DealFinder: A Collaborative, Location-Aware Mobile Shopping Application*

Wesley Chan
MIT Media Laboratory
Personal Information Architecture Group
20 Ames St., E15-468G
Cambridge, MA 02139 USA
+1 617 253 7874
wesleyc@media.mit.edu

ABSTRACT
We present DealFinder, a position-aware shopping application for mobile devices that illustrates how collaboration can help consumers make more informed purchasing decisions. DealFinder enables users to share product reviews, pricing information, and shopping experience, allowing them to filter any information they find based on their position.

Keywords: Mobile applications, collaboration, wireless and hand-held devices, location-based services, context-aware computing.

INTRODUCTION
The emergence of high-bandwidth wireless networks and the wide proliferation of always-connected mobile devices will enable new and compelling collaborative applications. Collaborative mobile applications, coupled with location-based services, will empower users to share information based on similar interests and context—when and where they need that information. Only a few of these applications exist today. As the wireless data infrastructure improves, however, many more collaborative applications will emerge.

We created DealFinder (figure 1a), a position-aware shopping application for mobile devices, to illustrate how consumers can collaborate and use the context of location to make more-informed decisions about their purchases. DealFinder currently enables users to asynchronously share information about product prices and availability. For instance, a person comparison-shopping for television sets at different local electronic stores can use DealFinder to "upload" prices to our public database. Other shoppers who will are looking for a similar television set will be able to find prices on TV sets, based on their location (e.g. "find prices for TV sets at stores within 10 miles of my current position"), using a series of simple forms (figure 1b). In a similar manner, shoppers will also be able to share information about deals or seasonal sales by uploading them to the database, so that other bargain hunters can later search for them based on position.

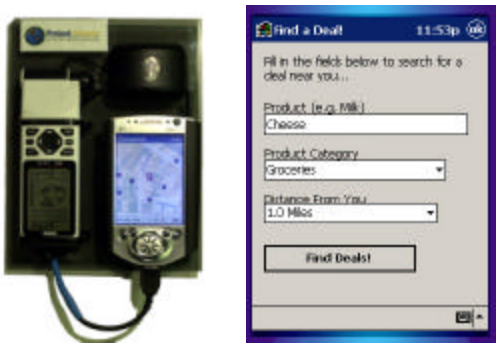

Figure 1a, 1b: Hardware Implementation of DealFinder; Form for user to input parameters to find location-specific deals.

We are in the process of implementing several other collaborative shopping features for DealFinder. We are adding a feature that allows customers to share their experience about shopping at particular stores or about purchasing particular products. For example, a customer will be able to let other shoppers know that they thought a specific store had excellent customer service, or why they ended up purchasing a particular television set after looking at six other ones. Other shoppers will be able retrieve this information based on their preferences and filter the results using their current position. For instance, a shopper casually browsing for DVD movies at a local video store will be able to access reviews, written by other users, for only those movies in stock at that particular store and for a particular genre.

With DealFinder, shoppers will be able to make more informed buying decision by examining the previous buying history of other users they explicitly trust—for example, personal friends or other users that have contributed outstanding product reviews.

BACKGROUND
DealFinder is part of Project Voyager, an endeavor at the MIT Media Laboratory that aims to build a platform that simplifies the prototyping of collaborative and context-aware mobile applications [3]. Using the Voyager platform, which is still under development, we previously built a

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position-aware mobile tour guide for the MIT campus that delivers multimedia content to visitors at specific points of interests.

We were also greatly influenced by the work on several location-aware and collaborative mobile applications. Much of this work has focused on creating mobile "tour guides," including the *CyberGuide* project [1] and Cheverst's context-aware electronic tour guide [2]. Furthermore, other location-aware applications at the Media Lab, including *Impulse* [4], provided guidance in our design of DealFinder. However, these applications ignore how collaboration can improve their user scenarios or enable new ones.

Thus, the proliferation of numerous virtual communities, product review web sites, Internet chat applications, and online discussion boards illustrates the importance of developing collaborative applications. Along these lines, both DealFinder and Project Voyager seek to explore and enable prototype implementations of collaborative and context-aware applications for mobile devices.

IMPLEMENTATION

DealFinder uses much of the infrastructure provided by Project Voyager, including a platform for tracking location using a Global Positioning System (GPS) receiver, storing position-indexed data remotely on the Media Lab's Wherehoo servers [5], displaying maps and location information, and delivering multimedia content (audio, photographs, text).

Project Voyager currently supports only one mobile device platform—Microsoft's PocketPC standard. Thus, we chose to use Compaq's iPaq H3650 PocketPC device to host our DealFinder application. To detect location, we use a Garmin GPS 48 receiver and transmit location information to the application via the PocketPC's serial port. To upload and retrieve data, we use a Sierra Wireless AirCard 300 CDPD modem attached to the device's PC Card slot.

Our prototype additionally allows users to search for and contribute pricing information and deals stored on a remote database server. This is done via a series of pre-generated forms that the user can access from the application's built-in menus. The user simply fills in several fields and retrieves a list of deals or uploads his/her contribution to the database.

FUTURE WORK

Since we use GPS as the only means for sensing position, DealFinder only works in outdoor areas where the system has a clear view of the sky. To handle the case when the shopper is inside a store, we cache the user's last known position when the system no longer receives location data from the receiver. We are also exploring different indoor position detection methods, including using RF tags and IR beacons. Furthermore, because of the limited bandwidth of our wireless data connection (4800-9600 bps), DealFinder is restricted to retrieving and sending only text data from the remote database. The system is, however, designed to support additional multimedia content (photographs, audio, and video) to take advantage of future high-bandwidth wireless networks such as GPRS or 3G-CDMA.

Currently, shopping data is cached on the local device as a text file and new data is periodically uploaded and downloaded to a web server at the Lab. However, this solution is neither scalable nor elegant. Thus, we are in the process of upgrading our infrastructure to use Wherehoo [6], a system which allows you to store and retrieve location-indexed data by position.

With these improvements, we will be able to deploy a more robust and scalable version of DealFinder. This will allow shoppers to search for and share additional information—including product reviews and personal buying history. These enhancements will enable us to properly evaluate how collaborative mobile applications can enhance a user's shopping experience.

CONCLUSION

We described our effort to prototype a collaborative, location-based mobile shopping application using commercially available hardware, existing wireless data infrastructure, and a prototyping toolkit that is still under development at the MIT Media Lab. While there are still numerous features we have yet to implement, DealFinder is a compelling demonstration of how collaborative mobile applications can help users improve their shopping experience by empowering them to access relevant information when and where they want it. Collaborative mobile applications, such as DealFinder, will empower us to share and access information without having to be tethered to a desktop computer, providing a powerful new interface to information that can potentially enhance many of the tasks we undertake today.

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REFERENCES

1. G.D. Abowd, C.G. Atkeson, J. Hong, S. Long., R. Kooper, M. Pinkerton. Cyberguide: A mobile context-aware tour guide. *ACM Wireless Networks.* 3 (1997) 421-433.
2. K. Cheverst, N. Davies, K. Mitchell, A. Friday, C. Efstratiou. Developing a Context-aware Electronic Tourist Guide, in *CHI Letters*, vol. 2, no1. Apr. 2000.
3. Project Voyager Web Site. Available at: http://www.media.mit.edu/pia/voyager/
4. J. Youll, J. Morris, R. Krikorian, P. Maes. Impulse: Location-based Agent Assistance, in *Software Demos, Proceedings of the Fourth International Conference on Autonomous Agents*. June 2000.
5. J. Youll, R. Krikorian. Wherehoo Server: An interactive location service for software agents and intelligent systems, in Workshop on Infrastructure for Smart Devices. Sept. 2000.