The AusStage *Researching Audiences* Mobile Service

Part of the Aus-e-Stage Project 2009 – 2011

Aus-e-Stage Background Information

AusStage fulfils a national need for public access to reliable information on the full spectrum of live performance in Australia, delivering a data set of national significance to researchers, postgraduate students, policy makers in government and industry practitioners; there is no other comparable database in existence. However, the conventional database methods of text-based search-and-retrieval are, on their own, no longer sufficiently effective in meeting the evolving needs of arts and humanities researchers. As a result, the Aus-e-Stage project has evolved from this need for new visual interfaces to interact more flexibly with quantifiable research data and to collaborate more productively across sectors of the creative economy.

Under the Aus-e-Stage project three new services will be designed, tested and deployed to operate alongside AusStage's current text-based search-and-retrieval service. These services are:

- Mapping Events
- Navigating Networks
- Researching Audiences

It is anticipated that the new *Researching Audiences* mobile service will allow AusStage to solicit live, location-based input from users, providing AusStage with data that is missing from present archives: immediate, on-location, experience-near responses to Australian performing arts practice. The significance of the mobile interface as a demonstration project for researchers seeking a continuous flow of research data from mobile, dispersed subjects will be readily applicable in media studies, cultural studies, cultural tourism, arts education and consumer research.

This project intends to create

(1) a mobile phone based feedback facility for spectators to respond to productions by recording short SMS-style comments as well as a mobile web interface to collect medium length responses for other users to read and comment upon, and
(2) a social networking tool for researchers, spectators and practitioners to track the popularity of live performance events.
(3) a real-time, location-aware, map-based service providing up-to-date information on productions, artists and venues and access to box office services

The mobile service will be developed and tested in conjunction with AusStage research partners in industry and government. Funding has been made available to pilot the mobile interface with the Adelaide Festival Centre, which produces multiple festivals, with Windmill, the national children's performing arts company, and with the Australian Dance Theatre, widely regarded as one of the most well known dance companies in the world. There will also be close collaboration with the Australia Council for the Arts, the Australian Government's arts funding and advisory body, to develop the mobile technology for an industry-ready audience research methodology.

The pilots will be undertaken with the approval of the Flinders University Social and Behavioural Research Ethics Committee. Respondents will be invited to send in feedback via SMS, Twitter or mobile web messages. They will not be required to register for the service. Data will be stored in a de-identified form. The number of the mobile device used to send an SMS or the Twitter identifier will not be recorded in the AusStage system. Provisions for access to data, analyses and results will respect the interests of production companies and respondents; individuals will not be identified.
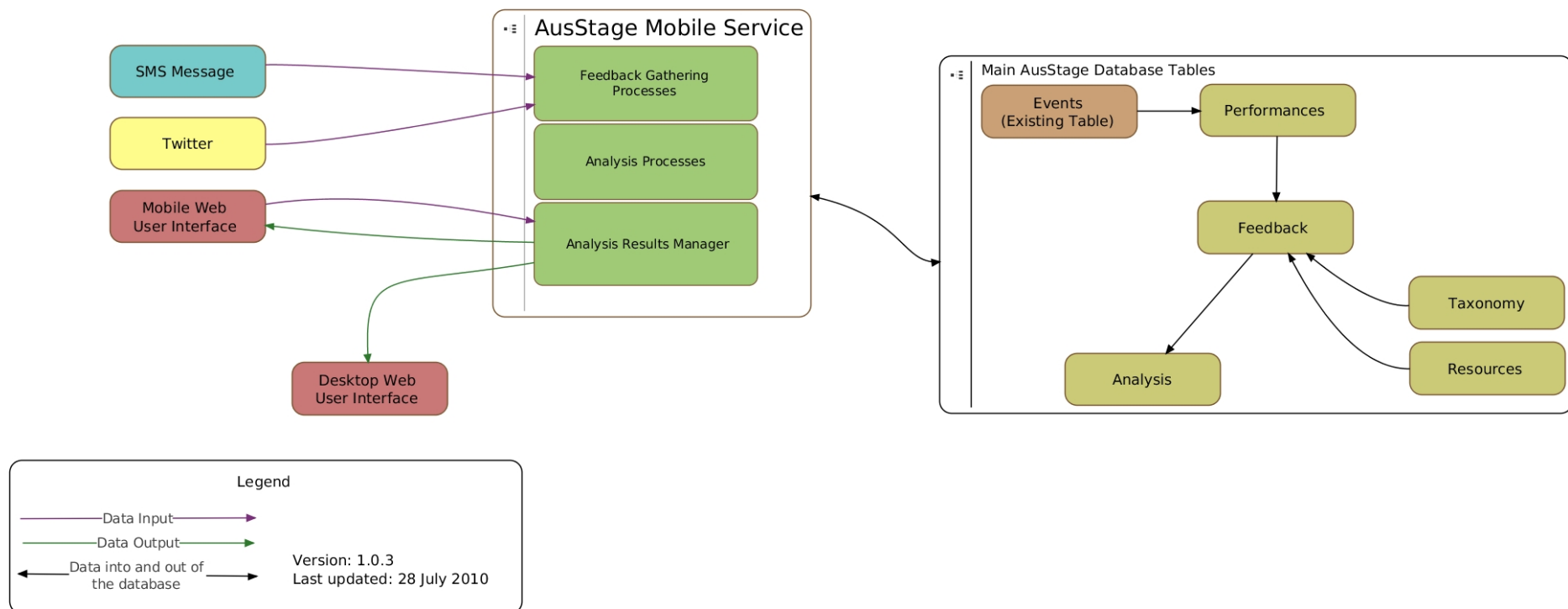
Technical diagrams and details of the planned mobile service are shown in more detail on the following pages.

Technical Specification

Overview

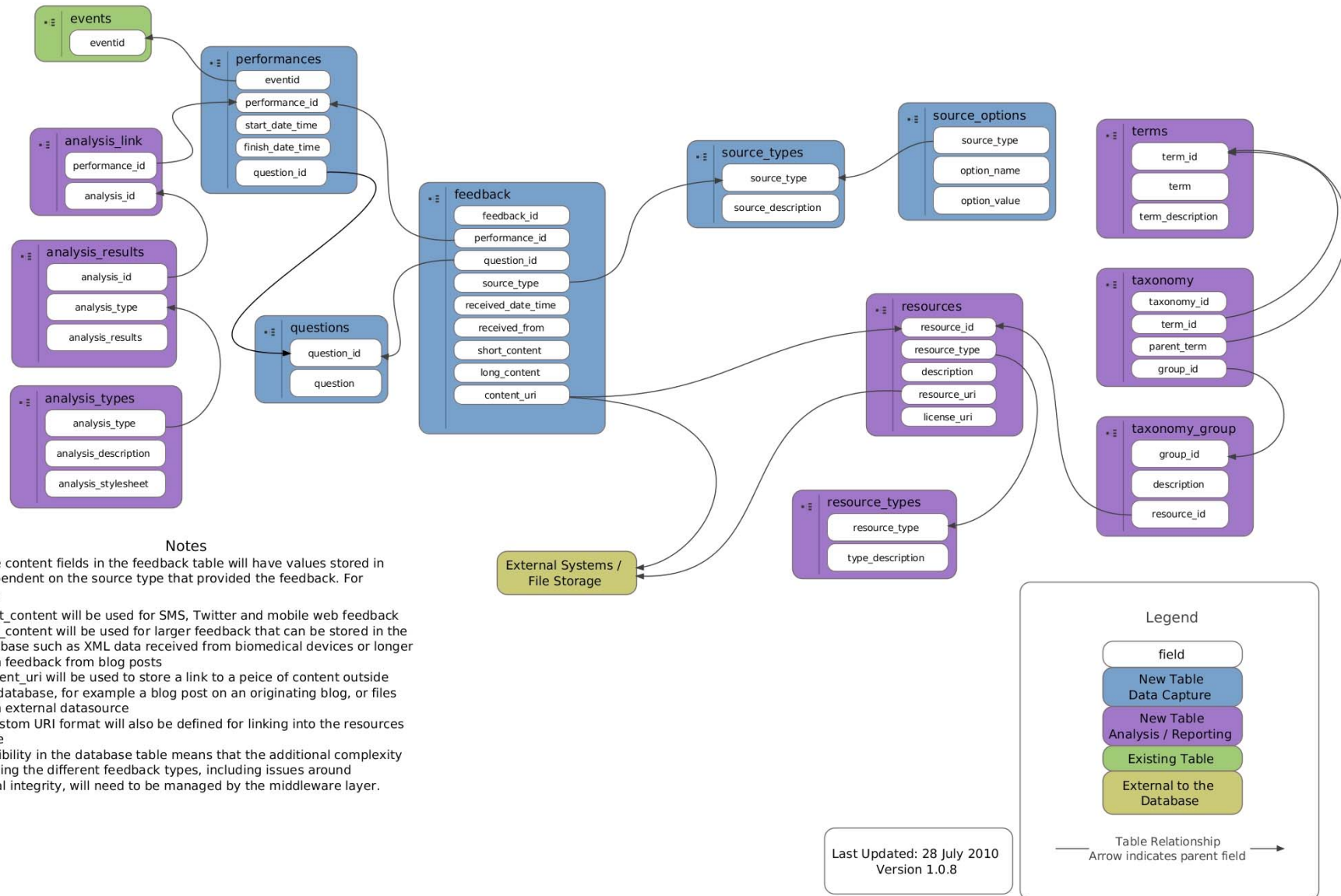**Figure 1: AusStage Mobile Service: Concept Diagram**

AusStage Mobile Service -
Preliminary Concept Diagram

The *AusStage Mobile Service Concept Diagram* shows how feedback can be gathered from the three anticipated services (*SMS Message*, *Twitter* and *Mobile Web*) and how that feedback is integrated within the existing AusStage database. It also highlights that there are different types of analysis that can be applied to the feedback as highlighted by the *Analysis Process* box on the diagram. Analysis results of this feedback will be made available to mobile and desktop clients as appropriate, for example ensuring that the results are formatted correctly for display on the smaller screen size of a mobile device as opposed to a desktop computer and that participating pilot companies have approved the release of results..

Figure 2: AusStage Audience Participation via Mobile: Database Structure

AusStage Audience Participation via Mobile
Database Structure

Notes

The three content fields in the feedback table will have values stored in them dependent on the source type that provided the feedback. For example:

- short_content will be used for SMS, Twitter and mobile web feedback
- long_content will be used for larger feedback that can be stored in the database such as XML data received from biomedical devices or longer form feedback from blog posts
- content_uri will be used to store a link to a peice of content outside the database, for example a blog post on an originating blog, or files from external datasource
- A custom URI format will also be defined for linking into the resources table

Such flexibility in the database table means that the additional complexity of managing the different feedback types, including issues around referential integrity, will need to be managed by the middleware layer.

Last Updated: 28 July 2010
Version 1.0.8

Legend

field

New Table
Data Capture

New Table
Analysis / Reporting

Existing Table

External to the
Database

Table Relationship
Arrow indicates parent field

The *AusStage Audience Participation via Mobile Database Structure* diagram shows the proposed changes to the AusStage database. These changes include tables that fall into four categories. These are:

1. *Feedback*: Tables are *Events*, *Performances*, *Feedback*, *Questions*, *Source Types* and *Source Options*

These tables store *Feedback* from audience participants, link the feedback to *Performances* and *Events* as well as store information about the source of the feedback. The feedback is associated with other AusStage data via the *Performances* and the existing *Events* table.

2. *Analysis*: Tables are *Analysis Link*, *Analysis Results* and *Analysis Types*

Records held under the *Analysis* category contain information about the various types of analysis that can be conducted and link the results of the analyses stored in the *Analysis Results* table with the rest of the data via the *Analysis Link* and *Performance* tables.

3. *Taxonomies*: Tables are *Terms*, *Taxonomy* and *Taxonomy* G*roup*

These three tables are used to store taxonomies that are used for the interpretation of common abbreviations used in SMS and Twitter messages to support the various analysis processes that can be undertaken. For example, interpreting the :-) ("smiley face") into the word "happy" before undertaking mood word analysis.

4. *Resources*: Tables are Resource and Resource Types

These tables will be used to store links to resources that are used as part of the gathering or analysis of feedback. For example storage of links to emotive images or to license agreements. For example the use of emotive images sources from Flickr will be used under the terms of one of the Creative Commons licenses.

Further information on these tables and fields can be found in the AusStage tables and fields document managed by the AusStage Project Manager, Jenny Fewster.

Figure 3: AusStage Audience Participation via Mobile: Dataflow Overview
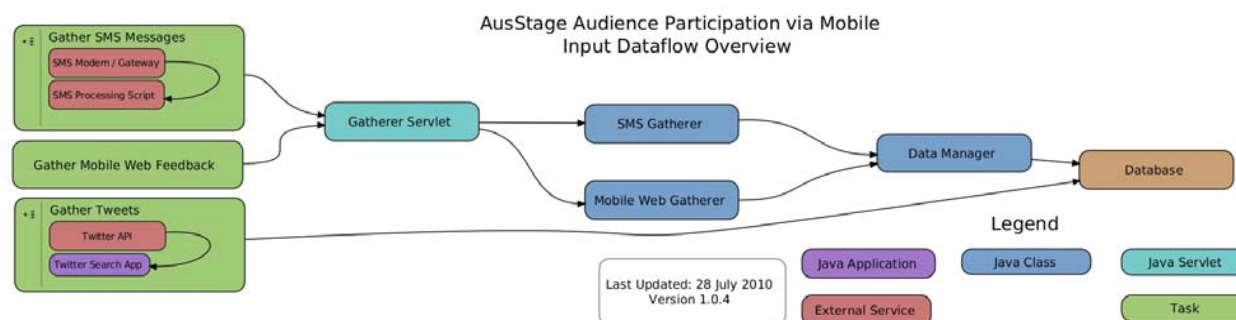
The *AusStage Audience Participation via Mobile Dataflow Overview diagram* demonstrates how data flows into the system from SMS or Twitter. This diagram highlights the modular structure of the system which enables easier integration with any additional data sources that may be required in the future but are currently outside the scope of the project. Additional information relating to feedback gathered from mobile web services will be appended to this diagram as available. Detail of each component of this diagram is available overleaf.

SMS MESSAGE

SMS, or Short Message Service, is a service component of the GSM mobile system, using standardized protocols that allow the exchange of short text messages between mobile phone devices. SMS text messaging, commonly referred to as "texting", is the most widely used data application in the world and results in the exchange of brief written messages between mobile phones over cellular networks.[1]

SMS is one of the planned methods for audience response to performances under the Aus-e-Stage project. Audience SMS responses gathered either during or immediately after performances will be directed to a mobile service number linked to a mobile gateway appliance (i.e. a modem) attached to the AusStage server.

On receiving an SMS response, a processing script held on the server will accept and format the SMS message as a HTTP post request to the Gatherer Servlet for storage and subsequent analysis. This processing script will, when necessary, aggregate multi part messages into a single request to the Gatherer Servlet. Due to the sensitive nature of gathering feedback from an audience during a performance it is not anticipated that the system will send messages back to respondents but this facility will be possible should circumstances require it. There will be a cost to the respondent for sending an SMS message which is dependent on their individual mobile subscription for standard SMS messages (not premium SMS messages). It is anticipated this will be approximately 25c per message. Further detail on this process is shown on the *AusStage Audience Participation via Mobile: Dataflow Overview* diagram. *.*

Technical Information

- Data Format: Plain Text
- Character Encoding: ASCII / UTF-16 (Data will be stored using UTF-8)
- Individual Message Size: Between 160 - 70 characters depending on encoding
- Typically 140 - 160 characters
- Messages can be joined together and sent as a single unit
- Available Metadata:
    a. Text of the message including the unique performance identifier and / or hashtag
    b. Mobile device number
    c. Date & Time that the message was sent
- Metadata used by the system
    a. Text of the message including the unique performance identifier and / or hashtag
    b. Mobile device number
    c. Date & Time that the message was sent

Storage Requirements

The AusStage feedback table will contain the following fields to be used with data received via SMS:
1. feedback_id: a unique identifier for each row in the table
2. performance_id: the unique identifier for a performance. As derived from the unique identifier included in the message or via a hashtag and the date/time that the message was sent.
3. question_id: the unique identifier for the question that prompted the feedback
4. source_type: an identifier indicating that this feedback was an SMS message
5. received_date_time: the date and time that the feedback was sent
6. received_from: a cryptographic hash constructed using the mobile device phone number
7. short_content: a variable length character field with a maximum size of 4000 characters

SMS Collection Methodology

Users submitting feedback via SMS will compose their message on their phone and send it to a specified phone number. This phone number will be registered with a GSM modem or gateway to be attached to the

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1 http://en.wikipedia.org/wiki/SMS

AusStage production server (refer to *SMS Gateway* below). Each SMS message will include a unique identifier for the performance or company presenting the performance.

The SMS dataflow is as follows:

1. A user composes an SMS message on their phone, including a unique identifier which will connect the response to either a performance or the company presenting the performance (a hashtag).
2. The user specifies our phone number as the destination
3. The message is sent from the phone and enters the mobile phone network
4. The message flows through the mobile network to the AusStage GSM modem
5. The modem passes the SMS to the the low level software
6. The low level software re-formats the message as an HTTP post
7. The HTTP post is sent to the Feedback Gatherer component of the AusStage Mobile website
8. The Feedback Gatherer validates the message, including determining which performance this message is about, and stores the data in the database
9. The SMS message becomes part of the data-set to be analysed and aggregated for display

Positives of this collection technique

- SMS is supported by all mobile phone devices
- The majority of mobile phone users are familiar with the way to compose and send SMS messages
- It is the easiest way for audience members to provide feedback

Negatives of this collection technique

- The SMS message must contain a unique string used to identify the performance. This reduces the amount of text available to the feedback and may cause usability issues
- Need to interpret the shorthand and abbreviations used by SMS users
- Direct per-message costs to users and Aus-e-Stage
- Geographic restrictions associated with mobile networks

SMS Gateway

The SMS gateway will consist of an SMS modem (costing approximately$900) connected via RS232 serial connection to the AusStage production Sun Server, Triton.

The SMS modem is a 2G/3G/Telstra NextG capable modem that will reside in the CSEM data centre alongside the AusStage servers. It will use a Telstra NextG pre-paid SIM to ensure maximum reliability and signal strength in the CSEM data centre. The use of NextG also maximises the future flexibility of the facility by allowing high-speed mobile internet applications as well as richer media services such as MMS.

When a message is detected by the SMS gateway infrastructure, it is retrieved along with the sender number and time and date and passed to the SMS action system. Typical message reception latency is 5-10 seconds, with a peak message handling rate of 10 per minute due to limitations in the GSM specification.

The SMS action system determines what should happen to each SMS message based on the sender and first word of the SMS message. If a matching pair is found, then an associated script is executed. Any SMS that does not trigger such a script is processed by a default handler. For AusStage this handler will submit a HTTP POST request to the AusStage web server, creating the point of insertion into the AusStage database and software.

The SMS infrastructure allow allows sending of messages by calling a specified script that takes the recipient list and message body as arguments and then sends the message to each recipient in turn. The peak message handling rate is 10 messages per minute due to limitations in the GSM standard.

Thus, in summary, the SMS gateway infrastructure supports both sending and receiving SMS messages at a rate of 10 per minute. By injecting messages directly into the AusStage software we have complete freedom over how we utilise SMS messages.

The NextG subscription should be on a pre-paid basis, on each recharge selecting the 1c SMS option to maximise the number of SMS messages that can be sent for any given cost per month. Also, the recharge should occur before the previous recharge expires to allow the carry-forward of any credit from the previous month, again to maximise the value that can be derived from the subscription.

The existing SMS gateway software infrastructure created by the CSEM Computing Services Group will be replicated on Triton, but with all components owned by the AusStage user, so that changes can be made without recourse to the Computing Services Group. This infrastructure consists of a cron job that regularly executes an EXPECT script that uses standard AT modem commands to check for new SMS messages and sends any queued messages.

There will be an initial setup fee charged by the Computing Services Group for commissioning the SMS gateway infrastructure and for the installation of the modem on Triton. However, there should be no ongoing charges from the Computing Services Group as the SMS gateway infrastructure will have all files owned by the AusStage user, allowing Paul Gardner-Stephen to make subsequent changes while employed directly by the Aus-e-Stage project.

TWITTER

Twitter is a free social networking and microblogging service that enables its users to send and read messages known as *tweets*. Tweets are text-based posts of up to 140 characters and can be sent openly to many or restricted to a select group. The Twitter service's API (Application Programming Interface) allows other web services and applications to integrate with Twitter.[2]

Twitter usage has evolved rapidly since its inception in 2006 and the quick, message style format fits well alongside SMS and Mobile Website based interfaces as shown in red on the *AusStage Audience Participation via Mobile Component Overview.*

In the Aus-e-Stage project, Twitter is expected to be particularly useful for companies that may tour both nationally and internationally. In this scenario, Twitter will offer similar functionality to SMS technology for audiences who may be unable to access Australian SMS services.

Twitter posts can be grouped by topic or type according to the hastag identifier (which will serve as a unique identifier for the production company or performance). For example: *#ADT This dance performance is really great!* In this example #ADT indicates that the message is intended to refer to an Australian Dance Theatre performance and the remainder is the respondent feedback. .

Twitter messages will be retrieved every minute (or as often as is possible) during a performance's season including a two hour window after the final performance using the Twitter API by a Java based application and added to the AusStage database.

Technical Information

- Data Format: Plain Text
- Character Encoding: UTF-8
- Individual Message Size: 140
- Available Metadata includes:
    a. Text of the message including unique performance identifier and / or hashtag
    b. Date and time that the message was sent
    c. Unique identifier of the message in the Twitter system
    d. What application was used to send the message
    e. Complete profile of the user that sent the message, including their Twitter user name
- Metadata used by the system
    a. Text of the message including unique performance identifier and / or hashtag

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2 http://en.wikipedia.org/wiki/Twitter

b. Date and time that the message was sent
c. Unique identifier of the message in the Twitter system
d. Twitter user name

Storage Requirements

The feedback table will contain the following fields to be used with data received via Twitter:
1. feedback_id: a unique identifier for each row in the table
2. performance_id: the unique identifier for a performance. As derived from the unique identifier included in the message or via a hashtag and the date/time that the message was sent.
3. question_id: the unique identifier for the question that prompted the feedback
4. source_type: an identifier indicating that this feedback was an SMS message
5. received_date_time: the date and time that the feedback was sent
6. received_from: a cryptographic hash constructed using the mobile device phone number
7. short_content: a variable length character field with a maximum size of 4000 characters

Twitter Collection Methodology

Users of Twitter send messages to each other by including the recipients user name in the message prefixed by the @ symbol. For example a message sent in response to an earlier message displayed in the real-time results feed will look like #ADT *@023 This dance performance is really great!* In this example @023 refers to an earlier message collected by the system that this message responds to.

The Twitter dataflow is as follows:

1. A user composes a Twitter message on their phone or other mobile device, including a unique identifier which will connect the response to the performance or the company presenting the performance.
2. The message is sent from their device to the Twitter network either via SMS or via a dedicated application on their phone, or by accessing the Twitter mobile website.
3. The message is stored in the Twitter system.
4. Periodically a Java based application uses the Twiter API to check for new messages that have arrived since the last messages were gathered. The unique identifier of the last message retrieved is used as a part of this request.
5. Any new messages are validated, ensuring that the unique identifier can be found and matched, and the feedback stored in the database.
6. If a unique identifier can not be found the message will be sent to AusStage personnel for analysis.
7. The unique identifier of the most recent message is stored separately to the feedback for later use.
8. The Twitter message becomes part of the data set to be analysed and aggregated for display

Positives of this collection technique

- Early adopters of this technology are becoming increasingly familiar with sending messages about their activities
- Messages are sent to us and they will also be shared with the users social network
- No direct costs as most early adopters have smartphones with a mobile data plan
- Not restricted geographically by mobile networks

Negatives of this collection technique

- The Twitter message must contain a unique string used to identify the performance. This reduces the amount of text available to the feedback and may cause usability issues
- Need to interpret the shorthand and abbreviations used by Twitter users, which may not be the same as that used by SMS users

MOBILE WEB (INPUT)

The Mobile Web refers to web browser-based access to the World Wide Web using a mobile device connected to a wireless network. Such mobile devices include smartphones or netbooks which can access the internet via integrated wireless capabilities or via an independent device such as a USB modem or PCMCIA card. The Mobile Web primarily utilises optimised pages written in Extensible Hypertext Markup Language (XHTML) to deliver content to mobile devices.[3]

A mobile website for audience feedback will provide a rich user experience targeted at users who have phones with a 3G connection such as the Apple iPhone or Android powered devices. The advanced functionality of these types of devices includes faster network speeds, enhanced media and scripting capabilities and GPS functionality.

In the Aus-e-Stage project, Mobile Web technology will enable the collection of longer pieces of feedback (>140 characters) and potentially the collection of data in different response formats (e.g. images, audio, video, emoticonography). Audience members will visit a customised mobile web page to input their response. Access to aggregated analysis of audience response data will also be accessible via this mobile web service.

Technical Information

- Data Format: Plain Text
- Character Encoding: UTF-8
- Individual Message Size: up to 4000 characters
- Available Metadata includes:
    a. Text of the message
    b. Date and time that the message was sent
    c. Geolocation of the user (dependent on device capabilities & approval from the user)
    d. What application / device was used to send the message
    e. Unique identifier of the performance
- Metadata used by the system
    a. Text of the message
    b. Date and time that the message was sent
    c. Unique identifier of the performance

Storage Requirements

The feedback table will contain the following fields to be used with data received via the mobile web:
1. performance_id: the unique identifier for a performance
2. number: a unique numerical value for the response relative to the performance_id.
3. question_id: the unique identifier for the question that prompted the feedback
4. source_type: an identifier indicating that this feedback was from a mobile source
5. received_date_time: the date and time that the feedback was sent
6. short_content: a variable length character field with a maximum size of 4000 characters

Mobile Web Collection Methodology

Users will interact with an AusStage website designed specifically for use on mobile devices. The user would search for a performance by keyword or location (as described in the Mobile Web Output section below). Search results will list the performance title and location, and, if available, links to a mobile web version of the event table from the AusStage database, a 'map' showing the venue's location, the mobile web input page (Audience Feedback) for that particular production and/or a real-time stream of audience response data.

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3 http://en.wikipedia.org/wiki/Mobile_Web

Users select the ' Audience Feeback' button for the performance that they are attending. Users would then submit their feedback via a form.

Additional checks could conceivably be performed with the user's consent, such as matching the user's geolocation to the known location of the venue where the performance is occurring. This could help to validate the likelihood that users providing feedback actually attended the event. Additional testing will be required to determine the efficacy of this type of approach. This link will only be returned in search results during a performance's season.

The Mobile Web data flow is as follows:

1. A user accesses the AusStage mobile website using their device while at or near the venue
2. User searches for performance by keyword or location.
3. User presented with returned search results listing show and location alongside relevant available links
4. The user selects 'Audience Feedback' link alongside the performance they wish to provide feedback on
5. The user enters the feedback into an online form
6. The form submits data the data to the Feedback Gatherer component of the system
7. The feedback is validated and then stored in the database
8. The feedback is now ready to become part of the data-set that will be used as part of the various analysis techniques

Positives of this collection technique

- Users can provide longer feedback than they can using the SMS or Twitter techniques
- Users don't need to enter a unique identifier for the performance
- No direct per-message costs to users or AusStage

Negatives of this collection technique

1. Only smartphones with mobile web access will be supported by the mobile website.

DESKTOP WEB (INPUT)

The Aus-e-Stage mobile web service will readily link to the LIEF funded Desktop Web feedback components currently under development. These desktop web focused components will be implemented after the SMS, Twitter and Mobile Web components have been put in place as part of the Aus-e-Stage project.

FEEDBACK GATHERER

The Feedback Gatherer component of the mobile service diagram represents a common interface for the way in which feedback is received from other components of the system (e.g. SMS). A Java based application will be used to retrieved messages from Twitter as it will be possible to respect the limited of the Twitter API in this way. For example limiting the number of requests for new messages in response to error codes from the Twitter service

Feedback can contain a unique performance identifier, a company based identifier such as a hashtag, or both. Using the unique performance identifier the piece of feedback can be matched to the appropriate performance. If a company specific identifier is used the date and time of when the feedback was sent in by the audience member will be used to determine the performance that this feedback is about. In this way the system is capable of identifying feedback using both types of identifiers. Importantly the unique performance identifier will take precedence over the company hashtag and an exception report will be

generated if a matching performance could not be found. In this way the feedback can be examined manually and added to database as required.

ANALYSIS PROCESS

The Analysis Process will be built around a group of pre determined objectives and analysis techniques. These will be derived from the requirements of the production companies working with researchers on the pilot projects.

Working in conjunction with pilot organisations, AusStage researchers are developing a set of content analysis techniques. These techniques will be encoded into automated procedures to aggregate qualitative data into abstract representations for immediate feedback to respondents. Each company will access their results through the user interface – a desktop web page, provisionally called 'Live Data', on the AusStage server. While each companies' Live Data page will look slightly different, each will be recognisably AusStage and provide a platform for future project developments to incorporate such modular, discrete analytical tools into a larger, one-page-for-all, type solution. A mobile web page will also display this data in a 'Live Data' page for the performance. Due to the additional constraints of the mobile web platform these pages will be standardised using the common AusStage theme.

Proposed analysis techniques could include:

- a real-time stream of results relevant for a particular search term (e.g, #ADT). A simple display of responses that shows the most recent result at the top of the page, with each new response pushing earlier responses further down the page. Results will be listed alongside their numerical identifier.
- tag cloud – simple static tag cloud, to visualise the frequency of certain words in response data; – for example, determining the frequency of specific "mood" words in feedback from a performance could provide an indication of how a particular audience felt during or after a show.
- emergent tag cloud – an interactive tag cloud in which users may 'drill-down' into response data by temporarily excluding large, high-frequency words to reveal smaller, lower frequency ones
- emoticons – extracting the emotional content from response data by, for instance, measuring the frequency count of emotion-related words, and displaying results using emotional icons
- image translation – translating response data into image results by aggregating content to identify key words, and using these keywords to search and display results from a keyword-tagged image bank.
- symbolic analysis – visualising response data in symbolic form by aggregating content into categories visualised as symbols (e.g. star rankings)
- comparative analysis – using one or more of these methods to compare results multiple performances, with different audiences, and so on,

The project does not intend collecting quantitative data or audience demographics; nor does it aim to convert qualitative audience feedback into statistical information.

See Appendix: Natural Language Processing.

ANALYSIS RESULTS MANAGER

Results of the various analysis processes are stored in the database as a XML document associated with the performance(s) that were analysed using a specific technique. In this way additional analysis techniques can be supported without the need to modify the underlying database schema.

The Analysis Results Manager will use an XSLT style-sheet to transform the XML results document into HTML for display in an Internet browser. The XSLT will have rules specific to mobile web and desktop web presentation that will be used when required.

DATA MANAGER

Once processed, the feedback is passed to the Data Manager for storage in the database. Access to the database is abstracted via the Data Manager component. In this way if the underlying database platform is to change in the future then this component will be the only one that will require updating.

EVENTS
(EXISTING TABLE)

In order to make the mobile feedback process work well exact date and time data is required. Feedback will be received from multiple performances of the one production. For example, only 3 of say 15 performances may be used in the audience feedback process and it is important to identify which actual performances the feedback relates to.

A new table, Performances, is proposed which will hold information about each performance that feedback is collected about. Fields in this table include accurate start and finish times for the performance. The Performances table will link to the existing Events table in a many-to-one relationship. Records in both Events and Performances tables will be created before audience feedback is collected.

DESKTOP WEB (OUTPUT)

Note: The desktop component lies outside the scope of the Aus-e-Stage project; it will be funded by AusStage under LIEF.

The desktop web user interface will allow companies and researchers (as approved by participating pilot project partners) access to results stored by the Data Manager. It is expected that each participating pilot project partners' interface will look slightly different and reveal slightly different functionality. Each interface will allow companies to

- search for results
- display processed results
- display real-time SMS, Twitter and Mobile Web responses

According to each pilot project partner's wishes, interfaces will provide for the provision of downloading processed results in an appropriate format. For example, Tag Clouds might be downloaded as .jpg files. Real time streams of results will not be able to be downloaded.

Search protocol:

1. Each interface will contain a search box where users enter search terms (e.g. #adt) and date parameters for their search. Complex search terms will be handled using Boolean operators.
2. Search results will be retrieved in all available formats for that particular project partner.
3. Users will be offered the choice of display formats (e.g. real time stream, tag cloud, etc).
4. Users select display format.
5. Results are displayed.

Search logic:

Results will be retrieved according to a keyword search. Users will enter hashtags into the database which correspond to the performance_id stored in the feedback table. If the user enters in a search term that does not correspond to a performance_id stored in the system a search failure message will be displayed prompting the user to the AusStage database to find the correct search term as relevant for the performance_id. Searches will be able to be refined using by entering dates in a box provided.

MOBILE WEB (OUTPUT)

The mobile web interface will provide users with real-time, location-aware, map-based,up-to-date information on current productions, artists, venues and real-time streams of Aus-e-Stage aggregated responses as described by the first dot point in the Analysis Processor section.[4]

Users will have the ability to link externally to valid box office services (if existent) relative to particular events or to the mobile web input page (see above) relative to a particular event.

The mobile web output interface will consist of a search page where users search for shows based on keywords or their current location.

Users will be returned a list of results relevant to the search query.

Search results will list the performance title and location, and, if available, links to a mobile web version of the event table from the AusStage database, a 'map' showing the venue's location, the mobile web input page for that particular production and/or a real-time stream of audience response data.

Event Info Function

Clicking on the 'event info' button will take users to a mobile web version of the event table as stored in the AusStage database.

Map Function

Clicking on the 'map' button will take users to a mobile version of Maps by Event Name for that particular event. The map will automatically load with a marker indicating the venue's location. Clicking on the marker will bring up the venue's address, contact and ticketing information (phone number or link) in a pop-up box. This function will always be available to users.

Audience Feedback Function.

Clicking the Audience Feedback Function will take users to the Mobile Web Input page as described above.

Real-Time Audience Responses Function.

Clicking on the 'real-time audience data' button will take users to a screen that displays real-time results for the searched performance. Results will appear at the top of the page and be replaced by newer results as they are received. This function will only appear for productions that are currently running..

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[4] "a real-time stream of results relevant for a particular search term (e.g, #ADT). A simple display of responses that shows the most recent result at the top of the page, with each new response pushing earlier responses further down the page."

Appendix: Natural Language Process

From: Wei Ren <wei.ren@flinders.edu.au>
Subject: Re: Mobile Tech Spec - Analysis Process
Date: 24 May 2010 8:48:52 AM GMT+08:00

Hi Jonathan,

After quickly investigation on the Natural Language Processing (NLP) based analysis I found the following list of natural language processing toolkits http://en.wikipedia.org/wiki/List_of_natural_language_processing_toolkits. They are implemented in different languages and with different type of license.

Basically, in order to extract concepts, entities, relationships and sentiment from text, the NLP based analysis involves the following tasks: Part-of-speech tagging (POS), named entity recognizing,phrase chunking,Tokeniser, etc. The above mentioned toolkits can realize more or less of these functions.

Among those toolkits, I noticed that there are 2 software mentioned voice of the customer (VOC) or "sentimental analysis" on their web pages.

1. One is GATE (General Architecture for Text Engineering) http://gate.ac.uk/biz/customers.html. The inputs to the process can include twitter posts and text messages. But it didn't mention the implementation details. Although core GATE is free and open, they also provide customisation services http://gate.ac.uk/customisation/

2. The other is lingPipe which has free or commercial license. However, linguistics expertise is needed to understand the program. http://alias-i.com/lingpipe/demos/tutorial/sentiment/read-me.html

In addition to the above tools, I also found the following commercial software:

1) Attensity Analyze for Voice of Customer:
http://www.attensity.com/applications-services/applications/attensity-analyze/analyze-for-voc.html

2) Lexalytics: sentiment and text Analysis solutions. It provides a free trial version.
They have applications for Customer Satisfaction and Insight
http://www.lexalytics.com/industries/customer-satisfaction

3) SAS Sentiment Analysis (screenshots are provided)
http://www.sas.com/text-analytics/sentiment-analysis/index.html

4) Recently IBM Acquires Business of RedPill Solutions to bolster its analytics services : IBM Voice of the customer analytics (VOCA). However no further technical details were found.
http://www-935.ibm.com/services/us/index.wss/offering/igs/a1031535

Another related software from IBM is Content Analyzer (omniFind Analytics Edition) which has an online demo at following:
http://www14.software.ibm.com/webapp/download/demo.jsp?id=IBM+Content+Analyzer+Benefits+and+Capabilities+Jan08&S_TACT=104CBW71

Although there are many software to realize the analysis process, further evaluation or expertise or customer services are needed if we want to know more details, to what extend they can automate the process and whether they can aggregate data automatically also.

Regards,
Wei