Using Ad Hoc Network Games to support Face-to-Face Interaction in Public Places

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ABSTRACT
We have created CaféTrek: a Mobile Ad Hoc Network game for Personal Digital Assistants for triggering and supporting face-to-face interaction in public places. CaféTrek is designed specifically for the unique properties of handheld devices, such as the possibility to rotate the display and placing devices next to each other to achieve a larger play area. Preliminary use results indicate that CaféTrek successfully may be used to trigger and support face-to-face interaction in public places.

KEYWORDS: Mobile computing, hand-held devices, interaction, ad hoc networking, mobile games.

INTRODUCTION
Much research has focused on technology that aims to encourage synchronous face-to-face communication: from early in-door installations such as [4; 5], to recent approaches such as [1; 2; 3]. All of these systems use the device itself as a trigger, notifying when its user should interact face-to-face with people in the environment. The systems assume people using them are already acquainted. With CaféTrek, we have chosen to focus on mobile Computer Mediated Communication (CMC) techniques designed to trigger and support face-to-face interaction. CaféTrek is specifically targeted for public places where most people do not already know each other.

Our previous work has focused on mobile support for informal communication in both work-oriented as well as social settings [2; 3]. There, support for informal communication was transient, and face-to-face interaction was immediately triggered by a wireless device. The support for face-to-face interaction in ProxyLady [2] was a simple reminder system: the information one wanted to discuss with a person was entered to the wearable device, and when that person came within the proximity of the device ProxyLady signaled an alert and displayed item information.

Based on previous use experience, our focus with Cafétrek is to provide tools that can:

1. Encourage a social encounter, resulting in a peer-to-peer CMC session.
2. Support face-to-face interaction, based on information entered in the CMC session.

This two-step approach differs from previous work in that the social encounter first results in a peer-to-peer communication session, which later may lead to a face-to-face interaction. Using the advantages of CMC, people can stay anonymous, and choose if, when, and with whom to interact.

CAFÉTREK
When choosing what type of game that would work for triggering and supporting face-to-face interaction, we searched several online game forums to see what type of game activities most often lead to personal communication. What we found was that it is very common that people wanted to exchange items collected in online games with each other, using the online forums, public chats and even synchronous communication with Instant Messaging (IM). Based on this we decided to create a game of trading.

The game concept for Cafétrek was taken from an old computer game created in 1984 called Elite, which can be described as a game of space trade. The aims in Elite were to slowly amass money, trade items, gain a better ship, pirating or escaping pirates, and improve one's rating to get the elusive 'elite' status. In creating Cafétrek we transferred the game properties of Elite into a mobile game

environment. Pirates and other spaceships encountered are real people. Planets, primarily used for trading and resource managing, are stationary computers stored inside public Cafés. To gather resources for trading, players must embark on a "café trek": purchasing resources cheap in one café and selling them expensive in another. Similar games [1] have recently been developed, but since they do not function without infrastructure they can not be used in most public places.

In Cafétrek, each player uses a Wireless-LAN equipped PDA. The PDA contains the CaféTrek client, which main interface much resembles that of the old Elite game. The interface contains a view from inside the player's space ship, and provides status information on the ship's current cargo hold and whether or not there are any planets or other players around. When approaching other planets or players, the player may choose to start a generic CMC service (chat or whiteboard) or one of the several game modules (e.g. Player-versus-Player fights or cooperative missions – see Figure 1).

Figure 1. Three of the CaféTrek game modules.

DYNAMIC GAME BOARDS

To encourage players to socialize, some of the game modules in CaféTrek support the construction of larger game boards by placing devices next to each other (see Figure 2). Current modules support two devices placed facing and next to each other, but the internal architecture developed for CaféTrek supports more complex topologies as well.

Figure 2. Larger game boards using multiple devices.

IMPLEMENTATION

Cafétrek was implemented in C++ on Microsoft Pocket PC hardware. C++ was chosen since the platform should be able to run real time, interactive game modules with acceptable speed. The handheld computers were each equipped with Lucent Wireless LAN network cards, and configured for peer-to-peer ad hoc networking.

PRELIMINARY USE EXPERIENCE

To test CaféTrek the game was given to 30 students at a local university. Each student had permanent access to a Compaq IPAQ H3630 handheld computer, equipped with a Wireless LAN interface. Two CaféTrek "planets" were installed at both the local student café as well as a public lunch room. After having used the software for four weeks, ten of the students were chosen randomly for a workshop to collect feedback. The feedback was recorded and transcribed.

All students used CaféTrek several times each week. Many of the game modules such as the Multiplayer Tetris seen in Figure 1 were used several times each day. All students reported having used the game in public places. As a side effect, one student also reported that many used the game when they could not communicate face-to-face with each other, such as during a lecture.

CONCLUSION

We have presented CaféTrek, an ad hoc network game for supporting face-to-face interaction in public places. By introducing CMC techniques commonly used over the Internet to interact with strangers, Cafétrek may have the potential to trigger social encounters between strangers in public places, possibly resulting in a face-to-face interaction. Preliminary use experience with 30 students already acquainted with each other has shown promising use in public places. Future work involves a long term study in different environments using more devices, given to people not familiar with each other prior to the evaluation.

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