

Lifeline: An Infrastructure for Context-Aware Smart Support

Overview/Goals:

One goal of organizations that provide services to consumers with disabilities is to increase the consumers' self-direction and engagement in the community. As activities become more and more decentralized, the need to coordinate and support dynamic groups of consumers and caregivers increases.

This research explores the promise and challenge of developing technologies to support collaboration among caregivers and mobile consumers with disabilities. Lifeline provides an infrastructure that supports a suite of services used to coordinate and provide feedback about group and individual activities both inside and outside the home. Tests highlight the potential of our approach but also indicate limitations in dependencies on current commercially available wireless infrastructures. The nature of these infrastructure limitations will be discussed along with next generation devices and services, which can potentially overcome these limitations.

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Portable Handheld Device

We are evaluating a number of different hardware devices to fill our needs in developing a client platform. The most important features we're looking for are their ability to collect information from the environment (e.g., GPS, camera, and audio) and to provide an interface to the user. We're focusing on PocketPC devices, running Microsoft's Windows Mobile operating system. These devices have, we believe, the best mix of computational power, connectivity, ease of development, and AV features for our needs.

The latest generation of devices can connect wirelessly in a variety of methods, including to the cellular network for voice phone calls or for an Internet connection, to WiFi (802.11b) wireless networks for a high-speed Internet connection, or to Bluetooth-enabled peripherals such as wireless GPS receivers or headsets. These devices are also capable of taking pictures and recording or playing video or audio.



Tracking External Events and Services

We are developing a set of software with the purpose of taking several different data sources, each with their own standards, and collecting them into a single standard form that other software can make use of.

For example, many of the City of Boulder local buses have GPS tracking systems installed that can be used to find their up-to-the-second location via the Internet. Users' personal GPS devices provide data in a similar, but different format, which must be accessed through the user's PDA. Weather and other data can be accessed through Web Services over the Internet.

Our software can access this data, or any data source we decide to use in the future, and provide it all together in a standard format that can be used for real-time prompting, as well as stored in a database to provide a historical record of the user's life.

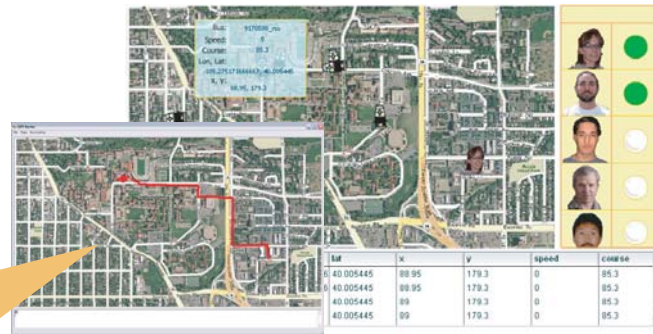


Situational Awareness for Caregivers

In increasingly distributed and dynamic care environments caregivers need to maintain a situational awareness of clients and other caregivers in the home or out in the community. We are working on tools that monitor the activities of clients and notifies the appropriate person as breakdowns occur. To provide effective support, caregivers need to have an understanding of their clients' immediate situation, history and available resources.

Design aspects being explored include:

- global perspectives providing quick assessments and broad context
- personal perspectives putting caregivers "in the client's shoes"
- historical perspectives retracing a client's steps
- biographical perspectives providing deeper client understanding



Current Status

Network connectivity to the Lifeline server is a critical component for providing the greatest functionality. We are investigating a number of ways of maintaining a network connection on a mobile device. The devices we are currently testing are capable of establishing an Internet connection via the GPRS protocol anywhere that it has a cellular phone signal. However, bandwidth and reliability limitations as well as packet filtering by service providers have caused problems with solutions we would like to use. To overcome these limitations we are developing our own network protocols, which provide more robustness, but less functionality. We are also exploring newer services that may avoid these limitations altogether. These include the EVDO and EDGE services, which are now being offered by the major network providers.



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