Going Beyond Surveys with Biometrics and Video

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J.D. POWER

LivingLens
What’s the customer’s experience? How often do they walk away happy?
Background

J.D. Power’s Voice of the Customer (VoC)

- *Surveys:* Ask how you think or feel (ratings, verbatims)
- *Behaviors:* Observe behaviors to infer attitudes

Biometrics — observational research of the future

- Facial expressions (face emotions)
- Eye tracking
- Voice tone

*Note: Heart rate and Skin Response (GSR) are difficult to collect given direct body contact is needed.*
Biometrics takes physical information from the body and makes it quantifiable.
Biometrics—Facial Expressions

Facial encoding scans points on face then interprets into measurable emotion events.

Face emotions:
Joy, Anger, Surprise, Fear, Sad, Disgust, Contempt, Confusion, Frustration, and sentiments: Positive, Negative
Past Example — Consumer Evaluation of Automotive Websites

Figure 1: Build a Car Websites Were Utilized in Research Procedure

Figure 2: Facial Encoding for Emotions

Figure 3: Face Emotions during Initial Impressions

Figure 4: Factor Analysis of Core Emotional Dimensions

Any video source with visible human face can be utilized. Eye tracking required lab setup.
NEW — Consumer Evaluation of Public Utilities Websites

Public Utilities:
Companies provide electricity, natural gas, water, and essential services. Website and App interfaces are a primary touchpoint for their customers.

Research Goal – Evaluate customers utilities digital experience:
• Provide actionable recommendations for website improvement
• Support insights with customer videos and biometrics
• Determine brand ranking and recognize top performance
Consumer Evaluation of Utilities Websites

Tasks – Engage Users with Common Online Activities:

- Login and review account
- View usage
- Pay Bill
- Move service
- View outage map
- Report leak/outage
Data Collection for Public Utilities Websites

Survey:
Website ratings were completed after each set of tasks.

Key Factors:
- Appearance
- Ease of Navigation
- Availability of Key Info
- Range of Services
- Clarity of Information Provided

Face Video:
Video was collected in two ways...

1. **Survey Panels**: Self-record/upload video verbatim about online experience. Also includes: Voice Tone and Word Sentiment (voice-to-text).

2. **Lab-based**: Webcam video / eye tracking during online tasks. Repeated measures across task videos provided more data.
Customer Feedback uploaded via Self-Video Recording

Customers with video camera (desktop or mobile device) upload self-video about their website experience.

Customers answered two questions:

1) Please describe your overall satisfaction with website / app for utility company.

2) What did you like Best & Least? Please be specific.

______________________

N=60, Gender: M-31% F-69%
Age: 21-74yrs (25-40yrs most)
Client’s Access to Customer Videos

Highest Satisfaction Rating

Millennial Segment
Client’s DIY Results for Customer Videos

Face Emotions

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Smile</td>
<td>30.1%</td>
</tr>
<tr>
<td>Anger</td>
<td>22.33%</td>
</tr>
<tr>
<td>Joy</td>
<td>21.96%</td>
</tr>
<tr>
<td>Critical Thought</td>
<td>18.45%</td>
</tr>
<tr>
<td>Contempt</td>
<td>7.77%</td>
</tr>
</tbody>
</table>

Sentiment (voice-to-text)

- Positive: 88.37%
- Negative: 10.85%
- Unanalyzed: 0%

Voice Tone

- Engagement: 43.92%
- Laughter: 32.72%
- Anger: 23.96%
Analysis: Face Emotions & Survey Ratings (Panels)

Face Emotions analyzed across customer video verbatims and matched with syndicated survey ratings.

Research findings:
Customers with higher enjoyment shared more details and recorded longer video.

Negative emotions increased with lower ratings of website appearance and navigation.
Analysis: Face Emotions & Survey Ratings (Lab)

Face Emotions analyzed across task videos and matched with ratings from lab “deep dive” sessions.

Research findings:
Brand differences in Joy, Frustration, Anger (ANOVAs).
Top-ranked brand is same as panel videos.

Negative emotions increased with lower ratings of website appearance, services, navigation, clarity, info.

<table>
<thead>
<tr>
<th>Task</th>
<th>Joy</th>
<th>Pos</th>
<th>Neg</th>
<th>Confuse</th>
<th>Frust</th>
<th>Surprs</th>
<th>Anger</th>
<th>Fear</th>
<th>Contempt</th>
<th>Disgust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>14</td>
<td>3</td>
<td>17</td>
<td>53</td>
<td>37</td>
<td>38</td>
<td>61</td>
<td>22</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Report Outage</td>
<td>19</td>
<td>4</td>
<td>15</td>
<td>47</td>
<td>37</td>
<td>40</td>
<td>63</td>
<td>21</td>
<td>9</td>
<td>28</td>
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<tr>
<td>LogOn</td>
<td>18</td>
<td>7</td>
<td>12</td>
<td>39</td>
<td>29</td>
<td>44</td>
<td>51</td>
<td>23</td>
<td>11</td>
<td>28</td>
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<tr>
<td>Outage Map</td>
<td>16</td>
<td>4</td>
<td>19</td>
<td>58</td>
<td>41</td>
<td>36</td>
<td>65</td>
<td>17</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Report a Leak</td>
<td>15</td>
<td>2</td>
<td>23</td>
<td>60</td>
<td>47</td>
<td>34</td>
<td>67</td>
<td>17</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>View Usage</td>
<td>14</td>
<td>2</td>
<td>18</td>
<td>58</td>
<td>38</td>
<td>35</td>
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<td>20</td>
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<td>35</td>
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<tr>
<td>Pay Bill</td>
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<td>3</td>
<td>13</td>
<td>51</td>
<td>34</td>
<td>39</td>
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<td>23</td>
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<tr>
<td>Move Service</td>
<td>8</td>
<td>1</td>
<td>18</td>
<td>57</td>
<td>36</td>
<td>62</td>
<td>24</td>
<td>5</td>
<td>28</td>
<td>39</td>
</tr>
</tbody>
</table>

< Ranked by Highest Emotional Satisfaction (Joy) >  * Joy indicates significant brand differences: F(6,226) = 2.25, p < .03

Biometrics technology is different for Lab system and Panels which results in different emotion scales / metrics. Nevertheless, Joy remains a strong indicator of customer satisfaction.
Analysis: Compare Face Emotion, Voice Tone, Sentiment

Emotion measures analyzed across customer video verbatims and matched with syndicated survey ratings.

Research findings:
Brand Ranking for face emotion aligns best with survey ratings of overall customer satisfaction.

Voice Tone and Word Sentiment were not as correlated with survey results.

### Brand Ranks by Survey, Biometrics, and Word Sentiment

<table>
<thead>
<tr>
<th>Survey Ratings</th>
<th>Face Emotions</th>
<th>Voice Tone</th>
<th>Word Sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Satisfaction</td>
<td>Joy</td>
<td>Laughter</td>
<td>Engaged</td>
</tr>
<tr>
<td>Brand 9</td>
<td>9.3</td>
<td>Brand 4</td>
<td>Brand 14</td>
</tr>
<tr>
<td>Brand 3</td>
<td>9.3</td>
<td>Brand 3</td>
<td>Brand 2</td>
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<tr>
<td>Brand 1</td>
<td>9.3</td>
<td>Brand 14</td>
<td>Brand 1</td>
</tr>
<tr>
<td>Brand 4</td>
<td>9.0</td>
<td>Brand 3</td>
<td>Brand 2</td>
</tr>
<tr>
<td>Brand 7</td>
<td>9.0</td>
<td>Brand 6</td>
<td>Brand 6</td>
</tr>
<tr>
<td>Brand 11</td>
<td>9.0</td>
<td>Brand 11</td>
<td>Brand 12</td>
</tr>
<tr>
<td>Brand 2</td>
<td>9.0</td>
<td>Brand 12</td>
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<tr>
<td>Brand 12</td>
<td>8.8</td>
<td>Brand 9</td>
<td>Brand 4</td>
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<td>Brand 8</td>
<td>8.7</td>
<td>Brand 11</td>
<td>Brand 9</td>
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<tr>
<td>Brand 14</td>
<td>8.5</td>
<td>Brand 12</td>
<td>Brand 8</td>
</tr>
<tr>
<td>Brand 6</td>
<td>8.5</td>
<td>Brand 14</td>
<td>Brand 11</td>
</tr>
</tbody>
</table>

*Brands removed that had missing values (face emotions and voice tone) and couldn’t be compared*
What predicts customer satisfaction and face emotions?

Exploratory regression analysis indicate:

‘Enjoy’ increased most with positive sentiment but can move together with other emotions (surprise, fear).
(R2 = .73, F= 86.59, p<.0001)

‘Surprise’ increases when navigation is not optimal, and there is an abundance of range of services and key info
(R2 = .30, F=3.16, p<.05)

‘Disgust’ increases mostly with high duration but also when appearance is poor and navigation impacted
(R2 = .57, F=16.49, p<.0001)
Conclusions

| **Face Emotions** — Top brand in Customer Video Verbatims was the same as top brand in Task Videos. |
| **Survey Ratings** — Top brand was also a high performer in the survey ratings. |
| **Alignment of Face Emotions and Ratings** — Negative emotions increased with lower ratings of website appearance, navigation, clarity, and availability of key information. |
| **Eye Tracking and Usage Patterns** — Heat maps, task analysis, hit/miss patterns reveal key learnings for site improvements. |

Face biometrics are viable measures of consumer reactions and provide key insights.
Research Applications

Many opportunities for nonobtrusive harvesting of consumer emotions to assess attitudes and behavior

- Automotive, retail, travel, hospitality – Retail video feeds can provide evaluations of daily consumer reactions.
- Direct customer feedback – Smartphones/Tablets/Webcams can be used to leave video-based reviews of products and services.
- Census a branch or facility to assess/improve customer service from video feeds.
- Optional security use to assess/alert on extreme polarized emotions.
- Privacy and legal permissions are becoming necessary to record video.
In summary, biometrics and video continue to inspire as a viable source for value-add insights for our clients and their products/services

Questions?

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Data Science Analytics Center

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Biometrics / Video – Industry Recommendations

How to strengthen and promote use in market research:

- Biometrics are enabled by *ready-to-analyze data exports* for emotion %, strength, duration within optimal frame rate resolutions

- Built-in *data privacy features* to protect legal concerns
  - Configure pre-timed video destruction and storage to meet legal guidelines
  - Face blurring options – must gather face emotions *before* blurring

- Improve *Survey Panels integration* for sure-fire implementation to optimize/simplify video data collection. Grow sources so more panels are available. On-demand panels are good.

- *Faster servers and networks* during video processing to assure no interruptions or data impacts during video uploads

- *Dressed-to-Impress web interfaces* are needed to delight clients with terrific landing pages, customizable dashboards, and video show-reel highlights
Eye-Tracking Gives Key Insights on Tasks (Lab)

Most difficult: Report Gas Leak
Gas leak reporting blends into rest of web pages / doesn’t catch eye.
High time to find: 20-30 sec

Can’t find? Users Check Outages
Heat maps shows outages screen usage.
Websites now place “report gas leak” on outage maps.

Paying bills
How do users view the page?