

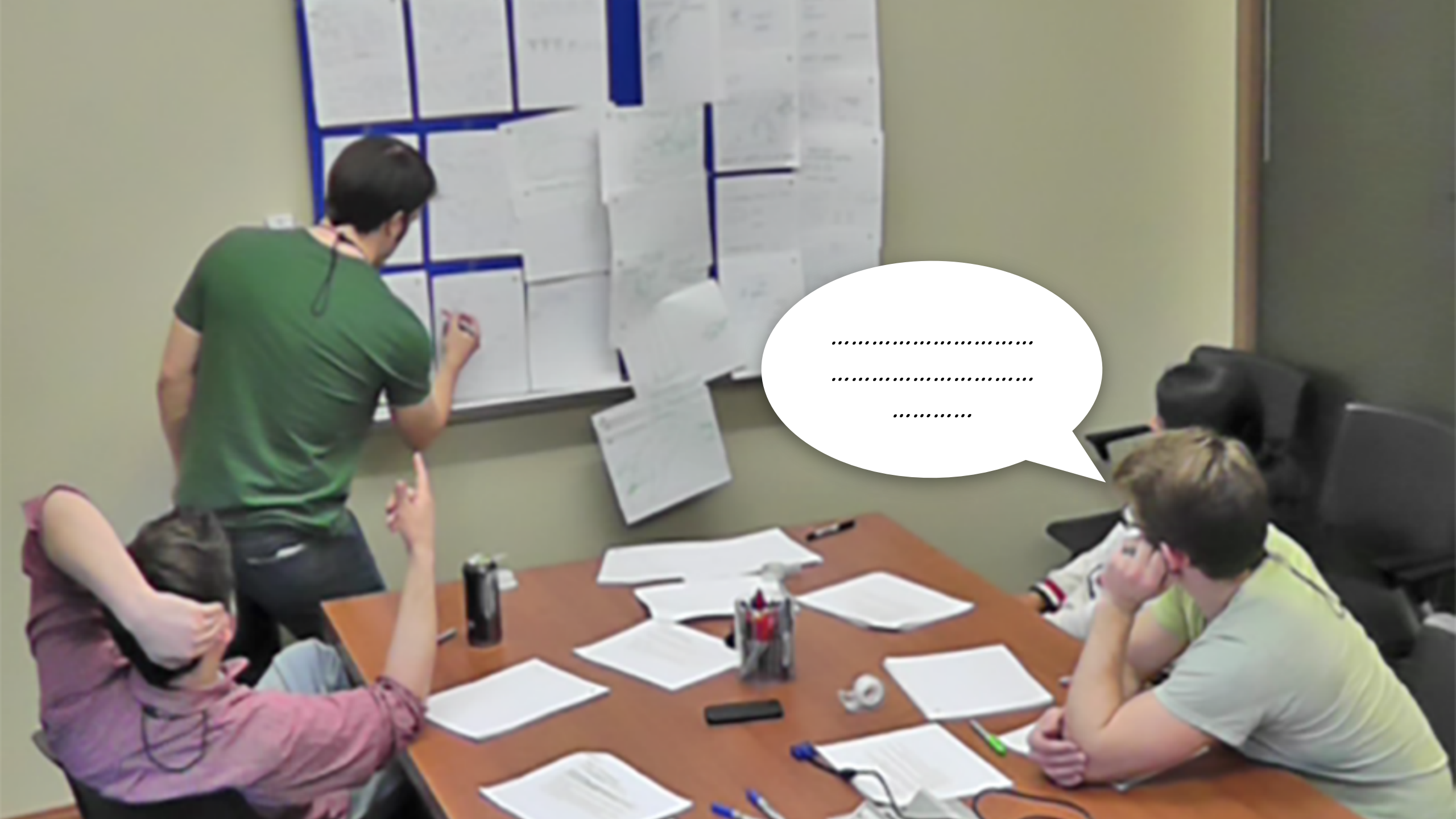
Visual Analysis of Unstructured Text Data

(and its application to Maintenance Work Orders)

Senthil Chandrasegaran

Postdoctoral Scholar

ViDi Labs, University of California-Davis



.....
.....
.....

Maintenance Data

Source: University of Western Australia System Health Lab (Excavator dataset)

StartDate	Asset	Original Short text	PM Type	Cost
7/1/04	A	BUCKET WON'T OPEN	PM01	183.05
3/20/05	A	L/H BUCKET CYL LEAKING.	PM01	407.40
5/5/06	A	SWAP BUCKET	PM01	0.00
7/11/06	A	FIT BUCKET TOOTH	PM01	0.00
11/10/06	A	REFIT BUCKET TOOTH	PM01	1157.27
4/21/08	A	REPAIR LOOSE BUCKET CYLINDER	PM01	0.00
10/2/08	A	REPLACE 2 BUCKET TEETH	PM01	1256.62
7/12/01	B	REPLACE MISSING LIP TIPS	PM01	1281.36
7/19/01	B	REPLACE LIP	PM01	1251.52
10/1/01	B	rebuild lip #3	PM01	0.00
10/10/01	B	REPLACE BUCKET TEETH.	PM01	681.10
10/29/01	B	Repair RH120 lip at P&H	PM01	22611.06
11/6/01	B	replace missing tip	PM01	1239.29
11/13/01	B	replace missing tip& adaptor.	PM01	221.15
11/16/01	B	Replace centre and LH lip shrouds	PM01	2118.87
1/15/02	B	OIL LEAK ON BUCKET....	PM01	0.00
2/6/02	B	REPLACE ADAPTOR LOCK	PM01	346.47
2/22/02	B	Fit a lip shroud	PM01	56.59
2/27/02	B	Refit left lip shroud	PM01	627.85
3/8/02	B	refit adapter and tooth	PM01	1186.45
3/12/02	B	FIT NEW TOOTH	PM01	397.57
3/12/02	B	cut off broken wear package	PM01	0.00

Maintenance Data

Source: University of Western Australia System Health Lab (Excavator dataset)

StartDate	Asset	Original Short text	PM Type	Cost
7/1/04	A	BUCKET WON'T OPEN	PM01	183.05
3/20/05	A	L/H BUCKET CYL LEAKING.	PM01	407.40
5/5/06	A	SWAP BUCKET	PM01	0.00
7/11/06	A	FIT BUCKET TOOTH	PM01	0.00
11/10/06	A	REFIT BUCKET TOOTH	PM01	1157.27
4/21/08	A	REPAIR LOOSE BUCKET CYLINDER	PM01	0.00
10/2/08	A	REPLACE 2 BUCKET TEETH	PM01	1256.62
7/12/01	B	REPLACE MISSING LIP TIPS	PM01	1281.36
7/19/01	B	REPLACE LIP	PM01	1251.52
10/1/01	B	rebuild lip #3	PM01	0.00
10/10/01	B	REPLACE BUCKET TEETH.	PM01	681.10
10/29/01	B	Repair RH120 lip at P&H	PM01	22611.06
11/6/01	B	replace missing tip	PM01	1239.29
11/13/01	B	replace missing tip& adaptor.	PM01	221.15
11/16/01	B	Replace centre and LH lip shrouds	PM01	2118.87
1/15/02	B	OIL LEAK ON BUCKET....	PM01	0.00
2/6/02	B	REPLACE ADAPTOR LOCK	PM01	346.47
2/22/02	B	Fit a lip shroud	PM01	56.59
2/27/02	B	Refit left lip shroud	PM01	627.85
3/8/02	B	refit adapter and tooth	PM01	1186.45
3/12/02	B	FIT NEW TOOTH	PM01	397.57
3/12/02	B	cut off broken wear package	PM01	0.00

Importance of Visual Analysis

Human in the Loop: Make use of analyst's tacit knowledge

Visual pattern identification: Visual representations allow detections of patterns & anomalies

Text logs → NLP + Text Visualization

Providing **contextual information** when visualizing text

Visualizing **intrinsic & extraneous measures** to identify patterns/anomalies

Integrating **machine learning & visualization** for analysis/monitoring

Text logs → NLP + Text Visualization

Providing **contextual information** when visualizing text

Visualizing **intrinsic & extraneous measures** to identify patterns/anomalies

Integrating **machine learning & visualization** for analysis/monitoring



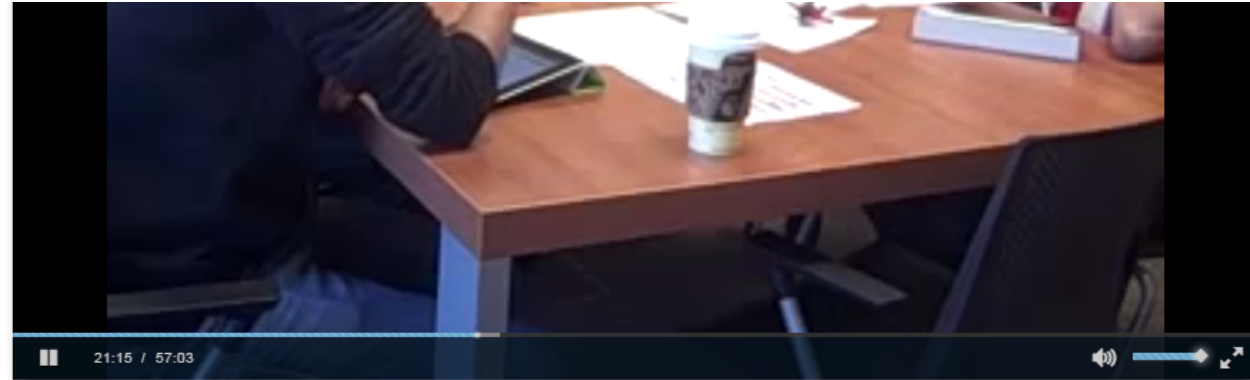


...MAYBE USE
A SERVO
MOTOR ON
THE TURRET?

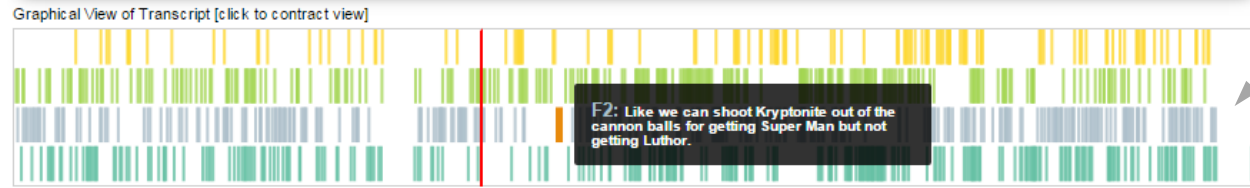


VizScribe: Visualizing Text + Context

video



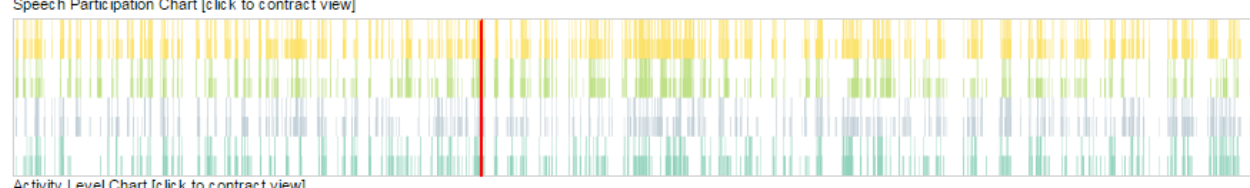
transcript



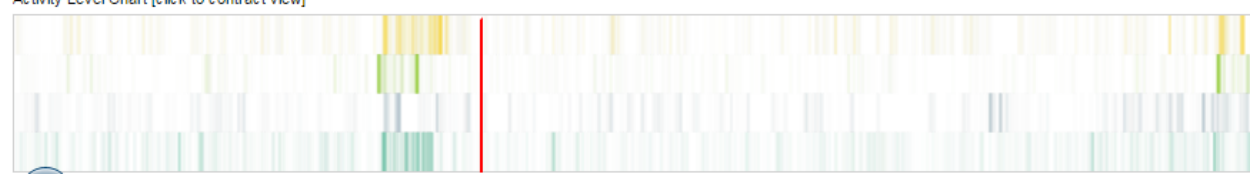
sketch log



speech participation

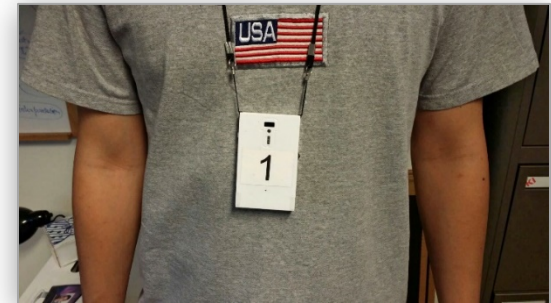
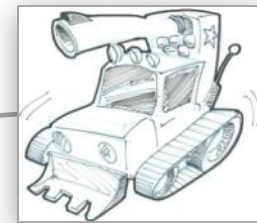


activity data



Transcript

- F4 Could you go over again? I was walking in when you
- F2 Yeah. We're trying to increase the play value of these
- F2 So what I said that maybe you can have something lik
- F2 They can just snap into the base figure of the action.
- F2 And the child can explore like something like the tran
- F2 they have a base with that. You can just plug in. Yeah
- F2 Various modalities into it. So in that way we can incre
- F1 Yeah. And imagination also. The mental aspect of the
- F3 Yeah. For the challenge part it'd be cool I think if may
- F3 board game or something made out of these. Like ma
- F2 Oh Like the ones that play in big bang theory and all.
- F2 I mean there are those fantasy board games
- F3 No. No. No. Those are like dungeon and dragons.
- F1 Yeah yeah yeah.
- F3 I'm talking about something simpler



localhost:3000/main

Navigate: Filter by: User Filter by User Tags Filter by Tags Annotation Filter by Annotation

13:57 / 57:03

Codes
Define and Edit Codes
View Add/Edit Distribution

Word Cloud from Transcript
Click on word for occurrences; Ctrl-click for concordance

yeah like just okay right one
inaudible think something go laughter get oh
play cross guess know board see game talk
want maybe fantasy mean make put thing also add
now uh action good f3 dice sensory idea actually
construction need kind gonna save use challenge
got canvas sorry guys whatever going sketch start
value done mmhmm ons stuff active draw f2 well
guy access much even probably lot figures base figure
keep toy number involvement many different saved
character level social f1 vehicles making way things 35
present no proposed user trying refresh time um
talk some yes mark guns able color write
had cool move around square highly
everything mental give special white
multiple motorcycle towards though
un free bit 33 first sure red addons
relative made it'd lose high id wait ideas part
chutes design middle increase better closer
rules sense people it'll thinking edit face let whole lower
thanks numbers set might activity giant means working
side daniel look obviously pyramid gun scamper products
cannon choose change 2d big ready exists skip moving

Graphical View of Transcript [click to contract view]

sketch Participation Chart [click to contract view]

Speech Participation Chart [click to contract view]

Activity Level Chart [click to contract view]

F2: Yeah yeah. On the level you can have submarines.

F2: So... The way I see it --

F4: Actually I think high on fantasy. Cause it pretty much [cross talk].

F3: Yeah. High on fantasy.

F2: There is no construction at all.

F1: No. There's no construction at all.

F2: If you're come to think of it we can just take care -- we need the -- 2D - 2D -

F1: Yeah we only need the lower triangle actually.

F2: There exists a sensory...

F1: It's not very high. I mean if you see the line between challenge and sensory I mean it was just this one. On that you'll mark it more towards the sensory part of the lines

F4: Yeah 'cause the colors kind of bring some sensory to it but not very high.

F3: There are only black red and gray.

F3: Does this guy have a Hitler mustache?

F1: Sorry?

F3: It's a Hitler mustache.

F1: It looks like someone's drawn over it.

F3: Yeah. I think so. [Laughter]

F2: That's really funny.

Male 0: Quickly. You don't have to literally implement all this play value and all that.

Male 0: That's just a framework for you to think right?

F3: Okay.

Male 0: So the goal is to create as many new play values as possible okay?

F3: Okay.

Male 0: That's it. Okay. As many good ones in the end right?

F4: Okay.

F1: I think we should start working on the play value.

F3: That's true.

F2: Okay how much time time - Do you have a time for this?


F1: Yeah. I think we do.

F2: Okay What is the next task?

Video Slide. Go to <https://vimeo.com/169905057> to view the video.

localhost:3000/main

Navigate: Filter by: User Filter by User Tags Filter by Tags Annotation Filter by Annotation



44:48 / 57:03

Codes
Define and Edit Codes
View Add/ Edit Distribution

Word Cloud from Transcript
Click on word for occurrences: Ctrl-click for concordance

yeah like just okay right one
inaudible think something go laughter get oh
play cross guess know board see game talk
want maybe fantasy mean make put thing also add
now uh action good f3 dice sensory idea actually
construction need kind gonna save use challenge
got canvas sorry guys whatever going sketch start
value done mmhmm ons stuff active draw f2 well
guy access much even probably lot figures base figure
keep toy number involvement many different saved
character level social f1 vehicles making way things 35
present no... proposed user trying refresh time um
take... come yes mark guns able color write
had cool move around square highly
everything mental give special white
multiple motorcycle towards though
... free bit 33 first sure red addons
... made it'd lose high id wait ideas part
... chutes design middle increase better closer
rules sense people it'll thinking edit face let whole lower
thanks numbers set might activity giant means working
side daniel look obviously pyramid gun scamper products
cannon choose change 2d big ready exists skip moving

... sense.
... although i think it would make sense if they were on some place you could move with a bike.
F1 Oh yeah.
F3 Mm-hmm.
F1 good idea.
F4 of course i didn't start with the bike. i dont know what kind of -
F2 Means the -
F4 [laughter]
F4 i'm just kidding.
F3 like a boss.
F2 wait. what just happened?
F2 My skWiki just froze. i'm not able to access anything.
F3 maybe some characters would have better bike riding skills.
F1 Mm-hmm?
F2 So yeah when we design the board game right? We'll have rivers we'll have mountains.
F2 So the bike cannot go across the river -
F1 Yeah.
F3 Yeah something like that. there'd be an enemy base. i think there'd be several different game boards.
F3 one might be an enemy base
F2 Yeah yeah yeah.
F3 or one might be a terrain.
F2 different scenarios.
F3 yeah. One might be a city. stuff like that.
F2 Yeah and in each everything will have a -
a better modality at every separate location.
F3 Yeah. In case we want to buy all of them.
F2 [laughter] we have the market value.
F3 yeah. pretty much. yeah.
(Male 5) Hey guys did somebody tell you--come in here just now?
F1 uh-uh.
(Male 5) Okay all right. you have about eight minutes. five to eight minutes left.
(Male 5) if you want to start converging on maybe your favorite idea as a group or multiple. whatever you want
(Male 5) and just present like a very short 30-second minute thing to the rest of the class.
F1 All right.

Graphic View of Transcript [click to contract view]

sketch Participation Chart [click to contract view]

Speech Participation Chart [click to contract view]

Activity Level Chart [click to contract view]

Video Slide. Go to <https://vimeo.com/169905057> to view the video.

Extension to Maintenance logs

The screenshot displays the VizScribe application interface, which is divided into two main sections: **Temporal View** and **Text View**.

Temporal View (Left Side):

- linked video view:** A video player showing a meeting with several people around a table.
- Timeline view of text:** A horizontal bar chart showing the duration of various activities and speech segments.
- sensor data:** Multiple charts (Participation Chart, Activity Level Chart) showing user engagement and activity levels over time.

Text View (Right Side):

- code definitions:** A list of codes with their corresponding colors and descriptions, such as "play value analysis", "idea generation", and "high activity inside the room".
- Word Cloud from Transcript:** A word cloud generated from the transcript, with the most prominent words being "yeah", "like", "just", "okay", "right", "one", "inaudible", "think", "something", "go", "laughter", "get", "oh", "play", "cross", "guess", "know", "board", "see", "game", "talk", "want", "maybe", "fantasy", "mean", "make", "put", "thing", "also", "add", "now", "uh", "action", "good", "f3", "dice", "sensory", "idea", "actually", "construction", "need", "kind", "gonna", "save", "use", "challenge", "got", "canvas", "sorry", "guys", "whatever", "going", "sketch", "start", "value", "done", "mmhmm", "ons", "stuff", "active", "draw", "f2", "well", "guy", "access", "much", "even", "probably", "lot", "figures", "base", "figure", "keep", "toy", "number", "involvement", "many", "different", "saved", "character", "level", "social", "f1", "vehicles", "making", "way", "things", "35", "present", "new", "two", "supposed", "user", "trying", "refresh", "time", "um", "take", "last", "ones", "little", "come", "yes", "mark", "guns", "able", "color", "write", "three", "based", "using", "ahead", "cool", "move", "around", "square", "highly", "drawing", "3d", "really", "f4", "everything", "mental", "give", "special", "white", "mine", "characters", "bad", "multiple", "motorcycle", "towards", "though", "box", "enemy", "imagination", "free", "bit", "33", "first", "sure", "red", "addons", "bike", "collaborative", "made", "it'd", "lose", "high", "id", "wait", "ideas", "part", "squares", "chutes", "design", "middle", "increase", "better", "closer", "rules", "sense", "people", "it's", "thinking", "edit", "face", "let", "whole", "lower", "thanks", "numbers", "set", "might", "activity", "giant", "means", "working", "side", "daniel", "look", "obviously", "pyramid", "gun", "scamper", "products", "cannon", "choose", "change", "2d", "big", "ready", "exists", "skip", "moving", "playing", "anything", "next", "certain", "recent", "sort", "hold", "let", "there", "d", "buy", "lines", "fighting", "star", "em", "ok", "29", "discussing", "product", "yep", "robots", "best", "open", "gender", "back", "legos", "pen", "chest", "name", "getting", "levels", "orange", "great", "manner", "eight", "extend", "friend", "end", "blue", "thought", "cards", "physical", "may", "four", "tyler", "pretty", "modify", "toys", "sides", "single", "f", "drawn", "makes", "kids", "true", "behind", "scale", "check", "coil", "allowed", "suppose", "money", "28", "ladder", "details", "g", "fact", "sketching", "quick", "heard", "adapt", "abilities", "chess", "powers", "superman", "far", "faunite", "characteristics", "enhance", "nnal", "planarite", "take", "to", "waste", "craaaa".
- Transcript:** A list of text segments with associated user identifiers (e.g., P1, P2, P3) and timestamps.

Annotations on the right side of the image indicate that the **code definitions** and **Word Cloud from Transcript** are part of an **interactive word cloud from text**, and the **Transcript** is part of an **interactive Text/log view**.

Text logs → NLP + Text Visualization

Providing **contextual information** when visualizing text

Visualizing **intrinsic & extraneous measures** to identify patterns/anomalies

Integrating **machine learning & visualization** for analysis/monitoring

Qualitative text analysis

Open Coding

Identify concepts of interest in qualitative data; name & tag them

Axial Coding

Identify relationships between concepts through inductive reasoning

Help identify concepts

Help compare concepts & identify relationships

Prototype Interface

The interface is a web browser window displaying a text analysis tool. The browser address bar shows 'localhost:8000/main'. The main content area is divided into several panels:

- Text Display:** A transcript of a conversation with speaker names and their utterances. The text is color-coded by category. A 'Highlight:' section at the bottom lists categories and their counts: Information content (checked), Nouns (1708), People (16), Adjectives (360), Places (9), Verbs (964), Names (27), and Adverbs (523).
- Codes:** A legend on the right side of the transcript panel, listing categories with corresponding colored squares: user safety (blue), user desire (green), camp desire for user experience (light green), cost of feature (pink), and aesthetic concerns (red).
- Word Cloud from Transcript:** A panel on the right showing a word cloud of terms from the transcript. The most prominent words are 'tree', 'kids', 'one', 'house', 'zip', 'think', 'line', 'background', 'camp', 'want', 'go', 'right', 'get', 'back', 'incorporate', 'design', 'kind', 'lot', 'may', 'see', 'screaming', 'make', 'terms', 'well', 'talking', 'need', 'campers', 'done', 'trees', 'ideas', 'experience', 'come', 'work', 'able', 'mean', 'ramp', 'kinda', 'us', 'say', 'people', 'thing', 'big', 'part', 'okay', 'also', 'long', 'look', 'another', 'got', 'time', 'put', 'typically', 'seen', 'use', 'type', 'first', 'getting', 'open', 'call', 'going', 'came', 'next', 'take', 'said', 'way', 'little'.
- Visualizations:** On the left side, there are three vertical panels: 'Text' (a horizontal bar chart), 'Info' (a heatmap), and 'Tags' (a vertical bar chart). A 'Codes' panel is also visible, showing a grid of colored squares corresponding to the categories in the legend.

Identifying Concepts

Um, the maj - , the **majority** of the **campers** are gonna be with **people** [**unintel**
campers will have all the **emergency equipment** they **need** right there . So if th
 anything that **happens** , we can **address** it wherever they are . **Accessibility** to
think we'll we do - you do that now . That's the be **caution** - **cautious** with that
 my **eyes** , that's , that's a **low** , **low priority** .

Sure .

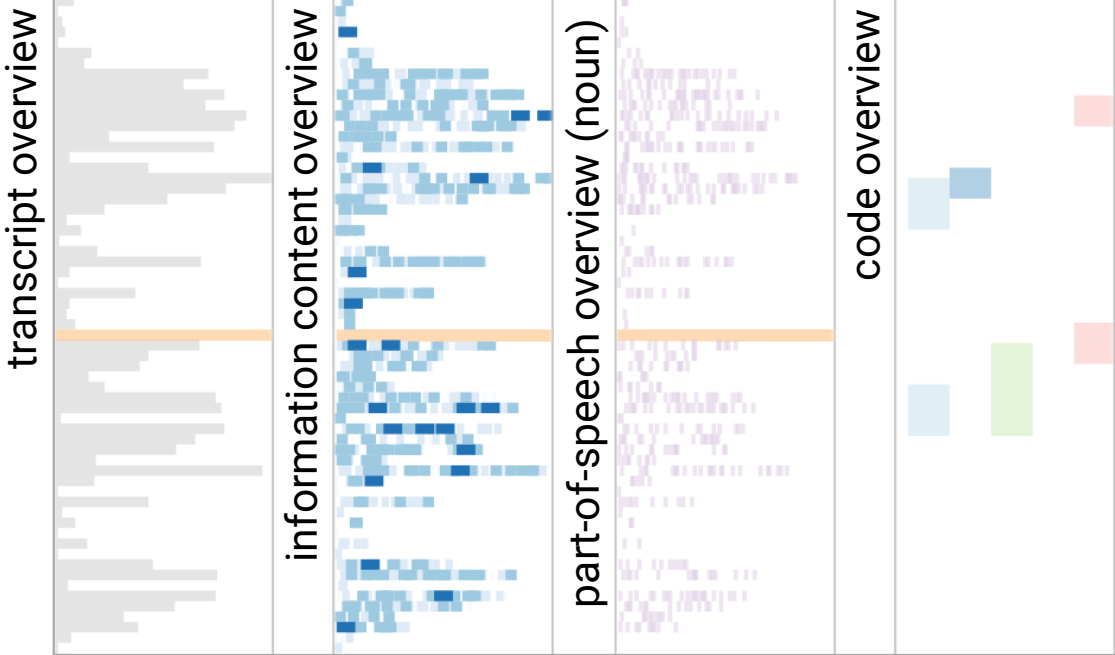
One **approach** to that **may** be , though , **accommodating** **able** - **bodied** **people**
might be that **similar** to what you do at a **main** **entrance** . The **ramp** is **primary**
 also have another **route** that **might** be **steps** or , or a **steeper** **ramp** that's **sort**
express **route** for **accommodating** **people** from **two** different , um , **paths** . Th
 be out of the **question** at all to have some **steps** or , or **extra** - **steep** -
ramping from **multiple** **places** or at **least** a **single** **location** . Um , **one** of those
 or uh , the **staff** that's actually **working** at the **zip** **line** to **get** up and down quick



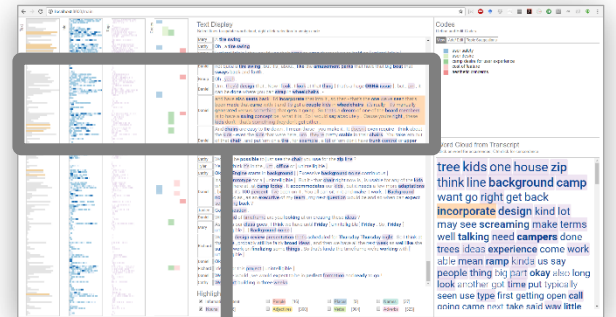
Skim formatting (filter by information content)

Highlight parts of speech (**nouns**, **adjectives** etc.)

Multiple Abstractions



Carrie	So I've heard a few like counselors so a lot of the kids were telling me like So how come you guys don't use you
Tyler	Are they talking about the overlook
Carrie	I don't know what they're talking abo
Tyler	- down here ? I wonder if that's what
Tyler	they're talking about . So if you go - a main trail that runs through camp , s pit up here that runs down , um , beh backs , all the way down to the lake . there is one spot there where you co a deck up there that overlooks the la
Tyler	It's called [sounds like 'Tulley'] Over spot that , that campers can go hang some of what they're doing . Ah , and





Text Display

Select lines to update word cloud; right-click selection to assign code

Tyler a few weeks ago. Right now, they have to sit down at the bottom of the zip line waiting to get geared up and before they can go up there and so [very loud machinery in background], one, the ramp to get up there [unintelligible] which you kinda saw is a big flat black swinger arm and [four to one] pulley system to get them up to the top. So, the ramp would obviously improve that. I think like you said, just the novelty and the, the uniqueness factor of being up in the trees, um, can be something in and of itself for that.

Daniel Yeah, and, and then even incorporating the zip line because these kids, all campers like to see their friends go.

Tyler Yeah.

Daniel And it's that first push off the platform where it's like, 'Okay. I'm trusting that I'm gonna make it.' Um, right now, they don't get that experience. They see them, they see the expression of the kid when they land, but it's that -

Daniel that descent is -

Tyler And, and to be with them and offer encouragement and -

Daniel Absolutely.

Tyler - you know the kids are up there when we ran it a few weeks ago, by themselves.

Daniel Right.

Tyler No one else - I mean Daniel was up there and one of our facilitators, um, there's no moral support up there with them in terms of, um, a counselor that they're particularly close to who could encourage them.

Mary I have a question for you guys. Um, so in terms of, um, would you like the most useful thing we can give to you to think about, um, an actual like kind of undeveloped design that's kind of like, um, something that we think would be great to incorporate? I mean, um, in terms of, of making this real?

Daniel I could see, um, there's some sense of, you know, not doing the finished design as, um, obviously, there's weight considerations structural stuff that needs to be gone, um, means, rough designs or designs plural [loud machinery in background] that some of the ideas I was hoping you guys could add, and in terms of the kids have had. Some of the kids have had are awesome.

Matt This is a big great space so design elements whether particularly interesting or innovative that [screaming in background] you might be able to dream up to we may not think of or the designers may not think of, um specifically with assisting these kids that, um, might not be common sense to us with creating lot of design over and over, but this is something unique that you can -

Matt wrap your minds around. But as far as getting into the, you know, the detail design or structural [unintelligible] or spatial relationships, um, [it could be generalizable].

Cathy And none of us have that expertise. We have one key [unintelligible], and that's it. The TA. [Engine starts in background] [But most of us are not even - unintelligible].

Tyler Yeah, but obviously, you know -

Cathy Right.

Tyler - it's not, it's not a totally -

Cathy Yeah.

Tyler - unrealistic conception [to sketch either] because you guys, you know, the existing trees and the

Highlight:

- Information content
- People [16]
- Places [9]
- Names [27]
- Nouns [1708]
- Adjectives [360]
- Verbs [964]
- Adverbs [523]

Video Slide. Go to <https://vimeo.com/194922904> to view the video.

Codes

Define and Edit Codes

View | Add/Edit | Topic Suggestions

Word Cloud from Transcript

Click on word for occurrences; Ctrl-click for concordance





about four-foot level. Anything above that is outside of their normal element. We try to bring those elements to them, and we try to do that at The Camp as well. So we incorporate programming to the extreme, and that is what can we provide, ah, visibly challenged population of campers from adolescence, from child adolescence up to adults that they wouldn't typically be able to do.

Text Display

Select lines to update word cloud; right-click selection to assign code

Daniel kids who come to The Camp require a lot more, ah, technological need maybe a wheelchair. So maybe indoor require ventilator assistance at nighttime. So these are typically kids that are not allowed to go to any other kinds of camps because of their medical condition. And as we came back to Bradford Woods three years ago and then Ohio for 20 years. um.

Daniel camps who can incorporate what The Camp brings to the table, we can handle the kind of kids we bring into our camp, and we see a facility can handle any type of camper just because of the physical demands of the environment, um, and then the physical demand to the camper. From an equipment perspective, it's [unintelligible] perspective. Um, i-, it is oftentimes that The Camp built new - established types of programs who want to do through the eyes of campers. Kids that you work - have seen today, this is - I've seen wheelchairs what there is what they see. While you have -

Daniel some kids who are ambulatory, but a lot of the kids who are in wheelchairs their life's vision is from about four feet - about four - foot level. Anything above that is outside of their normal element. We try to bring those elements to them, and we try to do that at The Camp as well. So we incorporate programming to the extreme, and that is what can we provide, ah, visibly challenged population of campers from adolescence, from child adolescence up to adults that they wouldn't typically be able to do.

Daniel And we've pushed the limits from, um, initially, um, there's - we, we get [tree to tree] that had ropes that we could, we can send up, ah, to all up to 25 - foot high. The ability to be up in a tree. Um, one confined to a wheelchair. A lot of you ask them whether they wanna do things inside or outside. Um, wanna do things outside because they're [life is incor].

Daniel And that's their life. So we want it to be different. Um, our camp, our camp, about what they want, um what they hope to do. Um, [unintelligible] [group of people walk through].

Female Sorry, guys.

Daniel Um, swimmers, um, canoes that are not tippable, and so [unintelligible] outriggers. These were designed, um, kind of conceptually and then we've created those. So literally, those canoes will not tip over. Um, on ventilators in that canoe without the fear of them tipping. Um, and that experience [they're missing] -

Daniel [unintelligible] in background] Ryan, Ryan.

Daniel For a long time [group of people walk through] we've talked about how we incorporate more activities. And if we were gonna do that, how could we incorporate a zip line into camp activities. So through some work with another camp out in Adirondack, ah, how to make, uh zip line adaptable for campers who are in wheelchairs or [rigid], um, we've found a way to do it and work with the company that makes adaptive ski chairs out in Denver to create a chair that allows kids to [master it]. So we're pushing envelope. So the zip lining is great.

Daniel We've incorporated it this year on the 100 - foot zip and that's opened the eyes to these kids and what they wanna do further. And so now we wanna incorporate it further. [We'll go further] always with the safety aspect in mind first. So now looking at the zip line going 400 feet down across the valley. And while that's all well and good, that's just a piece of the activity that we see and how we incorporate nature into that, the experience, and that's where the tree house came into play.

Daniel When we talk about what's that tree house incorporate, it's how do we get kids up so that it's not just the zip line experience, it's the whole getting up and into the canopy of the tree to be a part of nature. And what does that look like for a camper um prospectively? So getting their ideas is important. That's how we

Video Slide. Go to <https://vimeo.com/194922904> to view the video.

Codes

Define and Edit Codes

View | Add/ Edit | Topic Suggestions

Word Cloud from Transcript

Click on word for occurrences; Ctrl-click for concordance

kids camp tree want outside lot
 physical life try inside things camps times see
 adolescence incorporate handle four years require
 camper typically seen perspective wheelchair
 campers maybe foot wheelchairs bring walk people group
 limit beyond push hope talk different incorporated say ask confined one
 ability never high send ropes climb get initially limits pushed adults
 population challenged visibly provide extreme programming well elements
 element normal level feet vision ambulatory today work eyes programs types
 established new built oftentimes equipment demand environment demands
 type facility kind table brings ohio ago three woods bradford back came
 condition medical kinds go allowed nighttime 20 ventilator assistance indoor
 come 25 need technological child able

- ### Highlight:
- Information content
 - People [16]
 - Places [9]
 - Names [27]
 - Nouns [1708]
 - Adjectives [360]
 - Verbs [964]
 - Adverbs [523]

Text logs → NLP + Text Visualization

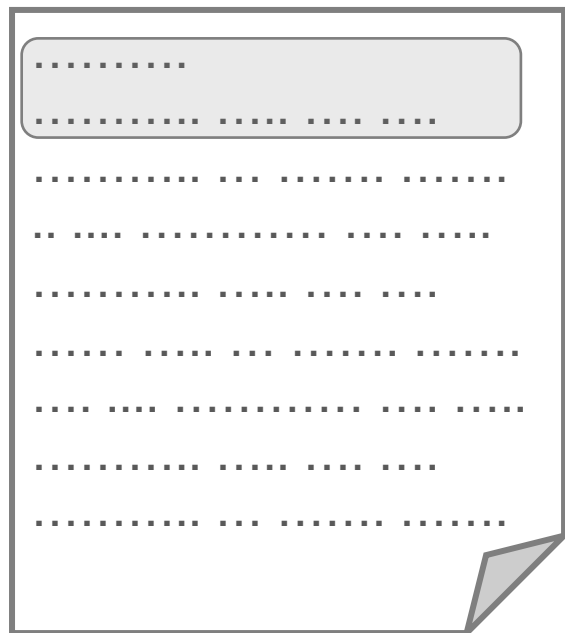
Providing **contextual information** when visualizing text

Visualizing **intrinsic & extraneous measures** to identify patterns/anomalies

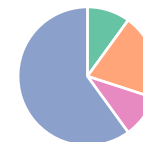
Integrating **machine learning & visualization** for analysis/monitoring

TalkTraces: Monitoring Meetings

Meeting Transcript/
(or Maintenance logs)



T1	T2	T3	T4
0.1	0.2	0.1	0.6
...
...
...
...



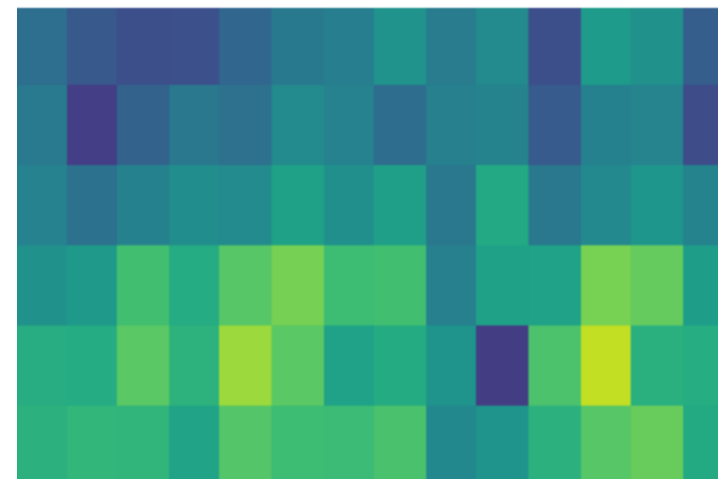
Providing Context

Using meeting agenda (or maint. log categories) to add **context**

Compute relatedness between agenda/category & discussion/log using **word embedding**

Agenda

1. [... ..]
 2. [... ..]
 3. [... ..]
 4. [... ..]
 5. [... ..]
 6. [... ..]



⌈ ⌈ ⌈ ⌈
 : : : :
 : : : :
 : : : :
 ⌋ ⌋ ⌋ ⌋

Transcript

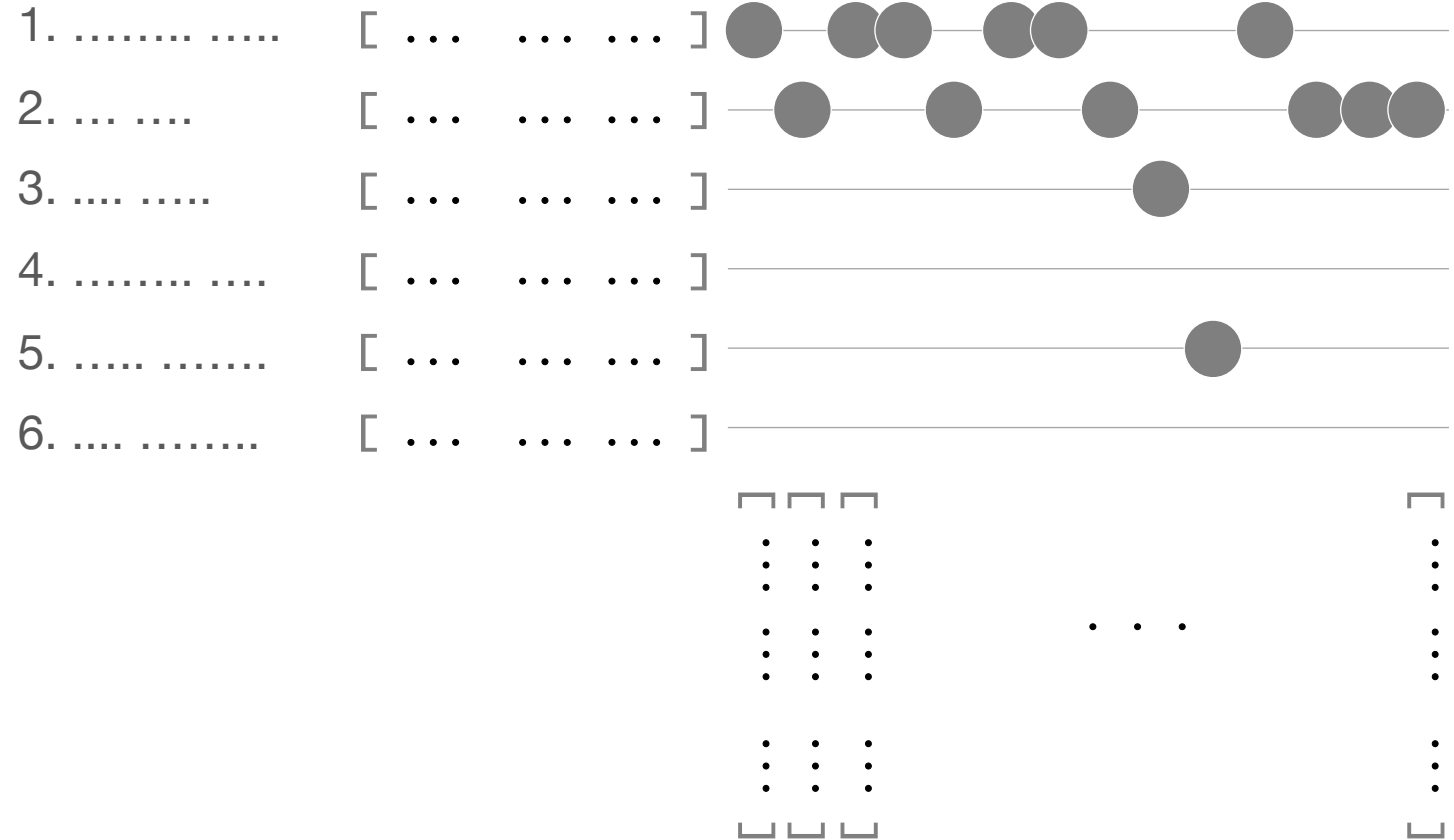
.....

Providing Context

Using meeting agenda (or maint. log categories) to add **context**

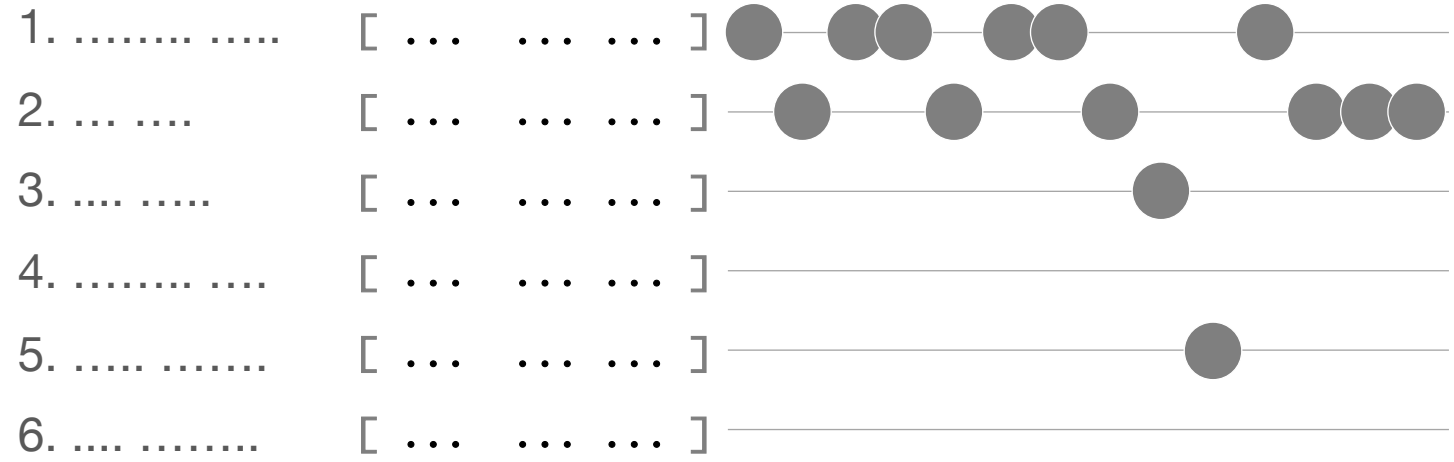
Compute relatedness between agenda/category & discussion/log using **word embedding**

Agenda

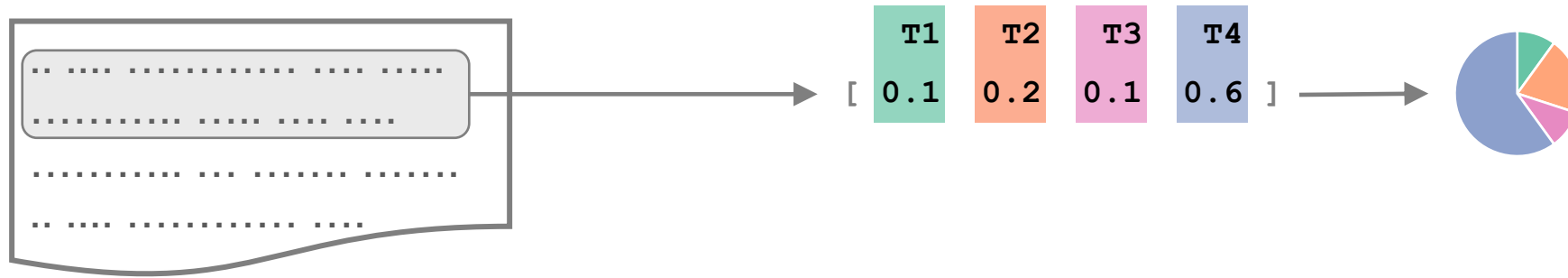


Providing Context

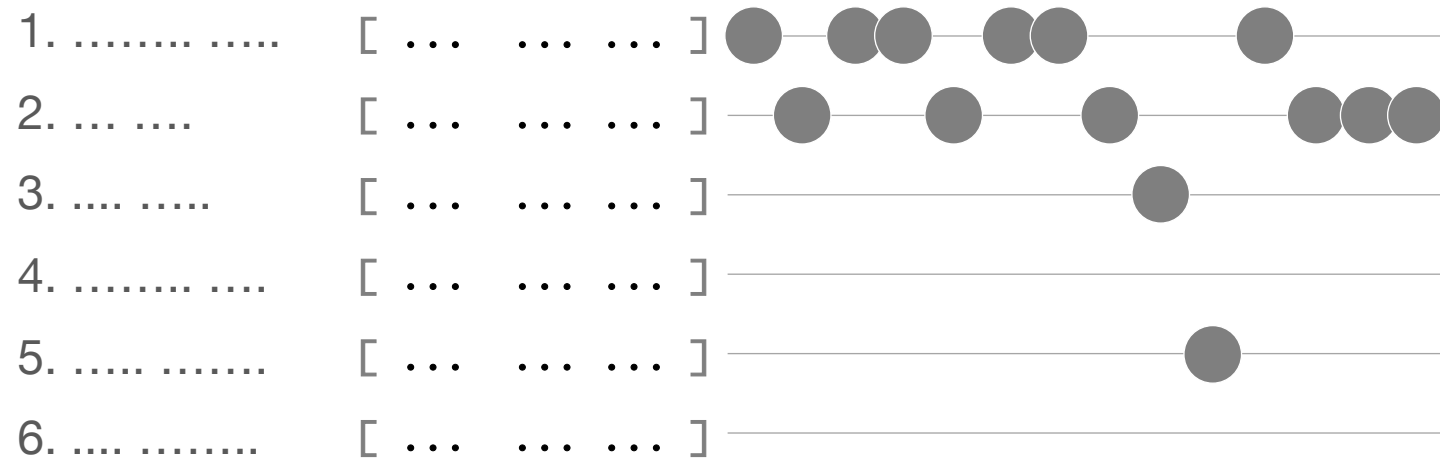
Agenda



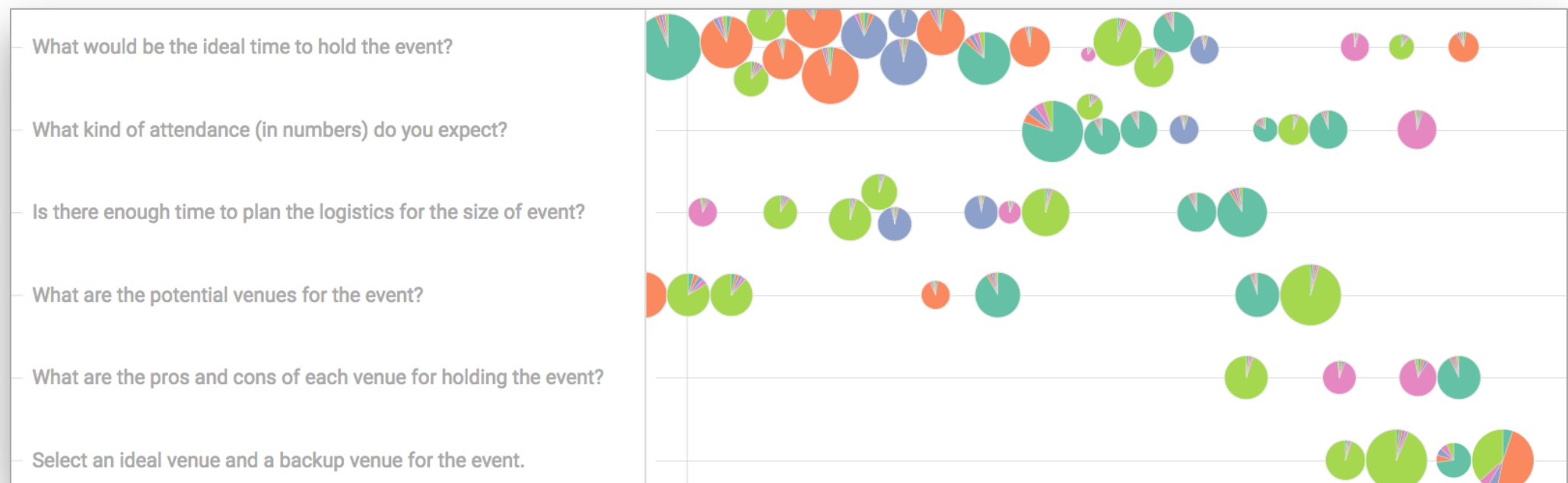
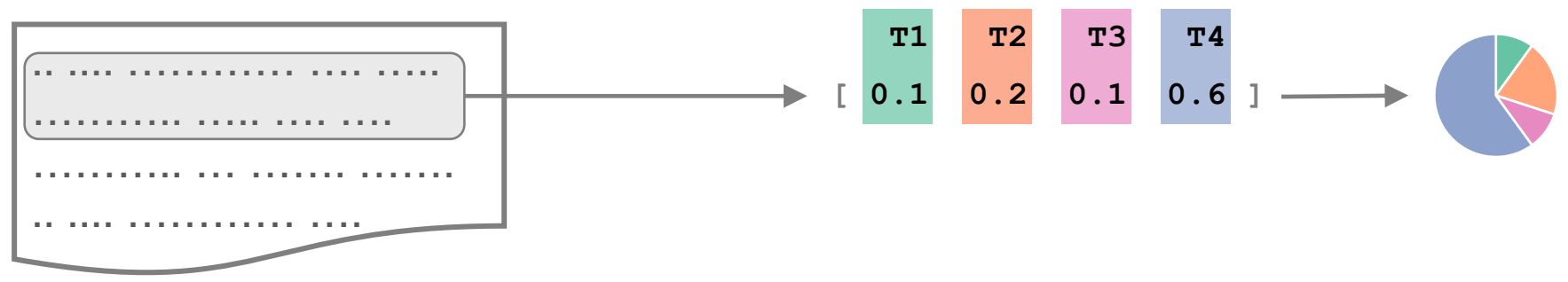
Providing Context

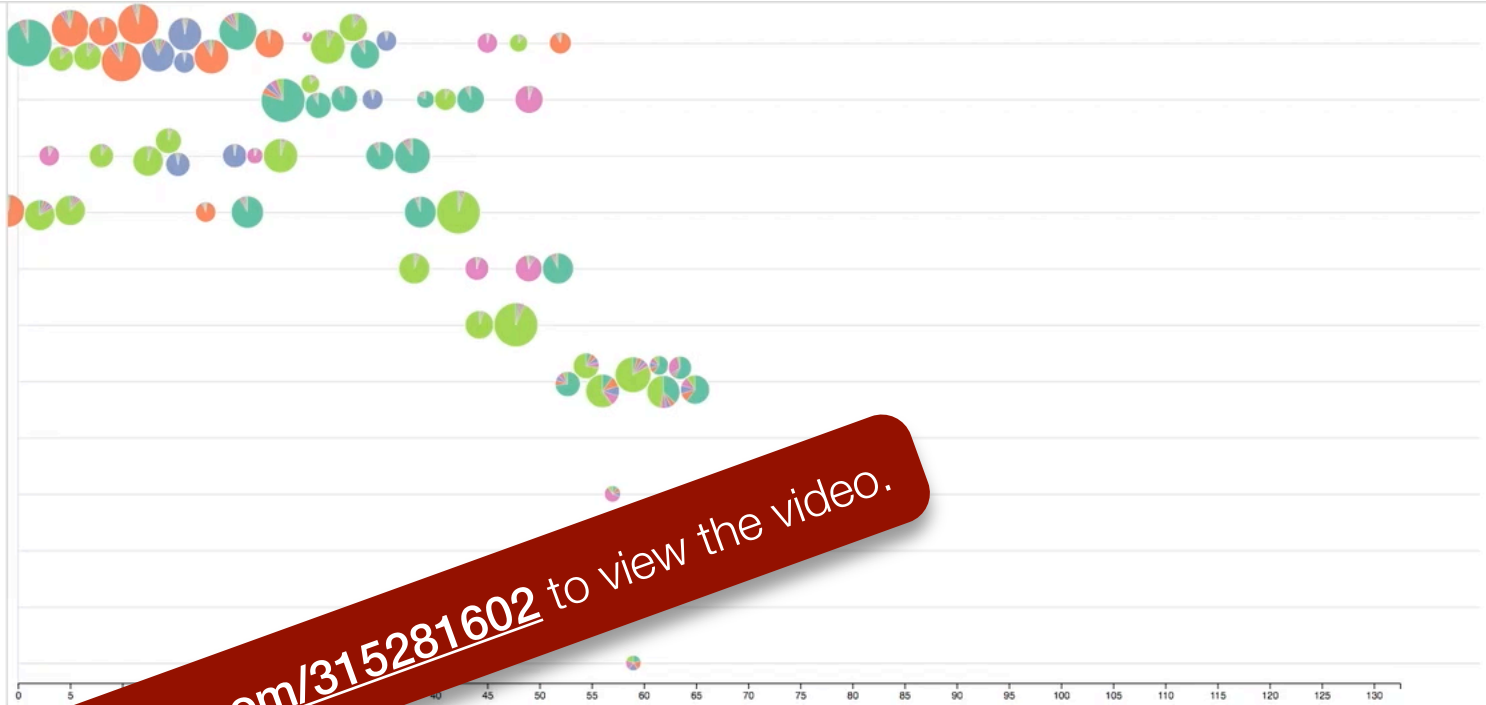


Agenda



Providing Context





Video Slide. Go to <https://vimeo.com/315281602> to view the video.

T1	many lot people event picnic_day pro time show rsvp
T2	event kemper hold even time alumnus im
T3	time saturday might alumnus building campus better though trying
T4	campus lunch forth people alumnus moved attendance tapping sound
T5	move people end show professor event matter time let

time people idea weekend
 even picnic_day best rock gun afternoon
 might many lunch let multiple alumnus
 campus date ideal sound week show good
 better see move first saturday lot specific venue
 combination pull con end coinciding night though

New keywords from current session:
 need set run food stop agenda planning
 morning require head justifying cilities discussing
 catering health along line everybody presentation
 man new projector permanent staff believe serve
 poof serving hello reduce power pay covered

hh:mm:ss Otherwise this sounds good to me. So I guess one of the cons here would be this like limits the attendance that we can have. Right.
 hh:mm:ss But pros is that it ticks like the demo and, Like talking them up boxes pretty well. If we're going for that. Okay so I think the main con is limits like capacity that we have.
 hh:mm:ss Okay does anybody have any other comments? I think that covers all our topics. Okay well let's call it a day then.

13:15:25 hello everybody this morning were going to be discussing our next set of agendas about planning the event that we need
 13:15:38 and how much money is going to require a set of heads
 13:15:51 how many people
 13:16:08 justifying cilities and then what do we actually need to run like we need catering so we can for health stuff
 13:16:12 consideration
 13:16:15 I think along those lines I think
 13:16:17 stop
 13:16:28 so we dont need specific stuff for the event because the people that are doing the presentations can also
 13:16:44 be there in you really dont need a man to run the new projector and show the video of you dont even need permanent staff
 13:16:53 also believe if we serve like poof and likes are serving food then we can reduce the main power
 13:17:06 I think if we can get camper people to pay for the food like they do for other events so Im pretty sure if we can be covered
 13:17:46 actually I dont think we need to make an appointment

Show keywords on word cloud that are:
 More Local More Global
 Relevance Weight: 0.40

Playback speed : 8x

Lessons Learned

Visualizing **context** helps analysts use experiential knowledge in sensemaking

Tagging the data through the visualization helps **assign meaning**, detecting patterns/anomalies

Visualization can be used to help make ML results **interpretable**

Relevant Publications & Code

Chandrasegaran, S., Badam, S. K., Kisselburgh, L., Pepler, K., Elmqvist, N., & Ramani, K. (2017). VizScribe: A visual analytics approach to understand designer behavior. *International Journal of Human-Computer Studies*, 100, 66-80.

 <https://github.com/senthilchandrasegaran/vizScribe>

Chandrasegaran, S., Badam, S. K., Kisselburgh, L., Ramani, K., & Elmqvist, N. (2017, June). Integrating visual analytics support for grounded theory practice in qualitative text analysis. In *Computer Graphics Forum* (Vol. 36, No. 3, pp. 201-212).

 <https://github.com/senthilchandrasegaran/textplorer>

Chandrasegaran, S., Bryan, C., Shidara, H., Chuang, T-Y., and Ma, K.-L. (2019). TalkTraces: Real-Time Capture and Visualization of Verbal Content in Meetings. In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems*, Paper 577, 14 pages.

 (TBD, please contact me for info)

Contact

Email: senthil.kumaran@gmail.com | schandrasegaran@ucdavis.edu

Web: <https://senthilchandrasegaran.github.io/>