Visualizing Excitement of Individuals and Groups

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Motivation
Motivation

http://goo.gl/FjppeB
THE RESULTS ARE IN: YOU CHEERED YOUR HEARTS OUT.

Motivation

How we measure heart rate:

Fitbit’s PurePulse® technology tracks heart rate automatically and continuously—right from the wrist. Now, with activity trackers like Fitbit Surge™ and Fitbit Charge HR®, users can monitor calorie burn, maintain intensity, maximize workouts and optimize their health, all without an uncomfortable chest strap. Visit [www.fitbit.com/purepulse](http://www.fitbit.com/purepulse) to learn more.

These results were determined using anonymous and aggregated data from Fitbit users in Seattle and Boston Metropolitan Areas on Sunday, February 1, 2015.

http://goo.gl/v7VVdU
Motivation
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Goal:

- capture and represent user excitement in the context of emotional self-awareness and group-level awareness
Data Acquisition and Processing

- UV sensor
- Charging port
- Microphone
- Barometer
- Galvanic Skin Response (GSR) sensor
- Heart rate monitor
Data Acquisition and Processing

Recorded galvanic skin response (GSR) and accelerometer (ACC) values for several people

Activities: watching a movie, an opera, and going to a museum

Participants: 3 to 4 at a time
Sessions: 20-60min

Synthetic datasets of up to 15 people
ACC values – sampled to synchronize them with GSR values

GSR values – de-trended and normalized to detect the extracted normal and stressed states

GSR issues: poor contact & tight fit
Design Considerations

Visualization tasks:
- Convey current excitement values for each user in a group
- Offer a short-term temporal overview of excitement levels
- Highlight the overall group excitement at a given moment

Focus points:
- Individual and group level excitement
Excitement Visualization

Animated glyphs representing each user’s excitement level

Components: rings and trails
Excitement Visualization

Experienced (GSR) vs. manifested (ACC) excitement

Note: Manifested excitement requires experienced
Excitement Visualization

Visual encoding of the animated dot trails:

- Clock-style
- Oscillating (with randomized direction)

<table>
<thead>
<tr>
<th>Captures excitement history</th>
<th>Highlights peak levels of excitement</th>
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<tbody>
<tr>
<td>Uncluttered and precise</td>
<td>Double encoding of the excitement level through adaptive oscillation</td>
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</table>
Excitement Visualization

Video

The solid grey circles represent the current experienced excitement level for each person, while the orange circles encode the current overall excitement (experienced & manifested).
Excitement Visualization

Video

In this representation, the orange dots move side to side in concordance with the level of excitement of the person, offering a bio-inspired encoding dimension.
Scalability

Adaptive oscillation – better visual differentiation of excited individuals
Scalability - Clustering Force Layout

Video
Javascript + D3
Supports both streaming data and JSON files

Handles:
• Data loss
• Streaming delay
• Unknown user IDs
• Customization for visuals and animation
Evaluation

Task: Explore the excitement visualization for groups of 3 to 4 people

Questionnaire related to the excitement levels of the group and the appeal of the visualization

8 participants (3 female), with ages 25 to 33
Evaluation
Evaluation

Open questions

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<tr>
<td>Simplicity</td>
<td>Visibility of overlapping circles</td>
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<td>Visual design</td>
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<td>Animation</td>
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Validation

Validating the data through the visualization

Comparison:

• Self-reported excitement levels vs. excitement visualization for data from cinema, opera and museum

Observations:

• Synchronized excitement
• Museum was perceived overall as less exciting
Moment of excitement for one of the participants at the museum
Conclusions

Visualizing real-time and historical excitement levels for individuals and groups through animated glyphs

- Two visual encodings: clock and oscillating
- Dynamic clustering layout

An initial evaluation offered promising results in terms of perception & insight generation

Future steps:
- Extending the timeframe of the history representation
- Improving the dynamic layout
Questions?