IDEAS Competition Application:
Salvation Army Cambridge Corps
Drop-In Center Data Collection System

ABSTRACT

The Salvation Army in Cambridge provides a large array of services to the homeless population in Cambridge through its drop-in center and emergency shelter. Unfortunately, The Salvation Army collects very little information on the majority of its clients and how they use its services. This problem, not unique to The Salvation Army, is largely due to the inadequacy of information-management systems used by homeless services providers.

The case of The Salvation Army is an example of the larger problem of inaccurate and incomplete data on homelessness. This lack of data is one of the major barriers to improving policies and programs designed to combat the root causes of homelessness. For example, research is already being done to find links, if any exist, between homelessness and health-related issues, or homelessness and educational level. But in the absence of adequate hard data, the results are often questioned, and consequently, increased support for the homeless in these areas is not forthcoming.

Information on how homeless individuals use social services (like those provided at The Salvation Army), especially when correlated with individual demographic information, could therefore be very valuable information for homeless services providers and for researchers attempting to learn more about homelessness. Consequently, The Salvation Army in Cambridge has identified an improved information-management system as a significant need.

When The Salvation Army met up with some MIT student volunteers during the MIT Graduate Student Volunteer Day, the assistance of the volunteers was sought to develop a system that would enable The Salvation Army to capture this potentially important data. We are the MIT team that was formed to help them design and build this system.

The idea to provide all shelter clients with a bar-coded "discount card" is the brainchild of Leo Lloyd, Director of Operations for The Salvation Army Cambridge Corps. It allows for card-carrying shelter clients to be efficiently scanned into an in-house database whenever they receive services like a meal or bed for the night. In order to access many of these services, clients currently

are required to sign in using a paper and pencil. The new system would replace this existing process, producing electronic data which can be used for research and analysis.

To ensure that the card is well received, The Salvation Army will be working with other community partners to provide benefits like meal discounts and free MBTA travel with the use of the card. Further care will be taken to ensure that in its deployment, the interests of the homeless will be protected at all times.

The MIT team, after verifying the technical feasibility of this system, now stands ready to develop the prototype system for The Salvation Army. The goal of our involvement is to ensure that a homeless shelter (like The Salvation Army) is equipped to collect data as accurately and reliably as possible, so that we can better understand how best to serve the needs of the homeless.

BACKGROUND AND MOTIVATION

The Salvation Army Cambridge Corps provides several services to the homeless in Cambridge that together form a continuum of care designed to break the cycle of homelessness. The entry point into its services is the daytime Drop-In Center, which serves over 200 meals a day to homeless men and women and provides shower and laundry facilities, clothing, haircuts, medical consultation and counseling. The emergency shelter houses up to 35 homeless men, and those seeking further help in escaping homelessness may enter the longer-term programs which have the capacity to house and serve over 40 additional men.

This project fills a longstanding need to gather a rich set of information on homeless clients and the services that they use. The Salvation Army shelter/drop-in center desires to build a client information-management system that can enable the staff to accomplish the following tasks:

- Efficiently acquire a more complete record of client information during client intake interviews (first admission into the shelter). These fields might include a record of past shelters visited, reasons for being homeless, jobs held, jobs applied for, etc., in addition to detailed demographic information;

- During a client's stay in the shelter, efficiently collect usage information for the various drop-in center services (meals, showers, laundry, clothing, medical care, etc.). Data on individual service usage will be used for program improvements and may indicate trends in the problem of homelessness that can be researched;

• Keep records of shelter stay information current at all times, such as bed assignments, check-in and check-out times for each client, and late night arrival information.

• Generate reports from aggregate data collected for purposes of analysis, such as shelter stay frequency and duration. Aggregate information will be helpful in fundraising efforts.

The Salvation Army Cambridge Corps currently employs a web-based program called ServicePoint for its client data collection. ServicePoint is considered the "best in its class" in homelessness information management and has been adopted statewide as part of a data collection effort led by the McCormack Institute of UMass, Boston. Unfortunately, ServicePoint's web-based interface is very slow and labor-intensive, making certain tasks (such as collecting service usage information) utterly impractical for a large shelter such as The Salvation Army.

After significant experience with ServicePoint, the Salvation Army staff feel that the platform is inadequate for the critical tasks listed above. ServicePoint is capable of facilitating client intakes, but the labor-intensive interface (further slowed down by the wait-time to post information to the internet forms) makes collecting only the most basic intake information practical. Though ServicePoint could in theory be used to track individual service usage, this is utterly impractical, since it would require manually entering hundreds of services into the slow system each day. The Salvation Army does currently use ServicePoint to record shelter stay information, though this information must be entered manually through a cumbersome interface and can take up to an hour per day. ServicePoint is an adequate platform for collecting detailed client demographic information during lengthy needs-assessment interviews. These interviews are only conducted for a fraction of its shelter clients, however.

Faced with these limitations of the ServicePoint platform, The Salvation Army is seeking to develop an automated data collection system that can capture needed information more quickly and more reliably. We thus intend to develop an in-house database that serves not to replace, but to augment the ServicePoint program. This database will be designed to store a rich superset of data specific to The Salvation Army's services, and simply report the subset of data that ServicePoint requires, via a secure conduit.

INNOVATION

This plan is fairly simple in its essentials. Clients would be issued a card with a preprinted barcode when they first enter the Drop-In Center.[1] Staff workers would carry a handheld, scanning device (Handspring/Palm device with attached barcode scanner module) and would scan the client's card each time they offer a service (for example when they provide a lunch, or sign them up for a bed). By doing away with the daily sign-in sheets, this system is also more environmentally friendly.

A general-purpose application will be written for the handhelds to allow the staff worker to select the service offered with the simple click of a button. He would then scan the card at the point of service. The handheld device would record the barcode number, the associated service code, and a timestamp. At the end of each day, the data on the handhelds would be uploaded into the database via a hotsync connection, allowing us to collect patterns of service usage over time. If a client returned on a following day and had lost his or her card, another preprinted barcode card could be issued.

We will also develop a secure interface which would allow us to perform bulk data transfer between the Salvation Army in-house database and the ServicePoint database. With the bulk transfer mechanism in place, volunteer and staff worker will no longer have to deal with the slow and tedious web interface for ServicePoint.

Although the technology is not new, the innovation lies in the application of the barcode scanning technology, coupled with the data integration to homeless shelter service provision. Other existing barcode reader technologies were considered, but it was felt that the Palm handheld approach is the optimal solution at the present time. If the initial prototype proves to be success, we may attempt to implement the data collection over a wireless network. Not only would this eliminate the need for the staff to hotsync their handhelds on a daily basis, but it would greatly increase functionality as well (for example, by allowing the staff worker to confirm the identity of the card's owner at point-of-scan).

The biggest technical challenge may therefore be the fact that we will make the system platform-independent at the outset. We intend our code to be agile and modular enough to swap in a different database platform, or even a wireless network, without grief. By this token, any shelter should then be able to adopt our software with whatever hardware they possess.

---

[1] Just as Star Market can quickly issue a preprinted card and then enter the personal information into the database later, we could quickly issue cards and then enter personal information at a later time.

IMPLEMENTATION

The Salvation Army Cambridge Corps has already invested significant resources to make this project happen. John Pittard was hired in February as a full-time project manager for this and two other initiatives, and has been spending one third of his time managing this project. We have met with The McCormack Institute, a University of Massachusetts research institute that administers the ServicePoint program, and with Bowman Internet Systems, the company which designed ServicePoint, and have gained their support and begun discussions on how our in-house database will automatically feed into the existing ServicePoint database. We have written to five hardware and software companies seeking equipment and software donations (with replies pending).

The team has had several meetings to work out the vision for the project, as well as put together a preliminary set of design notes (attached as an Appendix). Finally, we have had initial discussions with Peak Technologies, an international barcode integration firm providing hardware, software, and consulting services, regarding the hardware and software requirements for the project. Peak Technologies representatives confirmed that the project is clearly implementable with the technology we are proposing to use.

The following is the expected timeline for the project:

Phase	Dates	Activity
I	1 Mar -30 Apr	Apply for grants, write to companies for sponsorship
II	1 Apr - 14 May	(a) Overall System Design (b) Work out data structures for database (c) Set up development and deployment servers (d) Familiarization of hardware
III	1 Jun -15 Jul	System Development (details in Design Notes attached as an Appendix)
IV	16 Jul -15 Aug	Initial trials
-	16 Aug onwards	Prototype System fully deployed

We plan to develop the application in 3 phases over summer and to complete the system by August 2002.

In addition to the technical aspects of the project, we are aware that there are other issues with regard to the deployment of the system that require some creativity to address. For example, an incentive structure will be put into place to ensure that clients will be inclined to keep their cards. The Salvation Army of course will not deny services to any client simply because he/she does not have a card. Thus we plan to investigate how a simple supermarket card will be

received in the first place, and then if it is acceptable, introduce our own card in gradual stages. We will endeavor to persuade clients that it will make things more convenient for them, since they no longer have to sign in. We also hope that an attractive design for the card, and the coupling of benefits like meal discounts and free MBTA travel will allow the card to catch on quickly.

Regarding privacy issues, we will give the client the option to preclude as much information as they want from the barcode, so anyone who scans their card will not be informed of anything the client has not already consented to release. In any case, the barcode is simply a number and without the in-house database to interpret that number, no information can be gleaned. Furthermore, the in-house database will be stored on a protected intranet and will not be released to an outside party under any circumstances.

ServicePoint still requires that complete biographic data be recorded for every new client, so these records will be kept separate from what is viewable by a handheld scan of the barcode. For example, the full biographic data can be stored on the in-house database, but to preserve privacy and anonymity, we can program handheld scans to reveal only as much information as the client is willing to disclose. In the most limited case, only demographic information like race and gender will be available on a handheld scan (characteristics which are usually undeniable anyway).

Additionally, the system will be gradually phased-in, allowing Salvation Army staff to inform clients of the new system and to promote the discount card idea. For example, before the cards are ever introduced, clients could be given information on the new system during an intake, giving them an opportunity to ask questions and discuss the system with Salvation Army staff. After this, participation in the first phase of implementation will be purely voluntary. Clients would (hopefully) request for a card, which would provide them with benefits both within and outside The Salvation Army. By the time the system is fully implemented, we hope that a large portion of clients would already have been using the card for some time.

The proposed system will be developed entirely by the MIT graduate student volunteers, with the full support of The Salvation Army Cambridge Corps. The volunteers will be divided into 2 teams (hardware and software). We do not anticipate any major technical hurdles in the implementation of the system, as we believe we possess all the relevant technical expertise. The biggest obstacle may therefore be providing the social impetus for acceptance of the card system. We also intend to invest a substantial portion of time to train the staff workers (after first being trained ourselves!) to deploy the system sensitively.

EXPECTED IMPACT OF PROJECT

Data on individual service usage will be useful for fundraising efforts. For example, if The Salvation Army were able to accurately document how many showers and loads of laundry are provided each year, they would be more likely to secure funding for their sizable water bill. Likewise, if accurate documentation is available on items that are taken from their clothing room, they could tailor their donation requests in order to receive items most needed by their clients.

And while these fundraising benefits are important, the real power of the system we are proposing is that it is able to track service usage on a client by client basis. Essentially, the new database will act as a simple data warehouse. We hope that this information will allow The Salvation Army to paint a clearer picture of how their program affects individual lives, allowing The Salvation Army to home in on what measures are actually proven to be effective in fighting homelessness. For example, if the chronically homeless use Salvation Army services (e.g. medical consultation and counseling) significantly less than the short-term homeless, this may indicate that an aggressive use of services should be promoted to break the cycle of homelessness. The Salvation Army could test this conclusion by encouraging its long-term clients to use its services more extensively. Alternatively, if the short-term homeless use services less, this might suggest that they have more extensive support networks outside of traditional homeless services providers. Such information could lead to a shift in The Salvation Army's tactics to combat chronic homelessness (for instance it might focus on restoring broken relationships that prevent certain clients from accessing possible support networks).

As another example, The Salvation Army could research whether certain populations, for example immigrants or the elderly, receive fewer services than other groups (i.e. because of language or cultural barriers). This information could lead to changes to improve service access for these groups (by hiring more Spanish-speaking staff, for example).

These are only some of the lines of research that could be conducted given individual service usage data. Though data alone usually cannot prove causation and suggest obvious program improvements, it may reveal important trends, thus focusing further research which can then be used to institute program changes. Additionally, this data will allow The Salvation Army to adequately measure the effects of a program change when it is actually instituted.

In order to design and deploy the system, most of the MIT student volunteers will work with The Salvation Army Cambridge Corps to better

understand their procedures. In the process, the MIT student volunteers will undoubtedly gain some valuable experience working with a community service provider and serving the community.

Should the initiative prove to be a success, there is a significant chance that it will be expanded and adopted by other homeless services providers, both within The Salvation Army and throughout the homeless service provider network at large. Thus, this work can potentially have national implications.

BUDGET

The following is the breakdown of the estimated budget required for the project (see attached Design Notes in Appendix):

Item	Cost per unit (est.)	Quantity Required	Sub-total
Development Server (1.5 GHz Intel Pentium 4, 40 Gig HD, 512 MB RAM 10/100 Ethernet, Windows 2000, 40xCDROM)	$1,000.00	1	$1,000.00
Production Server (1.5 GHz Intel Pentium 4, 40 Gig HD, 256MB RAM 10/100 Ethernet, Windows 2000, 40xCDROM)	$900.00	1	$900.00
Handspring Visor (Reconditioned)	$100.00	3	$300.00
Symbol CSM 150 Barcode Scanner Module	$150.00	3	$450.00
CodeWarrior for Palm OS	$400.00	1	$400.00
Anticipated Miscellaneous Hardware (Hotsync cables, palm accessories, etc.)	$450.00	-	$450.00
TOTAL			$3,500.00

We have applied to several community service grants for funding for this project and also written to several hardware and software companies to ask for donations, namely Handspring, Symbol Technologies, Dell, Gateway and Metrowerks. Of course we will not be purchasing any items that get donated, so money allocated to such items will be returned to any grants that we receive.

OUR TEAM

The following are the short bibliographies of our team members:

✔Ji-Jon Sit - Hardware team leader. Second year graduate student in Electrical Engineering, Research Lab of Electronics. Long-time Palm aficionado, with some experience in programming Win32 apps.

✔Ben Leong - Software team leader. First year graduate student in Computer Science at the Advanced Network Architecture Group, LCS. Obtained S.B. and M.Eng. from MIT in 1997, currently in the PhD program. Experience in Computer systems design, web applications and databases.

✔John Pittard - Project Manager, The Salvation Army Cambridge Corps. Obtained A.B. in economics from Harvard University, June of 2000. Formerly worked as a Business Analyst at McKinsey & Company.

✔Leo Lloyd - Director of Operations, The Salvation Army Cambridge Corps.

✔Indraneel Chakraborty - First year graduate student in Computer Science at the Advanced Network Architecture Group, LCS. Obtained B. Tech from IIT (Guwahati) in 2001, currently in the PhD program. Experience in Computer systems design and programming.

✔Cynthia Lo - Third year graduate student in Chemical Engineering, PhD research on electronic structure calculations to study heterogeneous catalysis. Experienced in Linux network system administration, Perl, and HTML, some experience with SQL databases.

✔Lik Mui - PhD student in EECS. Rhodes Scholar. Obtained EECS S.B. and M.Eng from MIT in 1995, Management MPhil from University of Oxford in 1997. Experience in computer systems design, web applications and databases.

✔Steven Richman - First year graduate student in Computer Science in the Programming Methodology Group, LCS. Obtained B.S. from UC Santa Barbara in 2000.

Archit Shah - Master of Engineering student in Computer Science at LCS. Obtained S.B. in Computer Science with minor in Biology from MIT in 2001. Worked for two years as software developer at ArsDigita Corporation. Experienced in web applications, web security, and databases.