SCORE11 Project: Mass Observation (MOb)

Proponent: Stephen Fickas

Project Description

The Mass Observation (MOb) project will support the study of a question or issue through in-situ observations by a collection of people. Observations will be made using consumer devices that support mobile applications. For many student teams, the most readily available mobile device will be the Android OS running on an emulator for lab testing and a cell-phone for field testing. However, Android alternatives are clearly possible, e.g., iPhone, Blackberry, Smartphone.

There are three components of the desired system. First, there must be a means for a person (the *Initiator*) to enter a study question (the *observation event*) and to make it available to a set of people (the *observers*). The Initiator has the ability to choose the group by name/email, by region, or by other discernible attributes (or even by direct permission). Second, there must be a means for observers to observe. This may include answering questions (posed by the Initiator), making notes, taking pictures, providing audio commentary. Third, there must be a means of collecting observations and making them available for analysis and viewing. The Initiator may choose to make observations public (perhaps anonymously), or to summarize the collection of observations. Or to simply use the data privately.

Examples of Use

Transportation: An initiator (a private citizen or a government agency) might call upon the citizens of a city or region to help answer questions about the accessibility of transportation. Observations, both good and bad, will be collected. See, for instance, the Complete Streets Assessment tool (CSAT): http://www.uoregon.edu/~schlossb/be_gis.html.

Livability: similar to transportation, citizens could be asked to observe positive and negative aspects of daily living within a region. For instance, see the Photovoice project: http://www.wvphotovoice.org/.

Citizen Science: Recruit field observers for a science project. For instance, perhaps a mobile version of Celebrate Urban Birds: http://www.birds.cornell.edu/celebration.

Games: A simple game would be a treasure hunt with observations as "proof", e.g., http://www.associatedcontent.com/article/62281/how_to_have_a_photo_scavenger_hunt.html

The Functional Requirements

There are three stakeholders in the MOb system: the Initiator of an Observation Event, the Observers, and the Consumers of the observation data. The requirements for each will be discussed in this section.

The Initiator

You will provide a web interface for the Initiator that will allow him or her to develop an observation event (OE). The OE can be started and terminated by the Initiator. The group of people who can participate (make observations) can be managed by the Initiator. The Initiator will select the OE interface that can be used by the observers, e.g., check-boxes, image capture, voice recording, written notes.

An Observer

You will provide a mobile application (MA) that assists an observer in making an observation in the field (in situ). The MA should support various means to capture an observation (as prescribed by the Initiator). The observation should be time and location stamped. It may optionally include a unique ID identifying the observer (if indicated by the Initiator). The MA must have a means of transferring observations from the device to a web-server. Alternatives should be possible, e.g., instant transfer using cellular connection, delayed transfer until wifi available, transfer to desktop computer using cable.

An optional (not required) function for the MA is a proactive component that aids an observer in making a useful observation, e.g., by guiding them to a specific location, by showing the observer what areas have already been explored (by the observer or by other observers participating in the event).

Consumers of Information

You will provide a web-based interface that will allow a set of consumers to view the observed data from an observation event, and optionally to explore/analyze it. The Initiator can set the consumers to be a single person (e.g., himself or herself), or a group of people. The greater the power for consumers to visualize and make sense of the observations, the better.

The Non-Functional Requirements

The non-functional requirements (NFR) for the project are given below.

Privacy (and its companion, Security)

In some observation events, it may be that observers wish to remain anonymous. In essence, they wish to provide an observation but to not be personally identified as the observer. Several issues arise:

1. The MA given to the observer *does* record identifying information and attaches it to an observation.

2. Observations are kept on the phone and the phone is obtained by another. The phone can be linked to the observer, and hence, the observations on it can be linked to the observer.

3. Observations are sniffed when transferring to a web server and the sender is identified.

4. Observations can be coincidentally linked to the observer being at the observation point at the time of observation, e.g., by a public broadcast of the observer's location through loopt[1] (legitimate) or location-logger (spyware).

These are difficult problems and teams are not expected to solve them, in general. However, teams should note efforts employed to mitigate some or all of them, e.g., use of encryption techniques.

Authentication
In some cases, observations might need to be "signed" by an observer. This allows the Initiator to determine if the observation has come from an invited observer.

Accessibility
Observers may have impairments that limit their ability to use certain forms of observation recording. For instance, those with a visual impairment may prefer to use speech commands and voice recordings. Those with a speech impairment may wish to use non-audio interaction. Some physical disabilities may limit the use of a device through its touch-screen.

Affordability
On one hand, the mobile device must have the power to run the MA. And a means of transferring observations to a web-server. However, this should not require an expensive cellular service plan. For example, as new versions of cell-phones hit the market, old versions may be tossed in a drawer. As long as the old versions retain the ability to either transfer data using wifi or cable, they may be fine devices for participating in the MOb system, even without cell service.

Device Inclusion
The more devices that are supported, the larger the set of observers there will be to draw from. Teams may wish to consider the use of a browser-based approach such as HTML5 to avoid writing separate apps for each device OS. Note, however, that HTML5 (and web-apps in general) do require live Internet service to function; see affordability.

Testing and Evaluation

We expect teams to show their effort in unit testing. In terms of system testing, we suggest these options:

1. Recreate of one or more existing (but narrow) mass observation events in the team's MOb system. For example, this observation event uses many features that are similar to ones that will be found in your team's system: http://www.parkscan.org/send-observation. Can it be recreated easily by your student team? Similar question for other examples listed in the Examples of Use section. Find a set of observers that will help with evaluation. Ask the original authors to comment on your system.

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[1] http://en.wikipedia.org/wiki/Loopt

2. Find an Initiator not involved with your project. Ask him or her to organize and run an observation event of their own. Let them choose a topic that they think would be interesting to a group of observers. They will use your system to set up and run the event.

In both options, collect quantitative usage data as well as qualitative data in the form of post-event questionnaires to the three stakeholder groups.

Sponsor Involvement

The project sponsor, Stephen Fickas (fickas@cs.uoregon.edu) is willing to interact with student teams in general. However, final grading of team projects will rest heavily on their involvement of stakeholders and fielding of working systems (see the section above).