Super-charge Your Speech Application With Cross-Functional Reporting Techniques

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Cross-Functional Reporting Essentials

- Cross-functional reporting caters to both speech scientists / VUI designers and key business stakeholders.

- Cross-functional reporting takes into account individual ROI for reporting dimensions to avoid ‘reporting data for reporting’s sake’.

- Comprehensive reporting combines ‘micro’ hotspot analysis with ‘big picture’ trending and call path views.
Why we need reporting:
Application health and Business Goals

- Business stakeholders care about the **bottom line impact** of several **application** and **speech events**
- **Exit to live agent**
  - Transfer due to explicit caller request
  - Transfer due to errors (both speech and system)
  - Transfer by design (i.e. correctly routed calls)
- **Call path distribution**
  - Caller utterance events per dialog state
  - Caller behavior within and across modules
- **Application content ROI**
  - Open-ended speech dialog routing analysis: highest number of grammar hits provides valuable information about high-ROI application content additions
  - Voice-application data complements call center data traffic analysis, but call streams do not always match
Cross-Functional Reporting Design

- **Defines key terms**
  - Successful call
  - Automatable call
  - Compliant / non-compliant caller
  - Automation rate(s)
  - Designed vs. fail-state transfers

- **Creates agreement about reporting dimensions**
  - Call types: by DNIS, ANI, path, locale
  - Transaction types: single/multiple transactions per call, partial transactions with agent transfers, etc.
  - Tuning and business data: NoInput/NoMatch counts by dialog state, by grammar, prompt, population

- **Defines exact location of reporting trace points and transactions within the call flow**
  - Critical for proper success logging ($)

- **Defines reporting inclusions and exclusions**
Cross-Functional Reporting Instrumentation

- **Reporting is an architecture** and needs to be planned in before coding starts.
- Ideally, the *IDE* (Integrated Development Environment) for speech / VXML automates many rote reporting & logging tasks, including:
  - NoInput / NoMatch logging
  - `application.lastresult[].utterance` logging
  - `application.lastresult[].interpretation` logging

- **Trace Points**
  - Can occur inside or outside of transactions
  - Constitute milestones within a call
  - Can play ‘canary in the mine’ role for automated alarms

- **Transactions**
  - Have a beginning, one or more explicit or implicit end points (success, transfer, hang up)
  - Can be nested
  - Often contain one or more trace points
Reporting Goals for Business vs VUI / Speech Science

- Reporting **goals** for **business stakeholders** center around ROI, brand equity, and call management/CRM costs
  - Completed transactions within system
  - Survey results regarding caller experience, brand perception
  - Call stream analysis and live agent costing
  - Overall system hang time, infrastructure cost

- Reporting **goals** for **VUI / speech science** stakeholders often focus on detecting hotspots by dialog state
  - Grammar coverage: over-generating and under-generating grammars
  - Prompt design hotspots: cognitive load, chunking, end-focus
  - NoInput and NoMatch
  - Barge-in early
Reporting Goals for Business Stakeholders

Welcome Prompt

- Continue 91.0%
- Hang-up 1.1%
- Opt-out 7.1%

Authentication

- Continue 80.7%
- Opt-out 31.0%
- Hang-up 3.8%
- Error-out 0.8%
- Don't know 86.4%

Module 1
- 6.6% of all calls

Module 2
- 89.3% of all calls
- Hang-up 4.4%
- Error-out 0.1%
- System-init Transfers 0.5%

Module 3
- 4.0% of all calls
- Automated 87.7%

Module 4
- 0.1% of all calls
- Automated 89.0%

Module 5
- 0.015% of all calls
- Automated 92.2%

Authentication

- Continue 91.0%
- Hang-up 1.1%
- Opt-out 7.1%

Module 2
- 89.3% of all calls
- Hang-up 4.4%
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Module 5
- 0.015% of all calls
- Automated 92.2%
# Reporting Goals for Business Stakeholders

## Call Metrics (Displaying 1-2 of 2)

<table>
<thead>
<tr>
<th>Day</th>
<th># of Calls</th>
<th>Total Minutes</th>
<th>Avg. Call Duration</th>
<th>% Success Total</th>
<th>% Possible Success</th>
<th>% No Resolution</th>
<th>% Abandoned Before Menu</th>
<th>% Abandoned</th>
<th>% Request Transfer</th>
<th>% System Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 6th</td>
<td>412</td>
<td>477</td>
<td>01:09</td>
<td>82.8%</td>
<td>0%</td>
<td>6.3%</td>
<td>0%</td>
<td>10.9%</td>
<td>1.5%</td>
<td>85%</td>
</tr>
<tr>
<td>March 7th</td>
<td>325</td>
<td>388</td>
<td>01:11</td>
<td>83.1%</td>
<td>0%</td>
<td>5.2%</td>
<td>0%</td>
<td>11.7%</td>
<td>2.8%</td>
<td>82.2%</td>
</tr>
</tbody>
</table>

Export options: CSV | Excel

## Transaction Summaries

<table>
<thead>
<tr>
<th>Transaction Name</th>
<th># Initiated</th>
<th># Necessary Transfer</th>
<th>Net # Initiated</th>
<th># Completed</th>
<th>% Completed</th>
<th># Data Updates</th>
<th># Exit Before Completion</th>
<th># Transfer Before Completion</th>
<th># Transfer After Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>866</td>
<td>0</td>
<td>866</td>
<td>730</td>
<td>84.3%</td>
<td>0</td>
<td>91</td>
<td>45</td>
<td>696</td>
</tr>
<tr>
<td>WelcomeHome</td>
<td>68</td>
<td>0</td>
<td>68</td>
<td>67</td>
<td>98.5%</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td>WelcomeBusiness</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>80%</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>WelcomeHomeOrBusinessDirect</td>
<td>69</td>
<td>0</td>
<td>69</td>
<td>58</td>
<td>84.1%</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>HomeCallerChoice</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BusinessCallerChoice</td>
<td>423</td>
<td>0</td>
<td>423</td>
<td>320</td>
<td>75.7%</td>
<td>0</td>
<td>61</td>
<td>42</td>
<td>313</td>
</tr>
<tr>
<td>ConsumerElectronicsCallerChoice</td>
<td>247</td>
<td>0</td>
<td>247</td>
<td>232</td>
<td>93.9%</td>
<td>0</td>
<td>14</td>
<td>1</td>
<td>225</td>
</tr>
<tr>
<td>CustomerServiceOption</td>
<td>54</td>
<td>0</td>
<td>54</td>
<td>49</td>
<td>90.7%</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>47</td>
</tr>
</tbody>
</table>

Export options: CSV | Excel
Reporting Goals for VUI / Speech Science

- VUI / Speech science specialists perform in-depth analysis on hotspots based on both **business and VUI/tuning** reporting data

- VUI tuning addresses **business needs** and **caller experience optimization**

- Tuning changes should be **ROI-justified** based on expected impact on automation rates, brand equity, etc.
### Reporting Goals for VUI/Speech Science

- Hotspot detection by sorting for highest number of:
  - Final NoMatch, NoInput
  - Hangups
  - System or requested Transfers
- Once hotspot is detected, do detailed grammar or prompt analysis

<table>
<thead>
<tr>
<th>Prompt ID</th>
<th>Prompt Text</th>
<th>Type</th>
<th># of Hits</th>
<th># of Utterances</th>
<th># of Final No Matches</th>
<th>% of Final No Inputs</th>
<th>% of Hangups</th>
<th>% of System Transfers</th>
<th>% of Request Transfers</th>
<th>% ofHangup Transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>STLiveAgent#008</td>
<td>Please hold while your call is connected. For training purpo...</td>
<td>Guidance</td>
<td>644</td>
<td>45</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>0.5%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>STDetCallerNeedBus#474</td>
<td>Which of the following can I help you with? You can say Inform...</td>
<td>Ask</td>
<td>431</td>
<td>467</td>
<td>4</td>
<td>1</td>
<td>23</td>
<td>5.3%</td>
<td>4</td>
<td>0.9%</td>
</tr>
<tr>
<td>STSerialNumberCapture#651</td>
<td>Does your serial number have any letters in it</td>
<td>Ask</td>
<td>384</td>
<td>438</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td>2.6%</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>NTDirectCEProductType#14</td>
<td>When you hear the item the matches your need repeat it</td>
<td>Ask</td>
<td>251</td>
<td>253</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>2.4%</td>
<td>1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Reporting Goals for VUI/Speech Science

- Grammar level analysis, first grammar summary, then utterance by utterance to check for grammar coverage

<table>
<thead>
<tr>
<th>Grammars (Displaying 1 of 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar Name: SerialNumber.gsl Ask</td>
</tr>
<tr>
<td>SerialNumber.gsl Ask</td>
</tr>
</tbody>
</table>

Export options: CSV Excel
Reporting Goals for VUI/Speech Science

- Utterance level report: Analysis of utterance by utterance
  - to check for grammar coverage
  - Confusions
  - Optimize recognition engine parameters

<table>
<thead>
<tr>
<th>Utterances</th>
<th>(Displaying 1-200 of 405)</th>
</tr>
</thead>
<tbody>
<tr>
<td>---------------</td>
<td>-----------</td>
</tr>
<tr>
<td>4bc915e6-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>2944b75a-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>c1d77c90-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>40840f88-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>abb99252-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>85d20ace-e...</td>
<td>CR-out</td>
</tr>
<tr>
<td>e16c8dea-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>3485f970-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>997b6882-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>b06e657e-e...</td>
<td>CA-in</td>
</tr>
<tr>
<td>4cfa5cdc-e...</td>
<td>CA-in</td>
</tr>
</tbody>
</table>
Conclusions

- Reporting design is as important as actual application design

- The reporting design needs to address both business as well as VUI needs

- Reporting for speech application is different than standard IVR or call center reporting

- Well planned reporting can save time down the road, by avoiding hours of data crunching
Empowering Your customers and employees with speech technologies

SpeechTEKI 2006
The Voice Solutions Showcase

Empower

Thank You