A Visual Analysis of Laughter

using the TV Sitcom Seinfeld

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Motivation

- Multi-camera sitcoms such as *Seinfeld* and *Friends* dominated the US sitcom production in the 1980s.
- Multi-camera sitcoms are usually recorded in front of a live studio audience.
- We want to analyze the amount of laughter that each main character receives from the audience and/or laugh tracks.
- We want to create a fun and unique visualization on an interesting topic - "What makes us laugh?"

Audience

- Sitcom Fans
- All Seinfeld Fans
- Anyone who is curious about
  - Laughter
  - Sitcom dialogue patterns

Main Questions

- How often does laughter happen?
- Which character gets the most on-screen time?
- What does the dialogue sequence look like for segments with a lot of laughing?
- Among the four main characters who gets the most laughs?
  - It is difficult to determine if certain character is responsible for a specific laugh
  - Instead, we can see which characters were present when a laugh sequence happened?

Tools

- Adobe Color
- Amazon S3
- Amazon Transcribe
- Bootstrap
- D3.js
- Python
  - aws-transcribe-transcript
- Video JS

Jerry

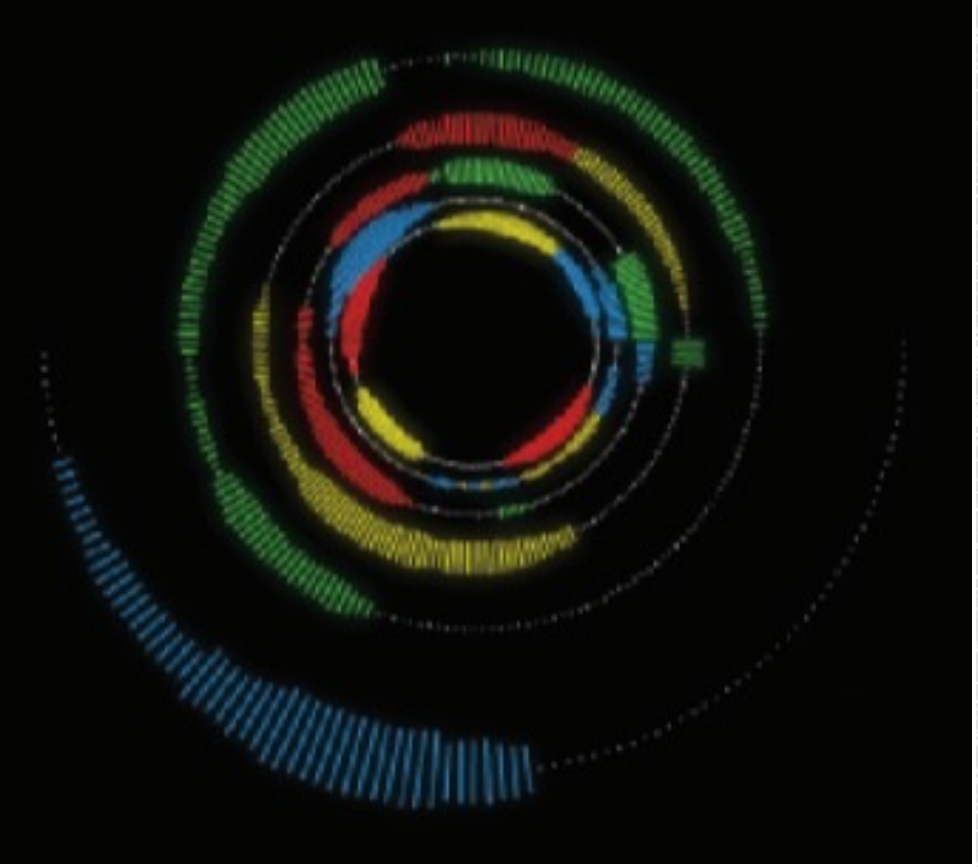
George

Elaine

Kramer

Data

- Seinfeld Episode – The Soup Nazi (s7e6)
  - Length: 22 mins 49 seconds
  - Granularity of data is 1 second
- Manually mark laughter
  - Currently the transcriber is not able to detect laughter
  - Three levels of laughter 1,2,3 (most intense)
  - 0 indicates no laughter
- ML + subtitle to transcribe and identify speaker
  - Manually check quality
  - Format that is compatible with D3.js
- Identifying a scene to group dialogue together
  - Manually mark scene start, end and description.
  - E.g., Jerry's Apartment, George and his soup



- We were inspired by the "Conversation Clock"
- Sitcoms like Seinfeld have few characters (four) and we wanted to visualize turn taking of dialogues.

"Conversation Clock" from the article "Social Mirrors as Social Signals: Transforming Audio into Graphics" - by Karahalios and Bergstrom.

Related Work & Differences (1/2)

- We visualize the entire episode as one ring segmented into scenes.
- We visualize laughter along with the conversation
- Each character is displayed as a separate color along a single donut (same thickness) ring.
- There is no history of conversation and the white space in the ring is utilized for summary statistics and a mini video player
- Selecting a segment generates a detailed view for the selected scene.

"Using Artistic Markers and Speaker Identification for Narrative -Theme Navigation of Seinfeld Episodes" by Friedland, Gottlieb, and Janin (2009).

Related Work & Differences (2/2)

- While looking if similar work has been done, we came across a paper by Friedland, Gottlieb, and Janin
- The paper uses speech markers to identify punch lines and focuses on Machine Learning related to diarization.
- The related work does not have a visualization that intersperses laughter and conversation.
- We want our visualization to be more exploratory in nature where the user can visualize conversation threads and laughter together.

DEMONSTRATION

LINK TO SERVER

Design Rationale 1/3

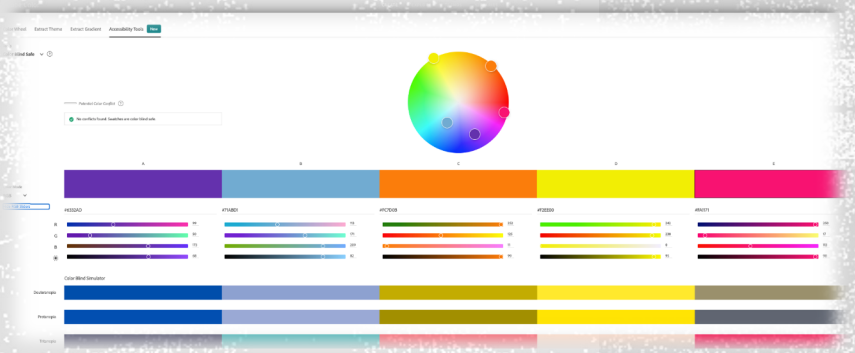
- The donut-like graph is the foundation of the visualization
  - Clicking on specific scenes will trigger detailed information.
  - Scene line graph that displays characters speaking in the scene.
  - Video of the specific scene.
- Intuitive interactions: e.g., clicking on specific scenes gives users a detailed view of the scene.
- Dialogue Filters: allows viewers to filter dialogue based on speaker.
- Horizontal lines in the line graph shows intensity of laughter.

Design Rationale 2/3

- Time is linear so why a circular visualization?
  - Better for seeing the big picture since it is more compact.
  - Easier to see the laughter rendered in parallel
  - Reminds one of a clock (think primetime hour)
  - Switch scenes like in view master or movie reel
- Individual Scene is a linear visualization?
  - Circular visual has too much distortion.
  - Better detailed view: Linearity show the start and end of each dialogue clearly.
  - See the dialogue pattern on top of the laughter

Design Rationale 3/3

- Color Scheme:
  - Color scheme is accessible to viewers with various color vision deficiency such as deuteranopia, protanopia, and tritanopia.



Insights 1/2

- Jerry has a head start due to the show's standup cold open.
- On-Screen Time Distribution
  - Jerry 26%, Elaine 23%, Other 22%, George 16%, Kramer 10%
  - Other characters are important to the storyline
  - 9 scenes do not have Jerry (6,7,8,9,12,14,15,16, 20)
- Laughter is distributed among the show's four main casts.
  - This shows that Seinfeld's comedy revolves around the dynamics of the characters; not just Jerry.
  - In this episode we see "The Soup Nazi" gets some very loud laughs

Insights 2/2

- Laughter Patterns
  - Scenes tend to end with laughing which then is cut out with theme tune before the next scene starts.
  - The laughter ranges from low chuckles to raucous laughter with audience clapping.
- Finding segments and scenes with heavy laughter
  - By looking at the laughter values in the circular visual we see that Scene 5: Crab Bisque is very funny.
  - We can see the dialogue patterns for the scene alternate between : Jerry – George and then Jerry – Kramer.
  - The scene ends with Kramer saying, "Yeah, but this is so nice and thick. Ahoy there!" , which gets a lot of laughs.

Future Work & Questions

- Generalize the visualization to work with other episodes.
  - More automation to process the dialogues
  - ML to detect laughter
- Include a chord diagram that shows character interactions.
- Layout changes
  - We felt restricted by our current D3.js knowledge.

Information References

- Amazon Transcribe https://docs.aws.amazon.com/transcribe/latest/dg/diarization.html
- Open CV Basics
  - https://youtu.be/RqlQYBcsq54
- D3 Resources
  - https://d3-graph-gallery.com/index.html
  - https://d3js.org/