CenceMe: Injecting Sensing Presence into Social Network Applications using Mobile Phones (Demo Abstract)

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1. INTRODUCTION

The near overnight mass adoption of social networking portals, such as Facebook and MySpace, following that of email, instant messaging services, and personal web pages, shows people's continuing willingness to embrace technology facilitating social connection. We conjecture the next step in this progression will emerge from research on people-centric sensing systems (e.g., [3] [2]). The CenceMe system [4] transparently makes useful inferences from sensor data gathered using mobile consumer devices, and supports both the self-consumption and social sharing of this data.

2. DESIGN

The CenceMe system infers "facts" of various types (e.g., activity, social setting), which collectively compose the *sensing presence* of a person, an enhancement over conventional, largely textual forms of presence information often used in IM clients (e.g., "I am away"). CenceMe allows a user to: (i) automatically export enriched forms of presence information to members of her social network (e.g., publish status messages in Facebook), and (ii) support historical analysis of his activity (e.g., how often did I go to the gym this week?).

CenceMe users install a sensing daemon on their phone that is designed not to disturb the normal user experience. The daemon pipes data sampled from the available sensors on the phone through resource-aware classifiers [5] to produce facts about the user. Facts are buffered locally on the phone and opportunistically transmitted (e.g., via GPRS, WiFi) to CenceMe backend servers. Backend classifiers draw cross-user inferences and inferences requiring more facts than are feasibly stored on the phone. Ultimately, facts stored in the backend servers are made available (filtered for privacy) via a standard CenceMe API supporting synchronous and subscription retrival to applications such as web portals (e.g., Facebook, the CenceMe portal) and VOIP clients like Skype.

3. PROTOTYPE

Our prototype system runs on any Symbian-based cell phones that include JVM support (e.g., Nokia N95, N80). The soft-
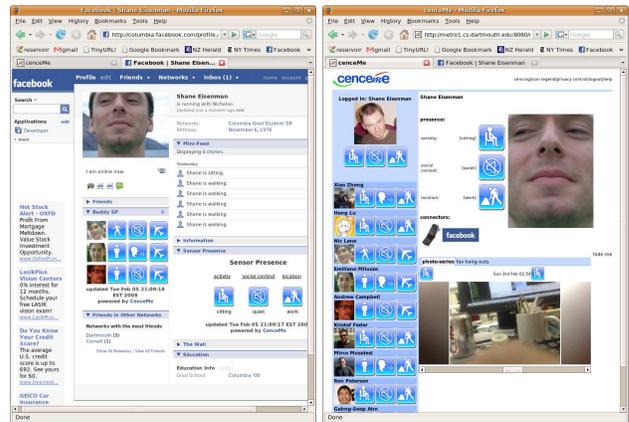
(a) Facebook with CenceMe   (b) CenceMe portal

Figure 1:

ware architecture of the sensing daemon is split into modules written in C++ and Java to maintain portability where possible while addressing limitations of the JVM system APIs. Fact bundles are pushed to the backend servers via XML-RPC calls over either WiFi or GPRS. A web-service-based API is offered from the backend servers to external systems. We have built: (i) a number of CenceMe widgets for Facebook (see Figure 1(a)), and (ii) a web portal that offers a broader and deeper user experience than the widgets alone can provide (see Figure 1(b)). For cell phones without the suite of sensors found on high-end models (e.g., accelerometers), we have developed a prototype CenceMe key ring attachment which provides the CenceMe daemon on the phone Bluetooth access to GPS and a 3-axis accelerometer. We plan to expand our current focus on consumer-driven social networking, and apply CenceMe technology to public health initiatives, domain specific sensing (e.g., skiing) and supporting logistics and production line efficiency in the commercial setting.

4. REFERENCES

[1] A. T. Campbell, et al. People-Centric Urban Sensing. *WiCon*, Boston, Aug 2006.
[2] M. Srivastava, et al. Network System Challenges in Selective Sharing and Verification for Personal, Social, and Urban-scale Sensing Applications. *HotNets*, Irvine, Nov 2006.
[3] S. B. Eisenman, et al. The BikeNet Mobile Sensing System for Cyclist Experience Mapping. *SenSys*, Sydney, Nov 2007.
[4] E. Miluzzo, et al. CenceMe - Injecting Sensing Presence into Social Networking Applications. *EuroSSC*, Kendal, Oct 2007.
[5] N. D. Lane, et al. Cooperative Techniques Supporting Sensor-based People-centric Inferencing. *Pervasive*, Sydney, May 2008.