



The Good, The Bad and The Neutral

*Everything you wanted to know
about sentiment analysis*



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Welcome & Introduction



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Helping 300+ local governments nationwide to build trust, improve communication & increase satisfaction of services



Taking community feedback into consideration is incredibly important to us. Zencity's platform and the data and analysis provided has allowed us to accommodate our residents and adapt our planning around critical issues.

- Jennifer Sourdellia, PIO
Seguin, TX



National Trends in Community Sentiment



Noam Rabinovich

Research Insights Lead

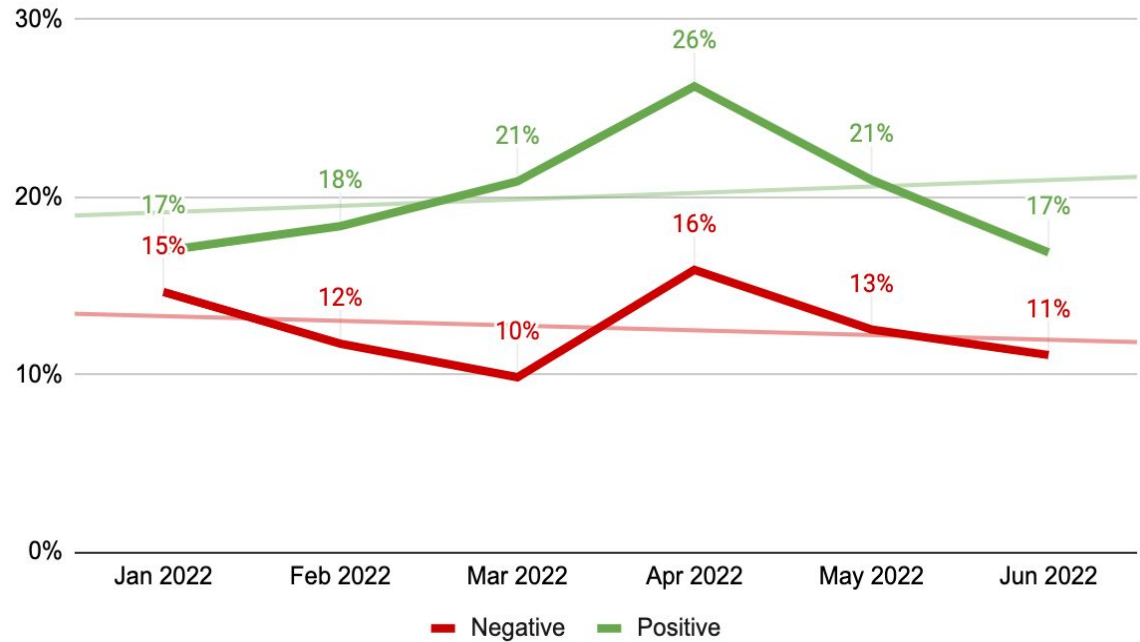
Zencity



Local Discourse on a National Scale (Jan-June 2022)

Local discourse across the country has consistently shown higher positive sentiment than negative.

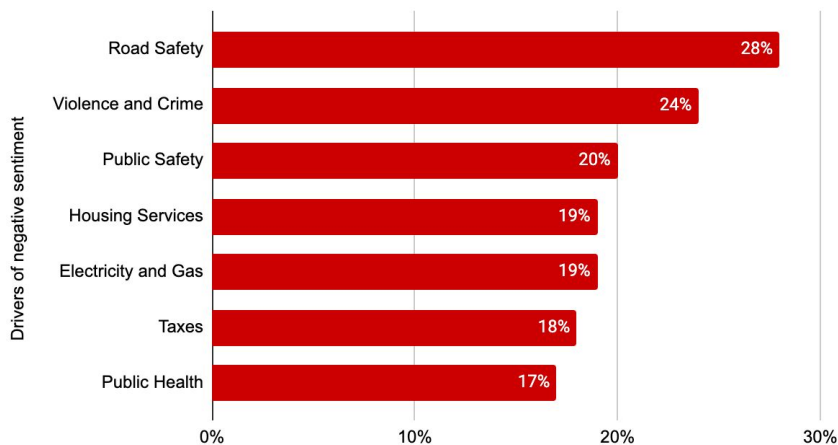
Sentiment Trend Over Time



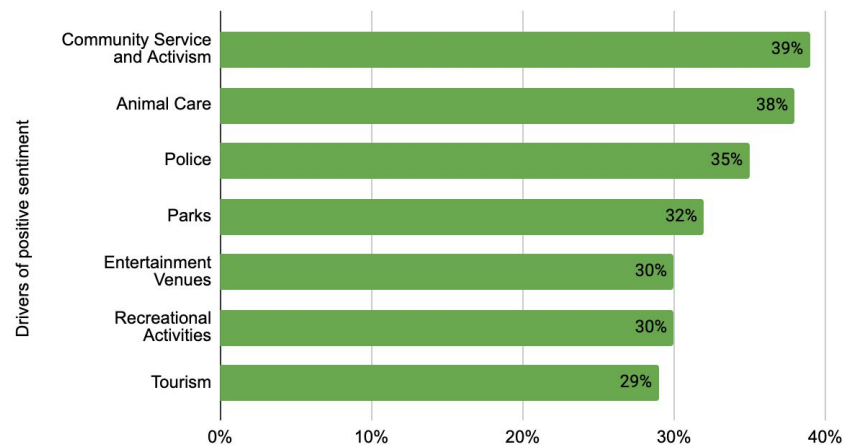
** Data from 260 cities and counties in the US*

Local Discourse on a National Scale (Jan-June 2022)

Drivers of negative sentiment

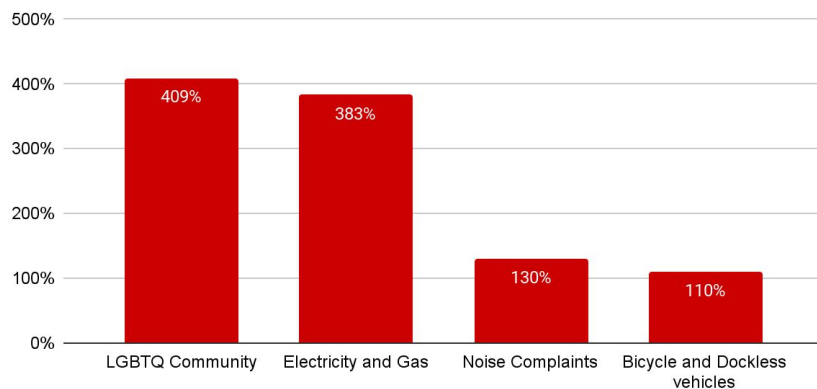


Drivers of positive sentiment



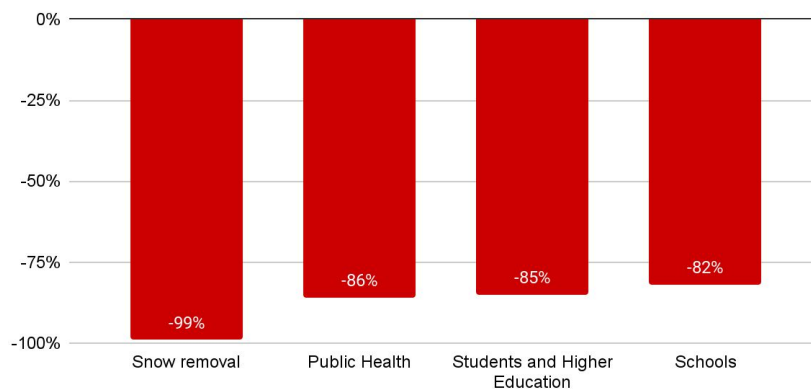
Local Discourse on a National Scale (Jan-June 2022)

Increase in Negative Interactions from Jan to June 2022



Biggest increase in negative sentiment june compared to jan

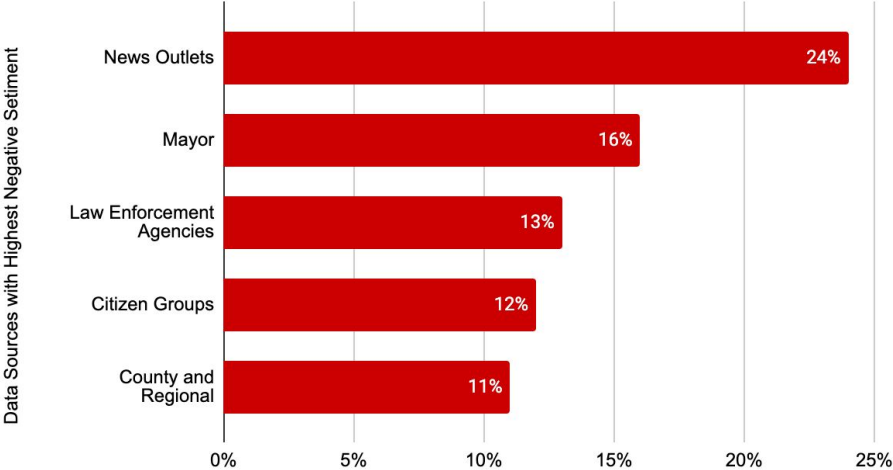
Decrease in Negative Interactions from Jan to June 2022



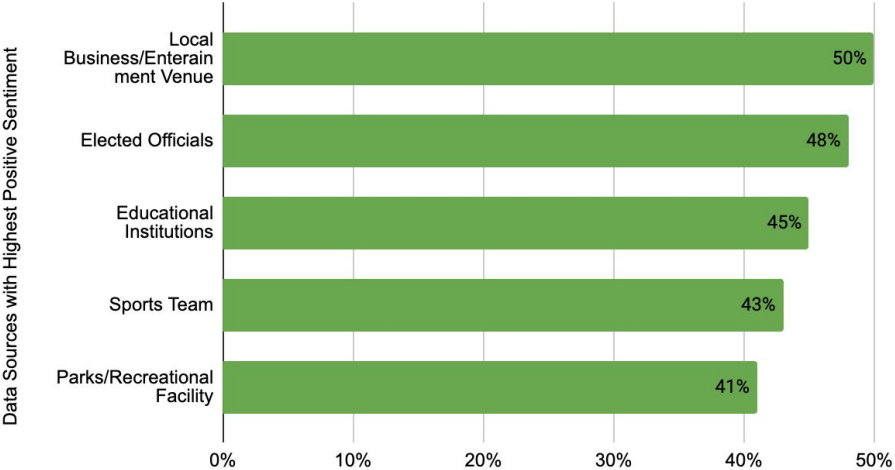
Biggest drop in negative sentiment

Local Discourse on a National Scale (Jan-June 2022)

Data Sources with Highest Negative Sentiment



Data Sources with Highest Positive Sentiment



The Sentiment Analysis Model



Shiran Golan

Data Science Team Lead

Zencity



Sentiment Analysis



March 11th, 2021

That's awesome ❤️

Positive ●



March 9th, 2021

His restaurant his choice..

👍 7

Neutral ●



March 16th, 2021

Officer needs to be fired!!!

👍 2

Negative ●

Sentiment Analysis

Simple approach: rule-based sentiment analysis



Positive words



Negative words

Sentiment Analysis

Simple approach: rule-based sentiment analysis

“I really appreciated him being honest”

Stemming

I
really
appreciate
him
be
honest

Filtering

appreciate
honest

Counting POS and
NEG tokens

appreciate
honest

Determine Sentiment



Sentiment Analysis

Simple approach: rule-based sentiment analysis

Challenges:

1. **Irony and sarcasm:**

"I love being ignored"

Just tried to make an appointment for my father to get the vaccine on the health district site. All appointments are booked thirty days out and the site is not capable of making appointments after that time span. Wonderful!!!

In reply to: I am so glad for the State & local co...

6004cc9f7ec1f79ff4cb70d2



10



4



1

2. **Word ambiguity relies on context:**

"The story is unpredictable" vs. "The steering wheel is unpredictable"

3. **Implicit and explicit negations:**

"with these decisions, it will be his last term"

4. **Multipolarity:**

"The audio quality of my new laptop is so cool but the display colors are not too good"

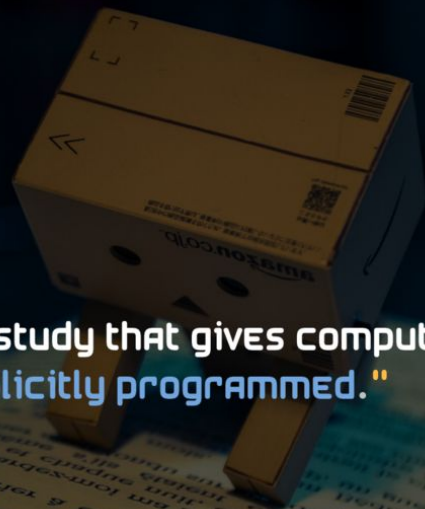
Sentiment Analysis

Automatic approach: Machine Learning

MACHINE LEARNING

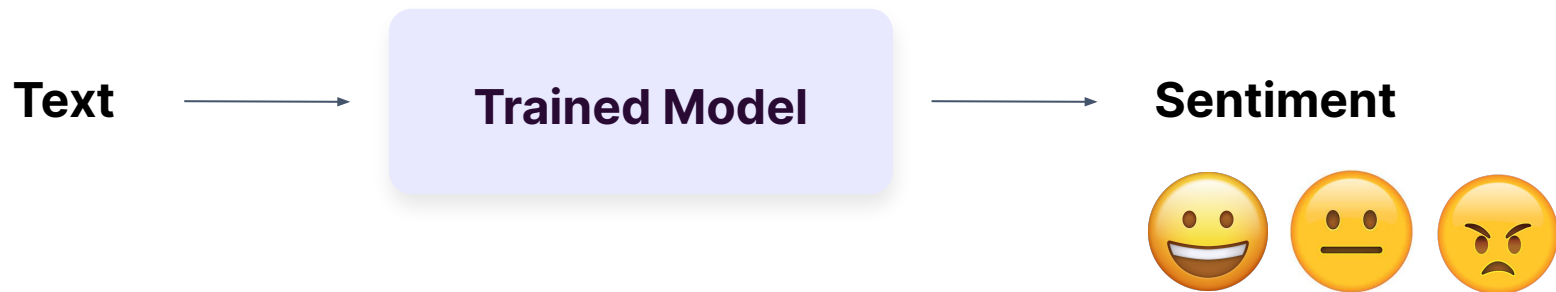
"machine learning is the field of study that gives computers the ability to learn without being explicitly programmed."

Attributed to **Arthur I. Samuel**
circa 1959



Sentiment Analysis

Automatic approach: Machine Learning



Sentiment Analysis

Automatic approach: Machine Learning

**"I really appreciated him
being honest"**



Trained Model



Sentiment Analysis

Automatic approach: Machine Learning

The model is learning from **tagged data**:

Reliability

- Human tagging
- Domain expertise
- Uniform guidelines
- Context

Variability

- Clients
- Topics

Quantity

Good job Senator!



Haven't I seen this same ad before.



Thanks for all you do



You're horrible.



I remember he did this after the hurricane, too.



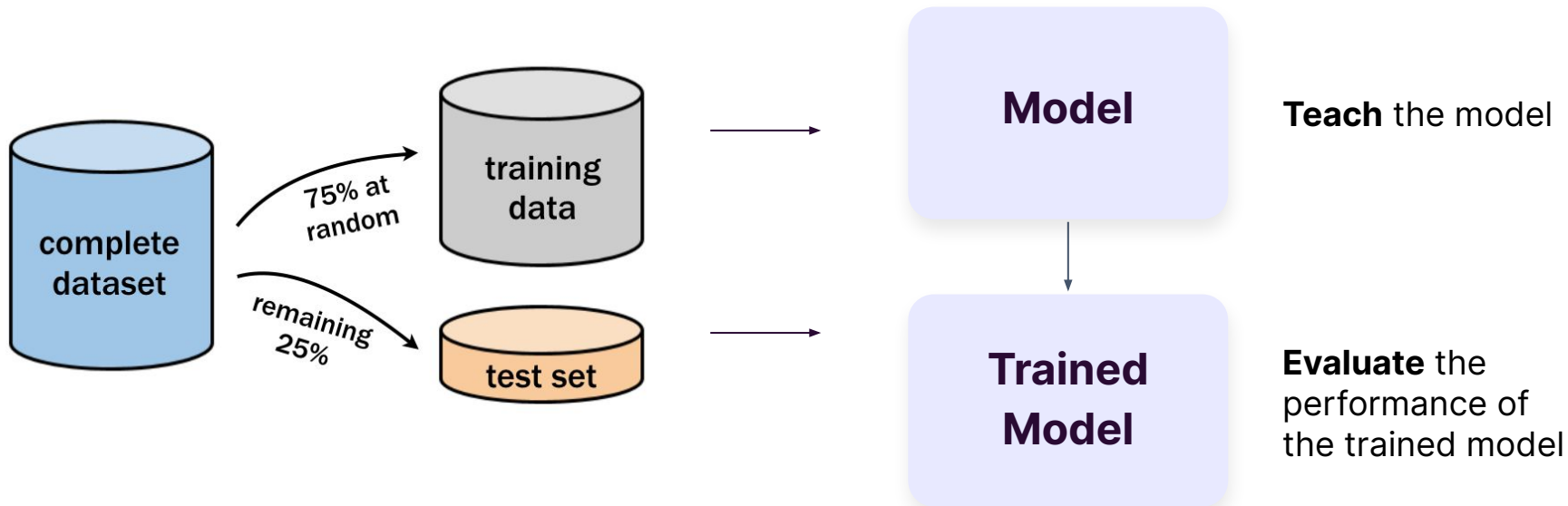
That does not excuse your choices. Resign.



...

Sentiment Analysis

Automatic approach: Machine Learning



Sentiment Analysis

Automatic approach: Machine Learning

**"I really appreciated
him being honest"**



**Convert Text
to Numbers**



Trained Model



Sentiment Analysis

Automatic approach: Machine Learning

Language Model - BERT (2018)

- A sentence converter
- **Context-dependent** - multiple representations for the same word depending on the context!
- State of the art performance



Sentiment Analysis in the Service of Local Government



Noam Rabinovich

Research Insights Lead

Zencity



Sentiment Analysis:

A crucial tool in local government's toolbox

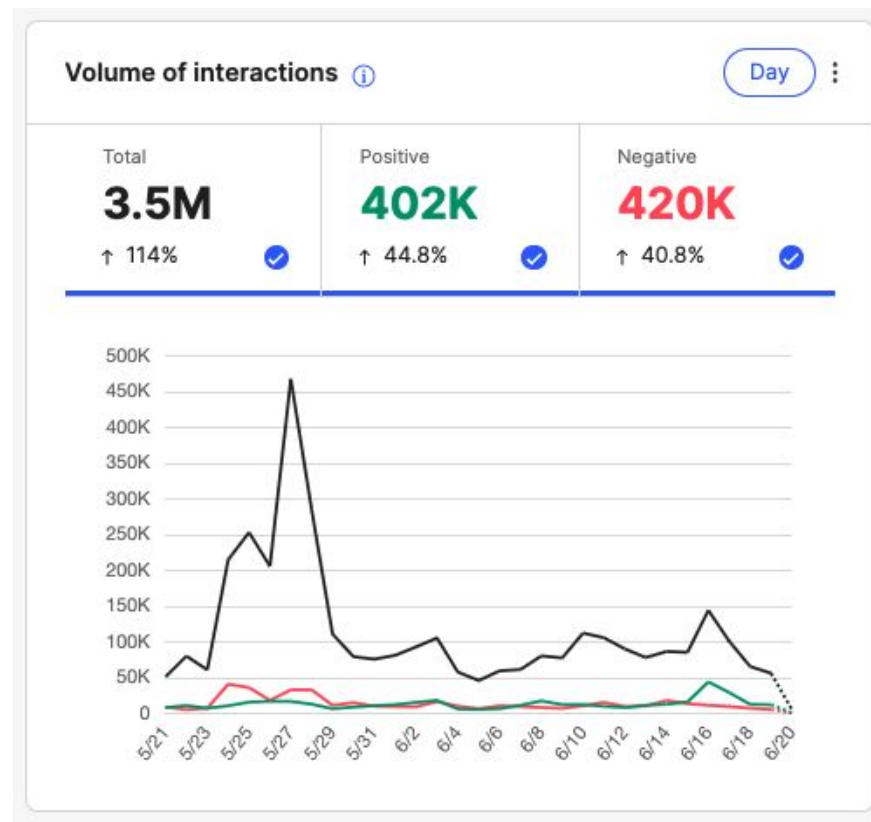
- Sentiment for understanding the city
- Sentiment for policy - for/against
- Sentiment for messaging - reception
- Sentiment for performance management – trends over time, satisfaction w/ event/crisis
- Sentiment as a precursor for what's to come - heads up

Sentiment Analysis:

A crucial tool in local government's toolbox

What does this graph tell you about your city?

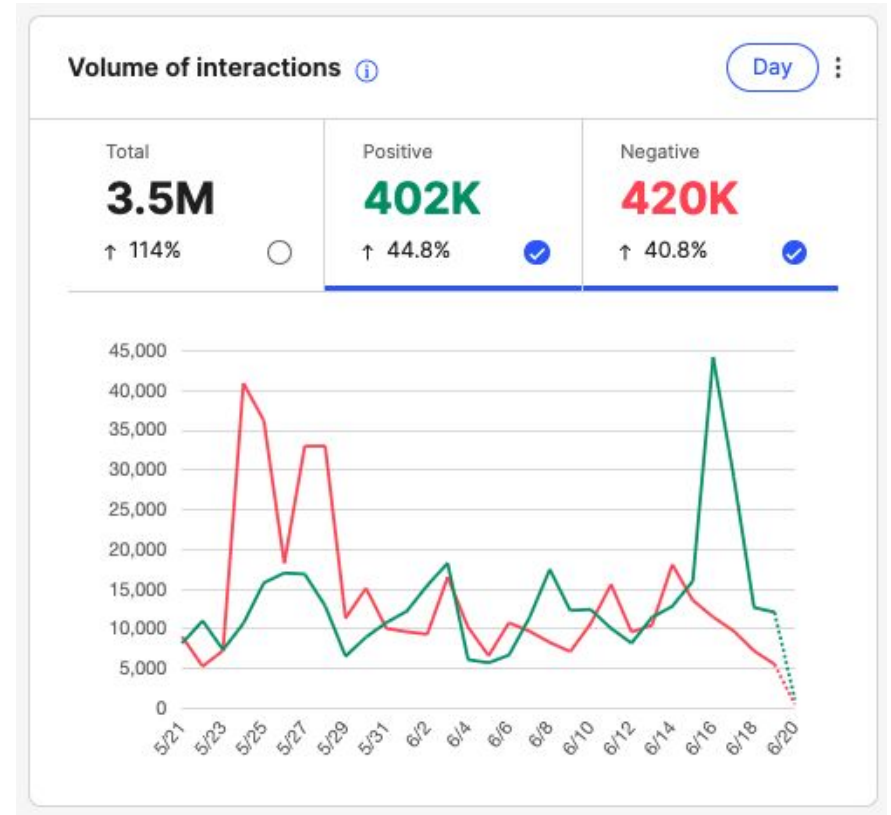
Volume tells you what people are talking about -
what is interesting to them, what has captured their
attention, what is generating engagement.



Understanding the city's emotional state

What does *this* graph tell you about your city?

Sentiment tells you how residents are *feeling* about the issues they are discussing - the general emotional state of the city.



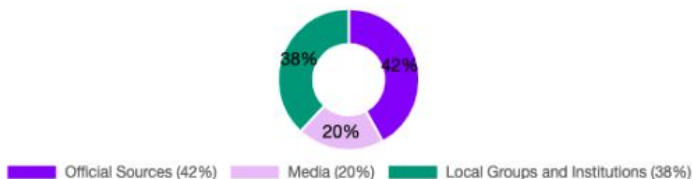
The real-time sentiment analysis helps city leaders keep their fingers on the pulse, keep tabs on the emotional state of their residents. But, Zencity Analysts want to say more than “sad events generate negative sentiment; happy events generate positive sentiment.”

We want sentiment analysis to be an *actionable tool*.

High volume of discourse, encompassing a broad array of city actors, signifies the emotional impact of Chief Tittle's passing

Jan 19 - Jan 28, 2020

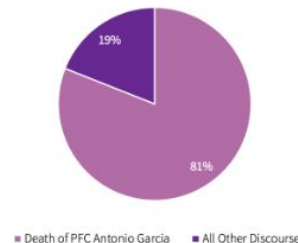
Discourse Breakdown by Source - Chief Tittle



Tragic death of PFC Antonio Garcia sends shockwaves across the Peoria community, with official sources making up a very small part of the discourse

Oct 17 - Oct 23, 2019

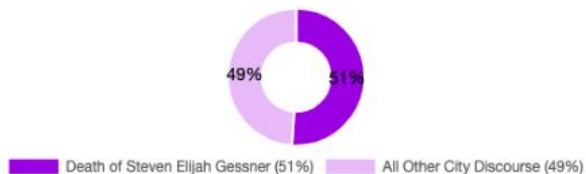
Discourse Breakdown



Death of Steven Elijah Gessner shakes the community and evokes concern, with conversations surfacing about police presence and the city's responsibility

Nov 10 - Nov 16, 2019

Breakdown of Discourse - November 10th-16th



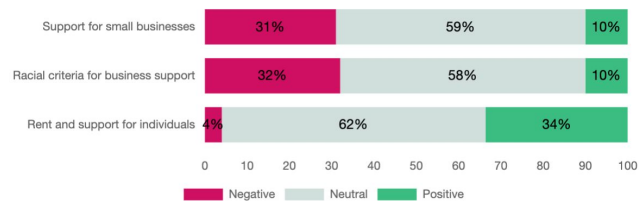
Sentiment Analysis as a policy tool

Sentiment can sometimes quantify two sides of a debate or levels of support/opposition to inform the city's deliberations and, ultimately, decisions.

CARES Act funding: negative sentiment reflects frustration with financial support for small businesses, while positive sentiment reflects gratitude and appreciation for the assistance promised to individuals in need

Aug 1 - Sep 5, 2020

Sentiment Comparison - CARES Act Funding Distribution



Discourse about ballot propositions drops in volume; negative sentiment increases due to the prominence of "vote against" actors

Oct 18 - Nov 1, 2020

Sentiment Overview - Ballot Propositions



As state officials discuss easing restrictions and against the backdrop of protests opposing the Stay at Home order, sentiment shows that more people object to reopening the economy at this stage due to concerns about the toll on public health

Apr 12 - Apr 19, 2020

Sentiment Overview - Reopening the Economy



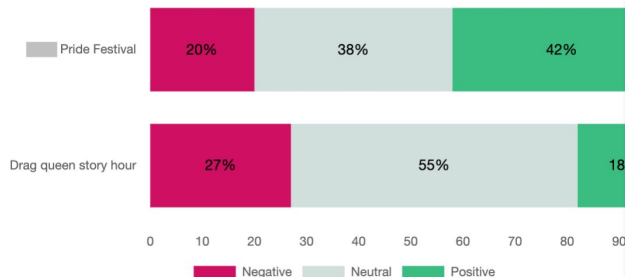
Sentiment Analysis as a policy tool

Sometimes sentiment does not help with for/against breakdowns and an extra layer of analysis is needed (for/against or opinion breakdown)

The town is driving online conversations around pride:
Commenters online express support for  Pride Festival and opposition to the drag queen story hour

May 1 - May 31, 2022

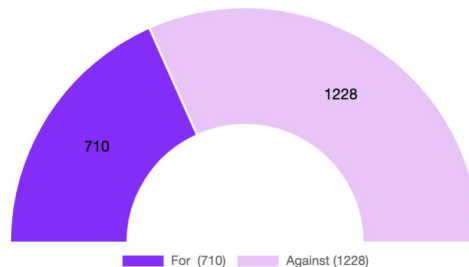
Main Areas of Discourse in Comments



Pride Festival and Drag Queen Story Hour: Most of the commenters online are against the cancellation

May 31 - Jun 8, 2022

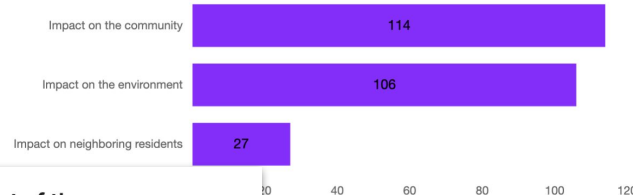
Drag Story Hour Cancellation



Development of the Glen Iris Golf Course generates strong pushback, mainly generated by an active opposition group; impact on the fabric of the community and the environment are the leading drivers of opposition

Nov 1, 2021 - Jun 21, 2022

Glen Iris Golf Course Development - Drivers of Opposition



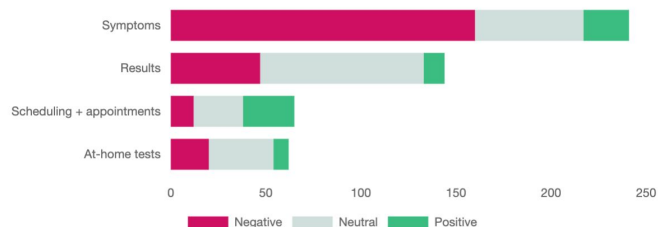
Sentiment Analysis to design messaging and assess campaigns

Sentiment can provide insight into how messages and campaigns are received - crucial information to support design and execution of communication efforts.

COVID-19 Testing: Confusion about benefits of testing given mild symptoms drives discussion & frustration; long wait times for results and shortage of at-home test kits emerge as less prevalent pain points, while reports scheduling difficulty are minimal

Jan 1 - Jan 30, 2022

COVID-19 Testing Commentary Themes + Sentiment



[Analyst Highlight] Posts about the Sheriff's response video drives a spike in discourse about law enforcement; online reactions to the video are predominantly negative

Jan 23 - Jan 29, 2022

Sheriff's Video Response: Sentiment Analysis



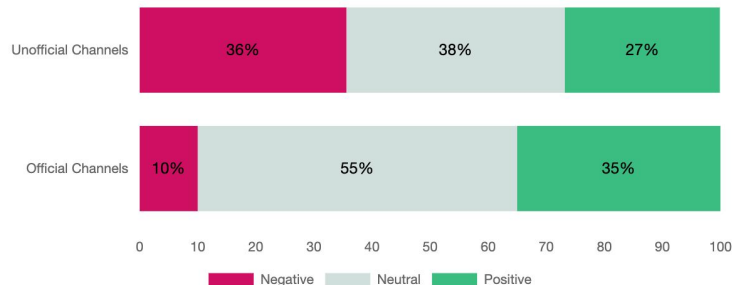
Sentiment Analysis to design messaging and assess campaigns

Sentiment serves to gauge impact and reception during the campaign's lifespan and to direct PIOs to where misinformation, misunderstanding, or objection occur, or how a campaign is performing over time.

Strive for 75 Campaign: Expressions of resident opposition considerably higher on unofficial channels

Aug 13 - Oct 9, 2021

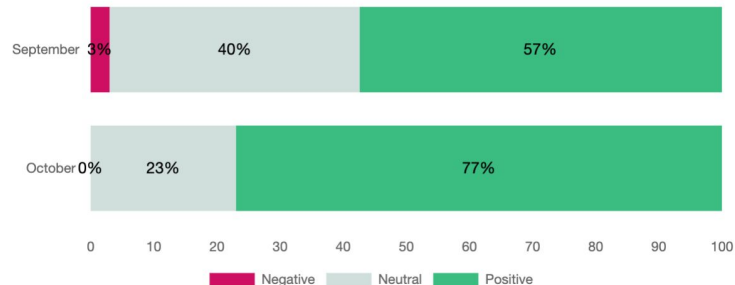
Sentiment Breakdown: Strive for 75



Dining Dollars campaign: Resident satisfaction considerably improves in October

Sep 1 - Nov 4, 2021

Sentiment Breakdown: Dining Dollars Campaign September vs. October



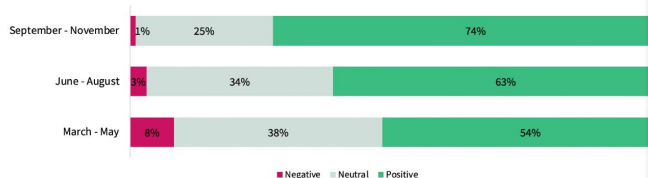
Sentiment Analysis to monitor and evaluate performance

Sentiment can support performance management by showing trends over time or providing feedback on how an event was organized or a crisis handled.

Neighborhood Walks Program is received favorably online, growing stronger with time while criticism decreases; commenters advocate for patrols to be conducted later at night and for increased police presence in [redacted]

Mar 1 - Dec 26, 2021

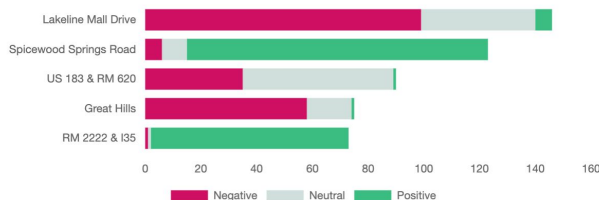
Neighborhood Walks: Sentiment Over Time



Homeless Encampments: Interest and positive sentiment spike this week following the clearing of an encampment on Lake Creek Parkway; commentary reveals concern about the conditions of Lakeline Mall Drive, US 183, and Great Hills

Sep 15 - Sep 22, 2021

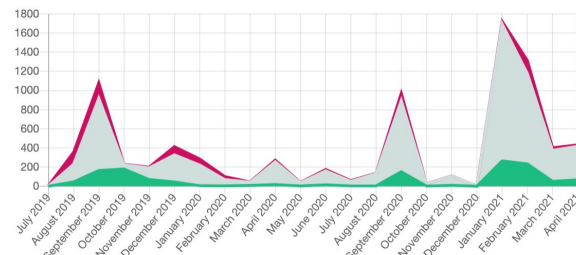
Homeless Encampments Commentary: Mentioned Locations



Arena: Resident discourse reached the highest spike in January; conversations have become less negative over time

Apr 20 - Apr 20, 2021

Score Over Time: Arena



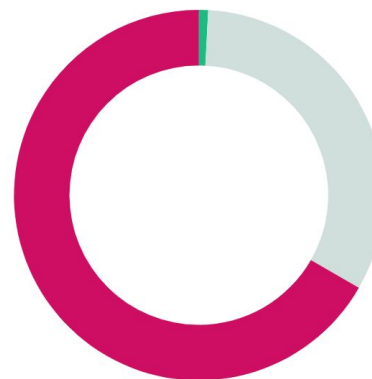
Sentiment Analysis to alert and forecast

Spikes in negative sentiment can indicate that something is brewing or outline the shape of the debate to come.

Relatively high negative sentiment on ██████ County Courthouse sidewalk replacement may indicate the shape of the debate to come

Apr 18 - Apr 29, 2021

Sidewalk Replacement project - Sentiment Overview





Abington, MA

Sentiment analysis in everyday work



Samantha Linnehan

Principal

Abington, MA | In-House Alternatives

Get to know Abington, MA



ABINGTON
MASSACHUSETTS

- **Population of 17,000**
- **Bedroom community to Boston**
- **Median household income \$106,000**
- **10 Square Miles**

Storm Response

Communications

- Disjointed Messaging
- Social Media Primary Outlet

Outcomes

- New Safety Measures
- Emergency Communication Platform



Abington Fire Department

October 27th, 2021

From the Fire Chief for immediate release: Following a conference call between area fire chiefs and National Grid managers, the anticipated schedule for restoring electric power for most residents has already



99 115 41

Interactions: 310

11%

3%



Abington Police Dept

October 27th, 2021

Electrical power to the Town of Abington will not be restored tonight. Traffic and street lights will not be working. Road conditions are and will remain treacherous. Please stay off the roads for your own safety. Thank you for your cooperation. Stay home, stay safe, and stay



80 32 14

Interactions: 130

11%

1%



Alex Hagerty - Abington Selectman

October 30th, 2021

Power will be restored to the Green Street Neighborhood tonight! I want to extend my sincerest apologies to our residents on Green, Clapp, Olson, Rice, Linda, Doris, Allen and Martin Streets for the delay



39 1 12

Interactions: 79

30%

14%

New Voice: Police Department

 **Abington Police Dept**
January 27 · 🌐

With a big Noreestah on its way, the APD needs your help as we all prepare to...weathah the storm.

Please stay home and off the road, even if your caaah is wicked good in the snow.

Make sure you chaahge your cell phone and other electronics. With all of the bread, milk, and eggs out there you don't want to miss any French Toast TikTok videos.

Gas up your snowblowah and please keep your hands away from the blades, you need to save your fingahs for the Patriot's future Supah Bowl rings.

Check-in with any of your neighbahs who might need assistance before the storm arrives.

With your help and cooperation we'll all get through this togethah.



 You, Kerry Franey, Elizabeth Kalajjian and 216 others 13 Comments 51 Shares

 Like

 Comment

 Share



 **Abington Police Dept**
February 3 · 🌐

All right stop, collaborate and listen. Ice is coming, and you're gonna be slippin'.

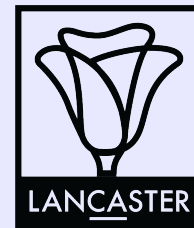
Accidents are a problem, yo the APD wants to solve it.

Take your time during the a.m. commute so your car doesn't revolve it.



 You, Kaitlyn Ingemi LaPointe, Kristen Gouthro and 270 others 15 Comments 68 Shares



Lancaster, CA

Sentiment analysis in everyday work



Brianne Terrell

Communications Senior Coordinator
Lancaster, CA

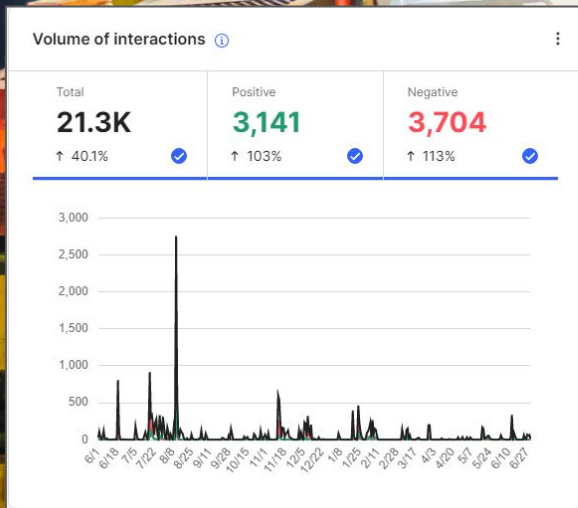
Get to know Lancaster, CA



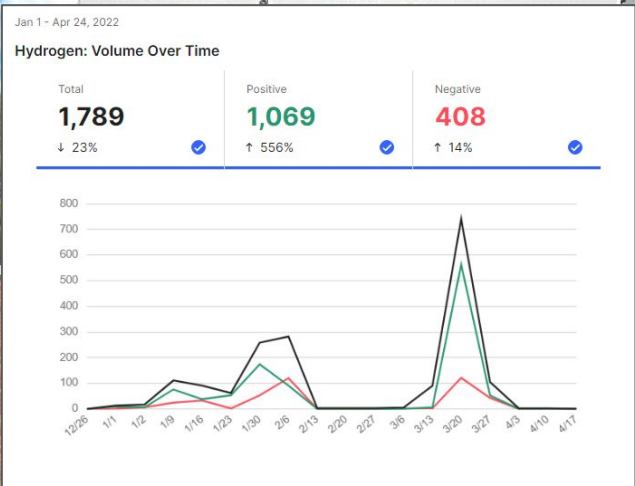
Creating
a better
tomorrow.
Together.

- **Northernmost edge of Los Angeles County**
- **Population: 170,000**
- **Ongoing Campaigns/Initiatives: ~342**
- **Communications Team: 4**

Road Construction



Hydrogen City





Creating
a better
tomorrow.
Together.



Questions?

Reach out to us at info@zencity.io

We're offering webinar attendees a
20% discount on an annual Zencity subscription.

Offer valid through October 2022.

Scan the QR code to get started



Thank you!





300+ local governments
use Zencity every day to **build
trust, improve services &
increase satisfaction**



The platform allows us to
**understand the needs and
concerns of our residents to
make the best decisions.**

- Todd Gloria, San Diego Mayor

