pilot group of busy graduate students, we found that a popular time-saving strategy is to recast exercise in terms of everyday, informal activities. Fitster employs pedometer data to support activity tracking, goal setting, and motivation through virtual competitions and teamwork. It contributes to the human-computer interaction (HCI) and health domains by identifying a new facet of exercise behavior and by offering a lightweight social interface to promote fitness motivation and enjoyment.

**Keywords**

Information visualization, user interface design, health and fitness, pedometers, motivation, social software

**ACM Classification Keywords**

H5.3. Information interfaces and presentation (e.g., HCI): Group and Organization Interfaces.

**Introduction**

Many industries are exploring how technology can be used to improve individual health behavior. Internet-based exercise tracking with an e-community component is a fast-emerging area of research [1] [6].

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While doctors and health insurers seek to curb costs through more effective disease prevention, HCI researchers are seeking to develop new, more valuable uses for social visualizations [3]. With both of these concerns in mind, we developed Fitster, a social visualization concept that supports busy people in their efforts to exercise.

### **Real-World Problems**

Fitster addresses the growing problem of sedentary behavior, which is known to contribute to heart disease, diabetes, and other life-threatening conditions [4]. Although our design research participants were University of Michigan graduate students, we believe the Fitster model may be applicable to other communities facing similar problems.

Our research found that severe time constraints prompt many graduate students to incorporate everyday activities like climbing stairs into an informal exercise routine. This casual approach makes exercise hard to measure and goals difficult to set. Individuals have only a vague sense of their activities and cannot track progress over time. Moreover, they lack the context of comparing themselves to others, a social element that helps many people sustain motivation. As a result, they struggle to maintain their commitment and progress in the face of competing priorities.

### **User-Centered Methodology**

We developed Fitster using an iterative, user-centered design process. To better understand our users' needs and motivations, we conducted a four-week pilot study with six full-time graduate students who met two participation criteria: valuing fitness and actively participating in online communities. We started by

interviewing participants to learn about their exercise activities, motivations, and feelings; their involvement with online communities; and their efforts to track fitness.

During the four-week period, participants wore a pedometer (a device that records time-stamped step counts) and contributed to a community blog (an online journal) where they recorded their step data, commented about their daily activities, and shared their thoughts about the experience. While we developed our prototypes, we used the blog to elicit ongoing information about participants' usage of pedometers, the patterns they noticed and goals they set, and their interactions with one another on and off the blog. Additionally, we participated in a one-day design workshop with nine of our peers at the School of Information where we received feedback that helped us further refine our ideas.

We then created a set of paper mock-ups and tested them with each of our participants. During these sessions, we conducted interviews to learn how our participants felt about the pedometer, the community, and their blog entries. This user feedback contributed to the final design.

### **Research Findings and Implications**

Our two-stage research study captured participants' experiences both before and after pedometer usage and helped us develop a user model. First, through intake interviews, we identified key themes such as:

- Time constraints limit the time spent exercising, inspiring a more casual approach to fitness (e.g.

walking to class instead of taking the bus), which makes goal setting difficult.

- Social connections give context to participants' activities and increases accountability to exercise. One participant noted, "It helps you show up when you know someone's waiting for you."

Second, after introducing the pedometers, we found our subjects employed specific strategies in relation to fitness, including:

- linking their daily routines with step counts ("[A]n ordinary day for me, with a walk down to central campus and back home, is close to 8,000 steps"),
- setting goals (using predefined targets and daily weekday or weekend averages),
- using step counts for planning or immediate inspiration,
- analyzing step count highs and lows ("Friday was 1354 steps, really sad--but I wrote 9.5 pages of a research paper, so it's not surprising"), and
- using awareness of other people's step count highs or averages to motivate their own behaviors.

These findings suggested that our design should provide users with:

- graphical displays of fitness activities to make patterns visible and memorable,
- tools for social interaction, and
- support for teamwork and competition, which facilitate goal setting and accountability.

Additionally, because our users are pressed for time, data entry must be quick and painless.

### **Fitster Design**

Based on these findings, we designed the Fitster application to feature three main components: Dashboard, Your Friends, and Competitions & Games. Users have the ability to fluidly move through the application in a variety of different paths.

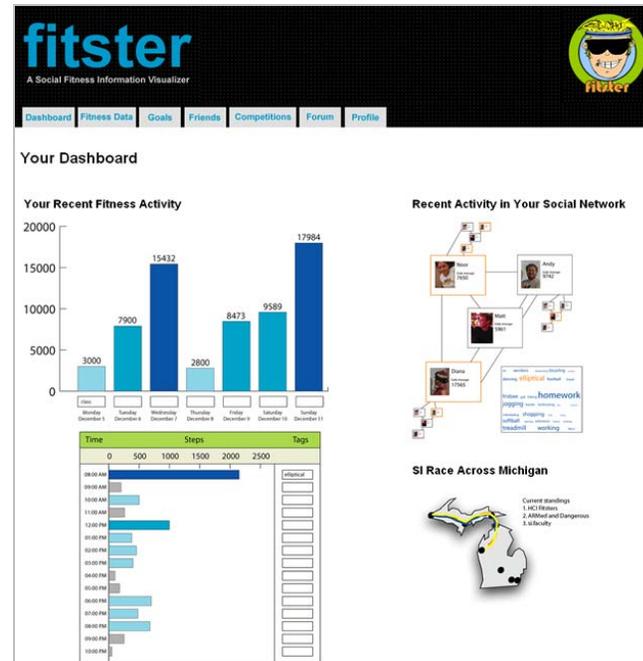
#### *Dashboard*

By utilizing the pedometer's built-in USB port, a user automatically uploads step count data to the Fitster website and then arrives at the Dashboard. To account for participants' lack of time, we designed the Dashboard to offer a first glance of key components that users were most interested in viewing. Since users wanted to receive immediate feedback of their progress, the Dashboard displays a bar chart visualizing the user's recently uploaded step count data. Under each bar, a user may type in one-word descriptors called tags to characterize the day's activities, though doing so is not required.

All tags are added to the system's tag collection. This folksonomy, a bottom-up user-generated classification system [2] [8], appears in other parts of the interface, offering users a quick perspective of the activities of others in their social network.

Also on the Dashboard, a social network diagram represents the recent activities of the user's friends, including the most frequently used tags in the network and each friend's daily step count average. The Dashboard also displays the current standings of

competitions and games in which the user is participating.



**figure 1.** The Fitster dashboard displays a bar chart of users' most recent step count data, a social network diagram representing their friends' recent activity, and a status update of the games that they are playing.

### Your Friends

Our research showed that social interactions play an important role in exercise motivation and activity. We observed participants engaging in lighthearted competition, teasing, and taunting when they encountered other participants online and offline. In our interviews, our participants also indicated that they

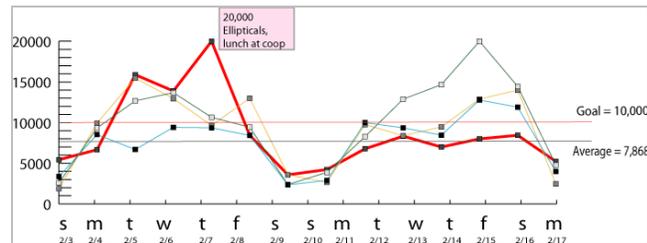
were more likely to contribute to the community blog when they knew the other participants well.

We developed our design with these user preferences in mind. First, the Your Friends component features a social network diagram that displays the user's friends in the Fitster system. The diagram takes an "egocentric" view in which the user is in the center of the diagram. As the user clicks on a friend in the diagram, that friend shifts to the middle of the diagram and his or her social network appears instead. At a quick glance, users can view their friends' profile photographs and their daily step count averages. Additionally, users can mouse over one of their friends to view a contextual menu of commands that includes viewing a friend's profile or issuing a one-on-one challenge to walk a certain amount of steps or miles within a restricted time period.

Second, the system allows users to compare progress with their friends'. For example, a line graph shows users their step counts across multiple weeks and compared to a number of their friends. By clicking on any one user's line, two horizontal lines appear: the selected user's step count average for that time period and his or her step count goal for that period.

Finally, the Fitster application aggregates the tags used by a member's first- and second-degree friends and displays them in a tag cloud (a list that displays the tags in differing sizes, where the size of the tag indicates its popularity) [2]. When users click on a tag, all of the members of their network who have used this tag will be highlighted. By displaying both first- and second-degree friends (and allowing users to explore past those degrees), Fitster enables users to meet new

people in their extended social network, which is an interest expressed by our pilot study participants. It also capitalizes on our participants' habit of noting extreme highs and lows, and helps create a sense of community.



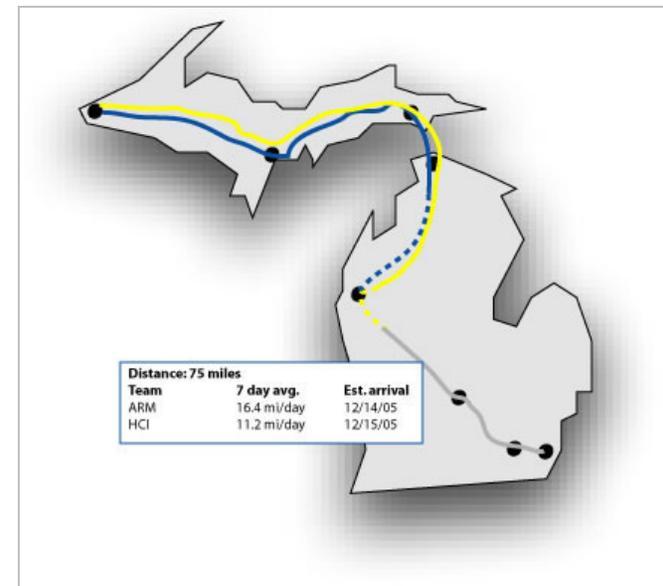
**figure 2.** This line graph illustrates four users' daily step counts across a two-week period.

### Competitions & Games

Several of the students in our pilot study indicated that they often felt isolated performing their fitness activities and that they would like a way to make their fitness activities fun and social. Fitster's Competitions & Games involves multiple participants' setting out to achieve a fitness goal, either individually or as a team, before a specified deadline.

We created a game in which users have the ability to select from a variety of maps such as the state of Michigan, the United States, or the world. Users can then plan a geographic route across the specified map, and the system will calculate the mileage of the route completed based on each user's uploaded step count data and stride length. Users will create teams and race to complete the virtual route first. These games use a geographic metaphor to contextualize step count data in a way that is easy to understand and fun to think

and talk about. As one participant remarked, "Seeing it on a map makes a difference. I can't visualize 46,000 steps but I can see it on a map." Moreover, by enlisting teams, these games facilitate both teamwork and competition, which were mentioned by our users as missing social aspects from their current fitness activities. The design is intended to create accountability between team members, making it more likely that they will engage in fitness activity on their own.



**figure 3.** In this view of a race across Michigan, a user is comparing two of six competing teams. Each team's progress is drawn in a different color on the map.

### Design Limitations and Next Steps

Although users reacted positively to paper prototypes and felt that the designs matched their needs and

preferences, a live prototype must still be developed and piloted. Conclusive evidence of Fitster's impact on individuals' behaviors can only be reached through piloting the system over a prolonged period of time. For example, the problem of motivating users with consistently low step counts did not arise in our study but would likely arise in testing with a larger audience. Moreover, extensive usability testing should be carried out with a cross-section of users, representing various demographic characteristics and differing levels of technical expertise.

In addition, since our pilot test participants were extremely busy graduate students, we are interested in comparing our findings with those of other pedometer studies targeting different populations. Pedometer studies are currently being conducted with at-risk diabetic and sedentary patients [5] [7]. How might the Fitster model support the needs of other populations?

### Conclusion

Fitster is a cost-efficient design that combines social networks, fitness tracking, and interactive visualizations. Using step counts from users' everyday activities as a foundation, Fitster offers playful visualizations to promote offline action. It thereby represents a new development in both fitness and community visualization, while combining older (graphs, charts) and newer (social network visualization, tagging) elements in novel ways.

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