

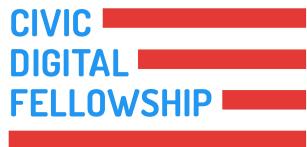
# TEXT ANALYTICS FOR CUSTOMER FEEDBACK PIPELINE

Communications Directorate

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Francine Krasowska — Customer Experience Analyst

Lisa Wolfisch — Director, CNMP



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Stanford University  
Symbolic Systems

# THE DISCONNECT

**CENSUS  
BUREAU**



**THE  
PUBLIC**

# WHY IS THIS IMPORTANT?

Census.gov is the primary interface for the dissemination of the Census Bureau's data products.

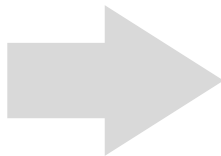
**45 million** annual visitors

**1.7 million pages** on census.gov

# FEEDBACK TOOL

## V1: FORESEE SURVEY

long, frustrating  
third-party/proprietary



## V2: HOME-GROWN TOOL

March 2018 - present  
short, simple  
instant feedback

3: \*Please rate how well the site layout helps you find what you are looking for.

1=Poor Excellent=10 Don't Know

1 2 3 4 5 6 7 8 9 10

4: \*Please rate the number of clicks to get where you want on this site

1=Poor Excellent=10 Don't Know

1 2 3 4 5 6 7 8 9 10

5: \*Please rate the visual appeal of this site.

1=Poor Excellent=10

Is this page helpful? X

Yes No

Comments or suggestions?

Tell us more.

255 characters remaining

[No, thanks](#) SUBMIT

# PURPOSE

How might we help program areas understand the **user experience** on their content pages?

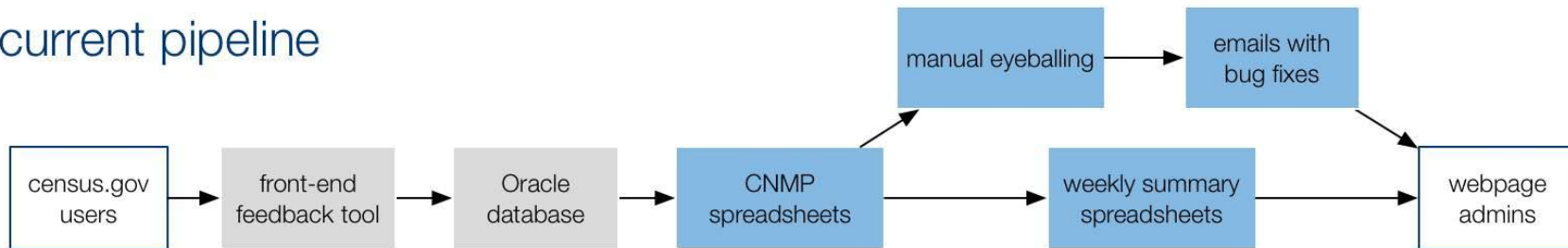
→ Develop and streamline the internal capacity for customer feedback **analytics & reporting** for the census.gov website

# USER RESEARCH: FINDINGS

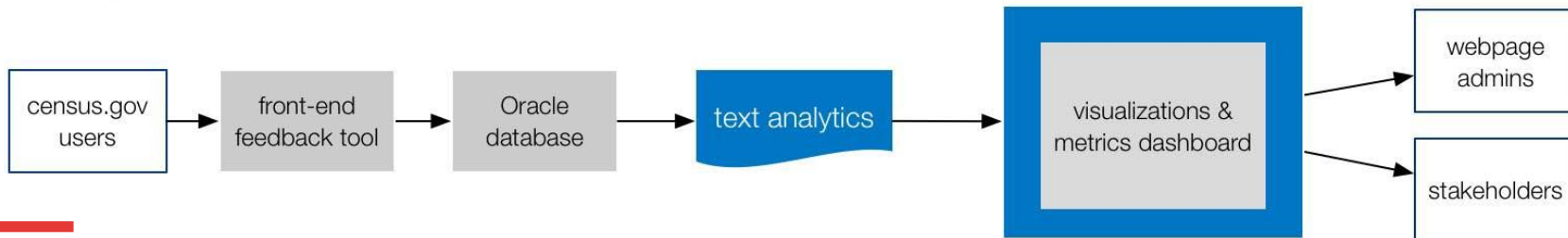
- 1) Stakeholders care about feedback **specific to their program areas**.
- 2) Stakeholders want a **quick triage** of comments for **relevant, actionable feedback**.
- 3) Stakeholders wish there was a **better structural workflow** in place to **close the feedback loop** and track progress stemming from customer feedback

# THE CUSTOMER FEEDBACK PIPELINE

## current pipeline

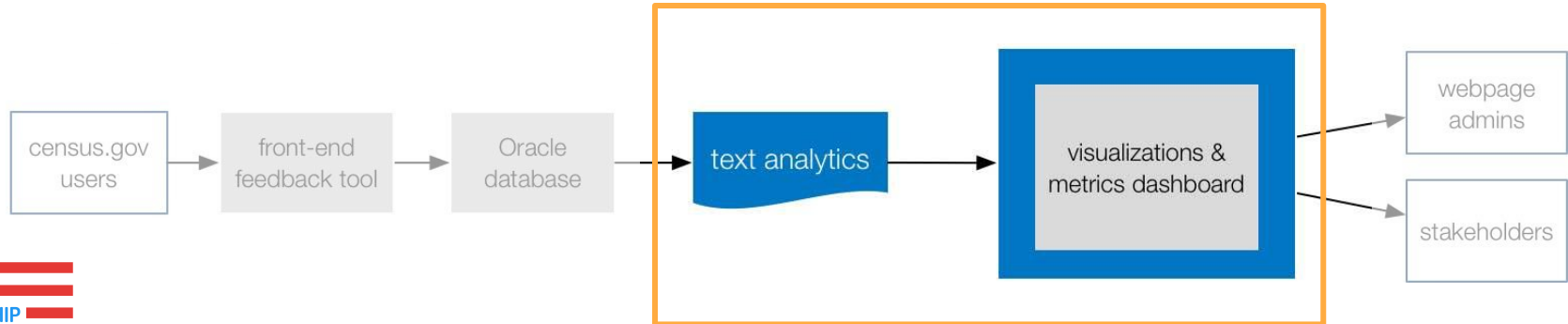


## new pipeline



# PROJECT DELIVERABLES

- 1) **Text analytics scripts** in Python implementing topic modeling/clustering/sentiment analysis to automate the **categorization/triage** of open-ended text feedback
- 2) **Prototype** for a new CEM **feedback analytics dashboard** in Tableau





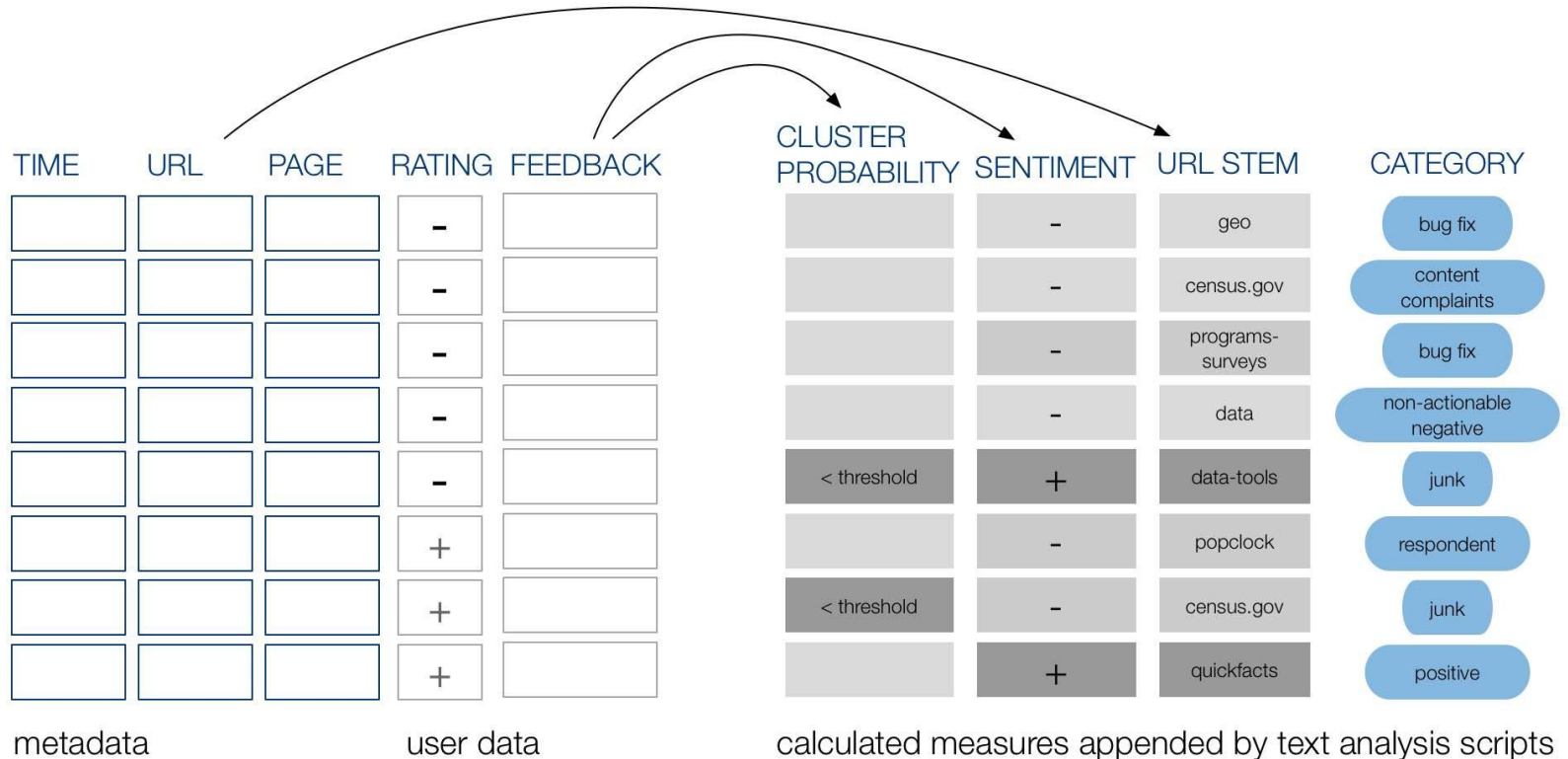
# TEXT ANALYTICS SCRIPTS

TIME	URL	PAGE	RATING	FEEDBACK
			-	
			-	
			-	
			-	
			-	
			+	
			+	
			+	

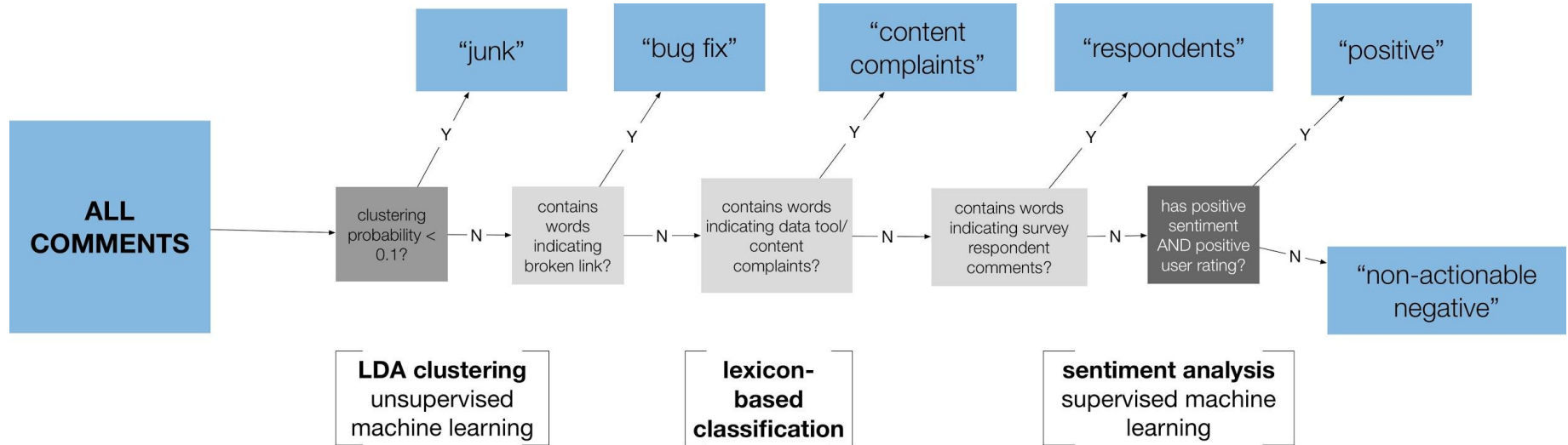
metadata

user data

# TEXT ANALYTICS SCRIPTS



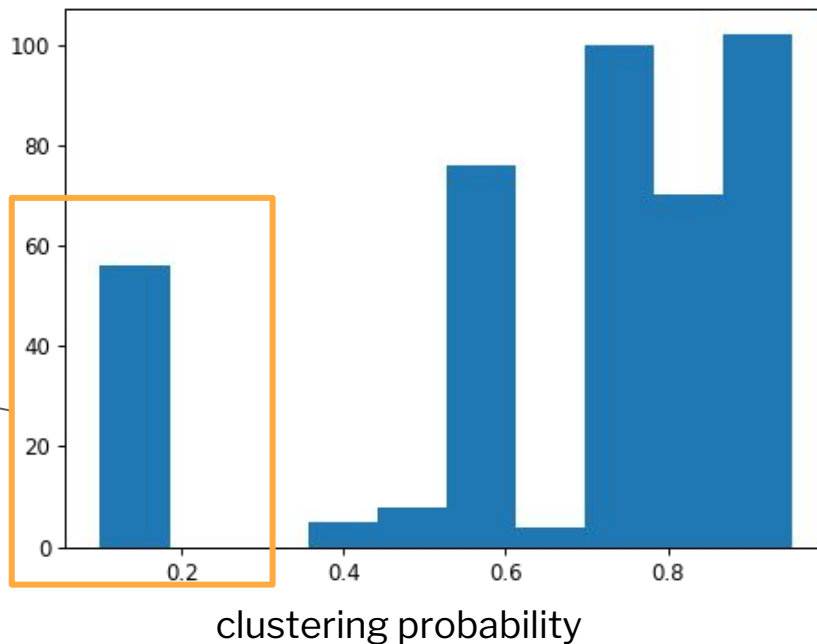
# TEXT ANALYTICS: TRIAGE LOGIC



# 1) CLUSTER THE COMMENTS

**low clustering  
probability  
= junk ?**

- less relevant comments
- fewer discernible words



**TECHNIQUE:**  
LDA CLUSTERING  
(UNSUPERVISED)

## 2) FIND ACTIONABLE COMMENTS

**BUG FIXES:** “broken link,” “doesn’t work,” “page not found,”...

**CONTENT COMPLAINTS:** “couldn’t find,” “fix,” “please add”...

**RESPONDENTS:** “login,” “submit questionnaire”...

# 3) CALCULATE SENTIMENT SCORE

**APPROACH 1:** Supervised machine learning (in-house sentiment classifier)

- Training set: Foresee (old feedback tool)

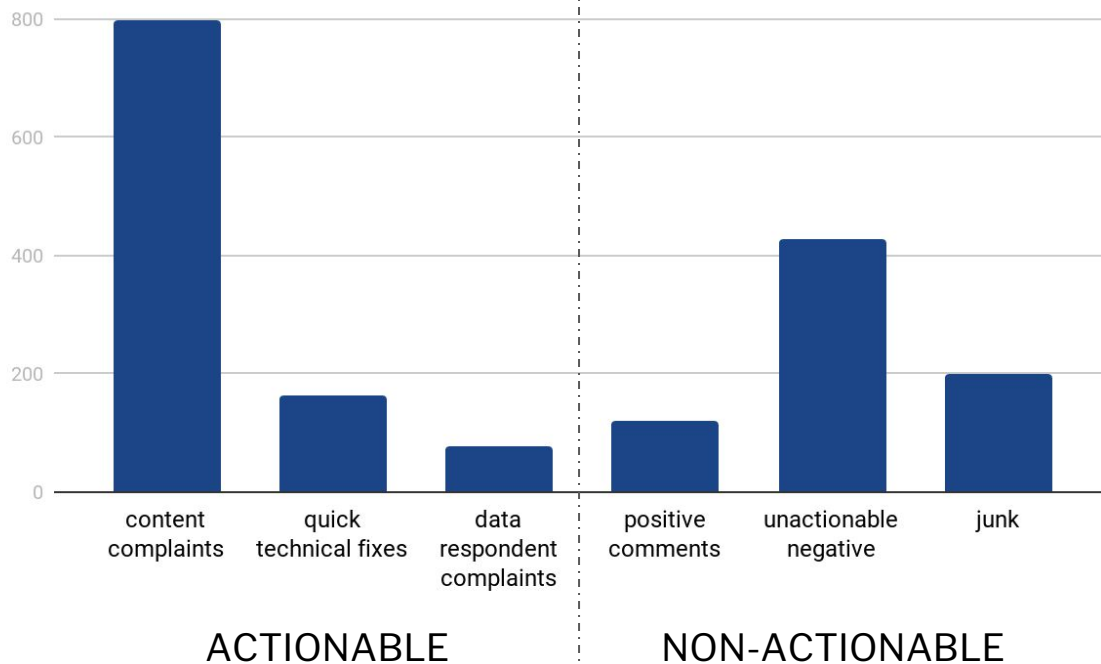
**APPROACH 2:** Lexicon-based (third-party classifier)

**COMBINED APPROACH:** Composite sentiment score

# RESULTS

Category	Count
content complaints	520
bug fixes	135
respondent complaints	45
positive comments	115
non-actionable negative comments	409
junk	200

Distribution of feedback categories



# FROM SCRIPTS TO VISUALIZATION

TIME	URL	PAGE	RATING	FEEDBACK
			-	
			-	
			-	
			-	
			-	
			-	
			-	
			+	
			+	
			+	

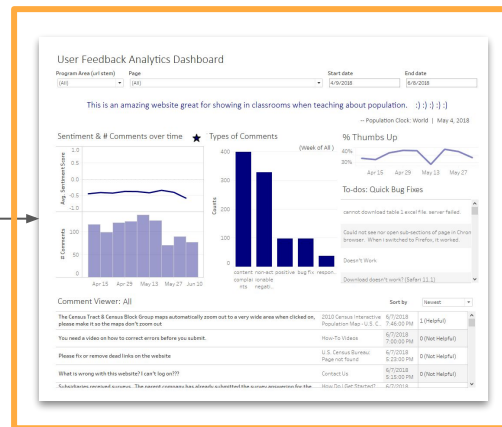
metadata                      user data

TIME	URL	PAGE	RATING	FEEDBACK
			-	
			-	
			-	
			-	
			-	
			-	
			-	
			+	
			+	
			+	

metadata                      user data

CLUSTER PROBABILITY	SENTIMENT	URL STEM	CATEGORY
	-	geo	bug fix
	-	census.gov	content complaints
	-	programs-surveys	bug fix
	-	data	non-actionable negative
< threshold	+	data-tools	junk
	-	popclock	respondent
< threshold	-	census.gov	junk
	+	quickfacts	positive

columns added by text analysis scripts





# THE DASHBOARD

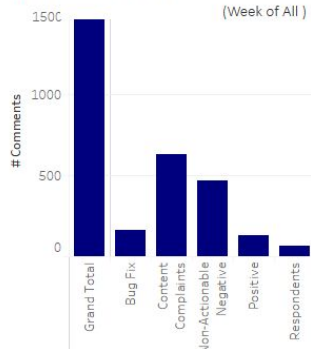
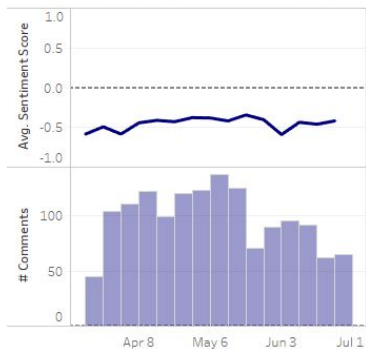
## Census.gov Visitor Feedback Analytics Dashboard

Program Area (URL Stem) Page Start date End date  
(All) (All) 3/14/2018 6/30/2018

This is an amazing website great for showing in classrooms when teaching about population. :) :) :) :)

-- Population Clock: World | May 4, 2018

### Sentiment Score and No. Comments ⓘ Types of Comments



### % Thumbs Up



### To-dos: Quick Bug Fixes

- Download doesn't work? (Safari 11.1)
- dropdown to change states does not work
- fix your broken links

### Comment Viewer: All

Sort by Newest

"The PDF to the right contains the 72-page report."	1960 Census: Per Capita and Median F...	6/29/2018 8:43:00 PM	0 (Not Helpful)
why do you make it so difficult to access past census data. 1990 and 1980 were not that long ago...do better	Decennial Census (2010, 2000, 1990)	6/29/2018 8:39:00 PM	0 (Not Helpful)
I want to find the top 1000 cities of the US. but this page goes to 768	Population and Housing Unit Estima...	6/29/2018 8:34:00 PM	0 (Not Helpful)
just a portal to the site that works	Survey of Business Owners and Self-Em...	6/29/2018 8:22:00 PM	0 (Not Helpful)
where do i find the actual data?	Decennial Census by...	6/29/2018	

# Census.gov Visitor Feedback Analytics Dashboard

Program Area (URL Stem) Page

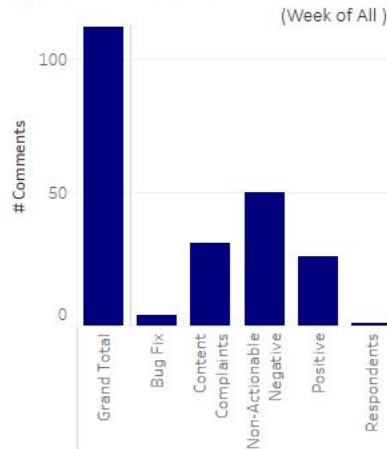
popclock (All) 3/5/2018 6/27/2018

- Enter search text
- ☐ eos
  - ☐ epcd
  - ☐ fedcasac
  - ☐ fieldjobs
  - ☐ geo
  - ☐ geographies
  - ☐ glossary
  - ☐ govcs
  - ☐ hhes
  - ☐ history
  - ☐ library
  - ☐ main
  - ☐ mp
  - ☐ mrtcs
  - ☐ mycd
  - ☐ newsroom
  - ☐ people
  - ☒ popclock
  - ☐ popest
  - ☐ popfinder
  - ☐ population
  - ☐ populationwldget
  - ☐ privacy
  - ☐ prod
  - ☐ programs-surveys
  - ☐ programs-surveys-abs
  - ☐ programs-surveys-aces
  - ☐ programs-surveys-acsc
  - ☐ programs-surveys-ahs

ite great for showing in classrooms when teaching about population. :) :) :) :)

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Types of Comments



% Thumbs Up



To-dos: Quick Bug Fixes

its not working

This page was recommended by my teacher and i do feel as if it's meeting my needs with the paper i am currently working on. Maybe a pull down bar with se

Website does not show information with many inter connection, website doesn't work with many differet wifi areas, needs improvement of being able to acces

Sort by Newest

world's population and every contry's and cities's poulation	Population Clock: World	6/23/2018 11:59:00 AM	1 (Helpful)
	Population Clock: World	6/21/2018 4:52:00 AM	1 (Helpful)
	Population Clock	6/20/2018 1:18:00 PM	0 (Not Helpful)
	Population Clock	6/11/2018 7:33:00 PM	0 (Not Helpful)
Would it be possible to show 'components of population change' for world population numbers? Thanks	Population Clock	6/4/2018	

1) filter by program area (url tags)

# Census.gov Visitor Feedback Analytics Dashboard

Program Area (URL Stem) popclock

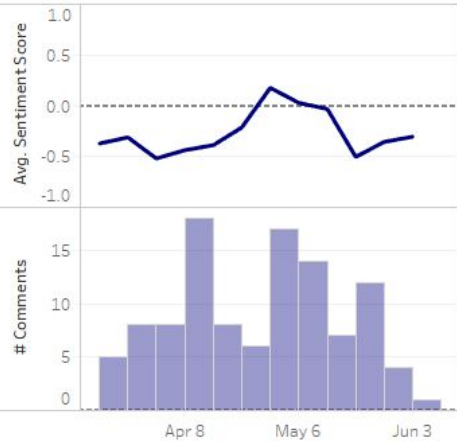
Page (All)

Start date 3/14/2018

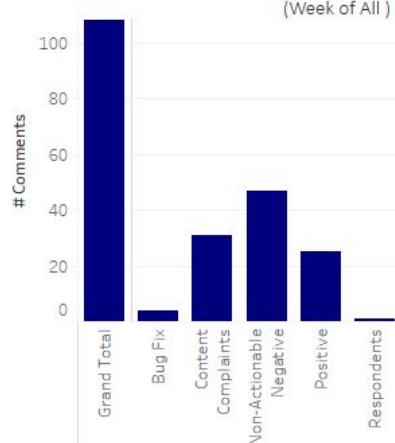
End date 6/7/2018

This is an amazing website great for showing in classrooms when teaching about population

Sentiment Score and No. Comments



Types of Comments



% Thumbs Up



< June 2018 >

S	M	T	W	T	F	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

Today: 7/31/2018

- 1) filter by program area (url tags)
- 2) filter by date range

## To-dos: Quick Bug Fixes

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## Comment Viewer: All

		Sort by	Newest
Would it be possible to show 'components of population change' for world population numbers? Thanks.	Population Clock	6/4/2018 3:47:00 PM	1 (Helpful)
go away	Population Clock: World	5/31/2018 10:49:00 AM	0 (Not Helpful)
give statistics for other countries	Population Clock	5/29/2018 6:33:00 AM	1 (Helpful)
This website is interesting to look at. Nice job. :)	Popclock Feedback - U.S. Census Bureau	5/27/2018 2:28:00 PM	1 (Helpful)
This is fake. the world population is 7.6 billion not 7.4 that was 2 years ago	Population Clock:	5/27/2018	

# Census.gov Visitor Feedback Analytics Dashboard

Program Area (URL Stem)  
popclock

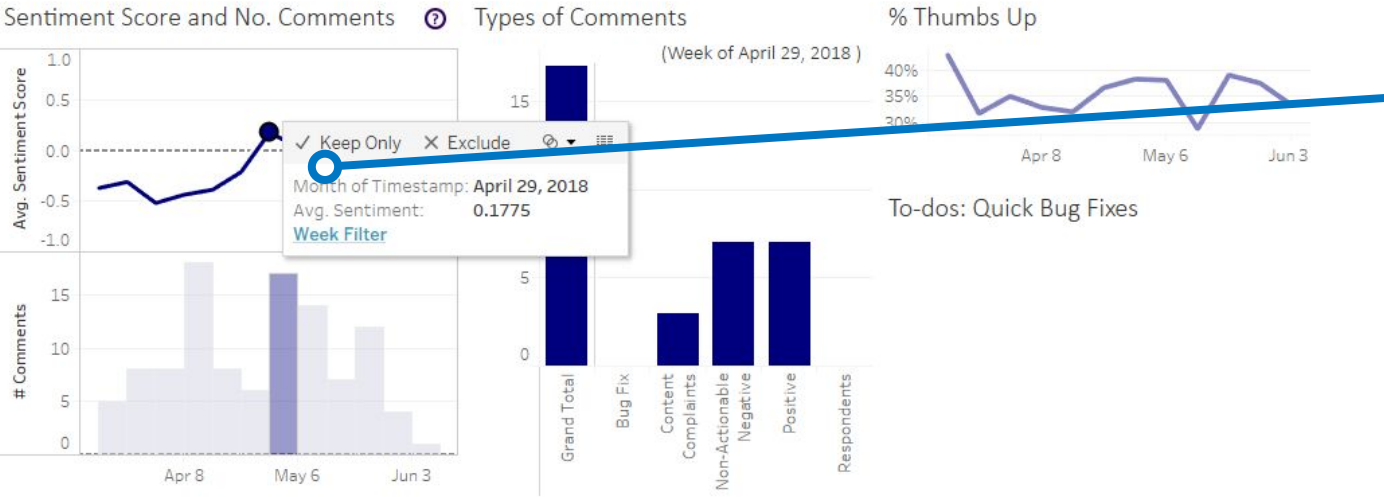
Page  
(All)

Start date  
3/14/2018

End date  
6/7/2018

This is an amazing website great for showing in classrooms when teaching about population. :) :) :) :)

-- Population Clock: World | May 4, 2018



Comment Viewer: All

Sort by Newest

Just delete this website it sucks DELETE IT AND DON'T EVER USE IT IT IS A SCAM..	Population Clock	5/5/2018 11:43:00 AM	0 (Not Helpful)
Wow this is cool how did you make this	Population Clock	5/4/2018 9:42:00 PM	1 (Helpful)
*Great website *Love to use this website..	Population Clock	5/4/2018 8:06:00 PM	1 (Helpful)
USE THIS WEBSITE OR ELSE.....WILL REGRET IT	Population Clock	5/4/2018 3:27:00 PM	1 (Helpful)
This is an amazing website great for showing in classrooms when teaching about population. :) :) :) :)	Population Clock	5/4/2018	

- 1) filter by program area (url tags)
- 2) filter by date range
- 3) see weekly trends in sentiment score

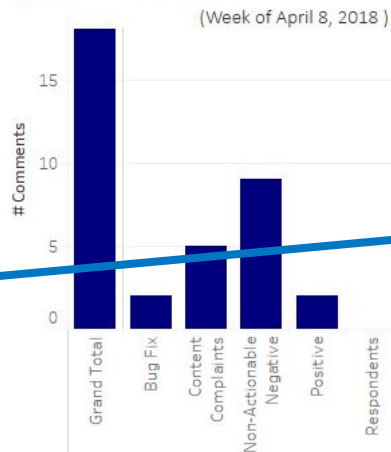
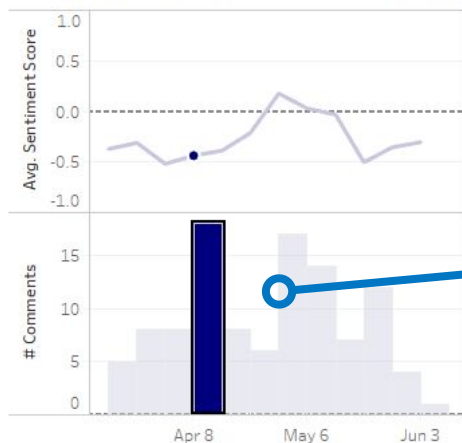
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Program Area (URL Stem)  Page  Start date  End date

This is an amazing website great for showing in classrooms when teaching about population. :) :) :) :)

-- Population Clock: World | May 4, 2018

Sentiment Score and No. Comments ⓘ Types of Comments



% Thumbs Up



To-dos: Quick Bug Fixes

its not working

Website does not show information with many internet connection, website doesn't work with many different wifi areas, needs improvement of being able to access ..

1) filter by program area (url tags)

2) filter by date range

3) see weekly trends in sentiment score

**& weekly number of comments**

Comment Viewer: All

Sort by

The basic facts section should indicate what goods were EXported TO the US and those IMPORTed From the US. The way it is currently written is confusing	Population Clock: World	4/13/2018 12:16:00 PM	0 (Not Helpful)
no games	Population Clock	4/13/2018 11:03:00 AM	0 (Not Helpful)
..	Population Clock	4/13/2018 10:55:00 AM	0 (Not Helpful)
dab on the h8rs	Population Clock	4/12/2018 10:01:00 PM	1 (Helpful)
nice	Population Clock	4/12/2018	
this site is fake how do you know if some one was iust born or died	Population Clock	4/12/2018	



# Census.gov Visitor Feedback Analytics Dashboard

Program Area (URL Stem)  Page  Start date  End date

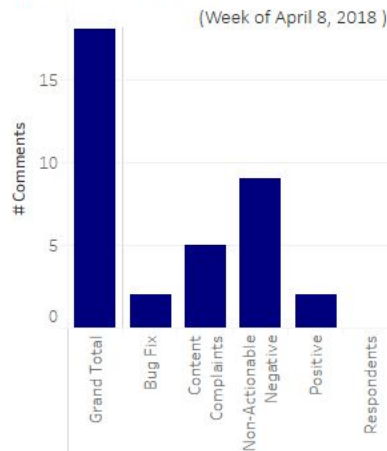
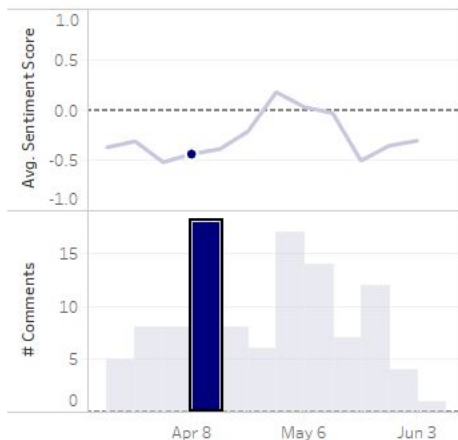
This is an amazing website great for showing in classrooms when teaching about population. :) :) :) :) :

-- Population Clock: World | May 4, 2018

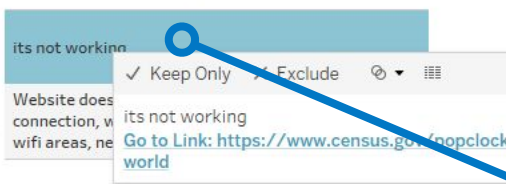
Sentiment Score and No. Comments

Types of Comments

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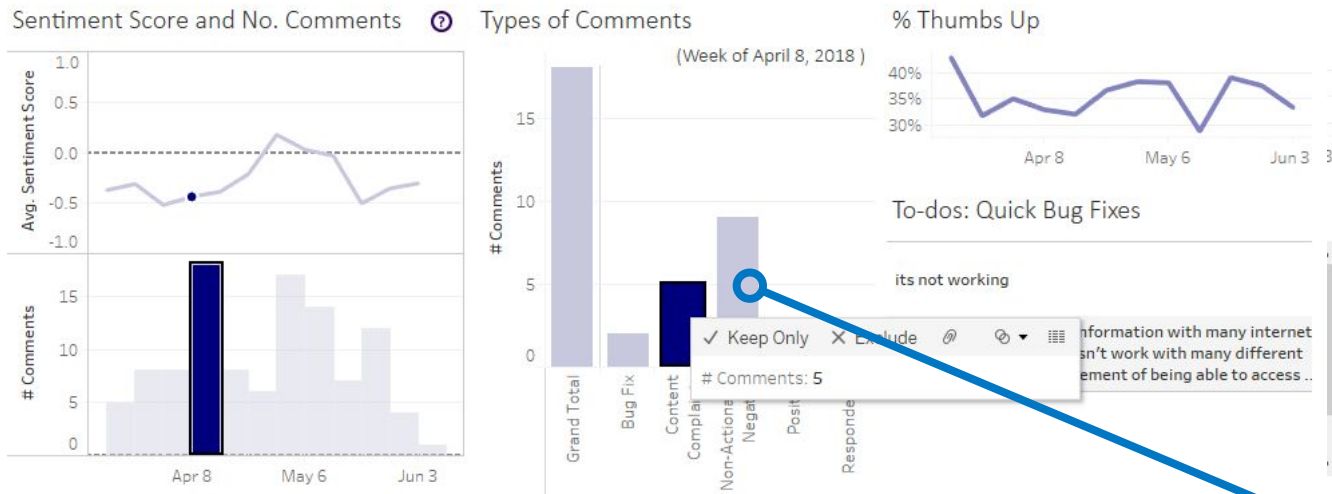
3) see weekly trends in sentiment score

& weekly number of comments

4) view quick actionable comments for selected week

Program Area (URL Stem)	Page	Start date	End date
popclock	(All)	3/14/2018	6/7/2018

-- Population Clock: World | May 4, 2018



Sort by Newest

The basic facts section should indicate what goods were EXported TO the US and those IMported From the US. The way it is currently written is confusing	Population Clock: World	4/13/2018 12:16:00 PM	0 (Not Helpful)
this site is fake how do you know if some one was just born or died	Population Clock	4/12/2018 2:35:00 PM	0 (Not Helpful)
Search or select a country is broken- I type a country, press enter, and nothing happens.	Population Clock: World	4/11/2018 3:39:00 PM	0 (Not Helpful)
Please make sure it works	Population Clock	4/11/2018 3:03:00 PM	0 (Not Helpful)
I'm a little confused as to why the world population is 7.47 billion, as opposed to the 7.6 billion estimate	Population Clock	4/9/2018	

- 1) filter by program area (url tags)
- 2) filter by date range
- 3) see weekly trends in sentiment score  
& weekly number of comments
- 4) view quick actionable comments for selected week
- 5) filter by comment category**

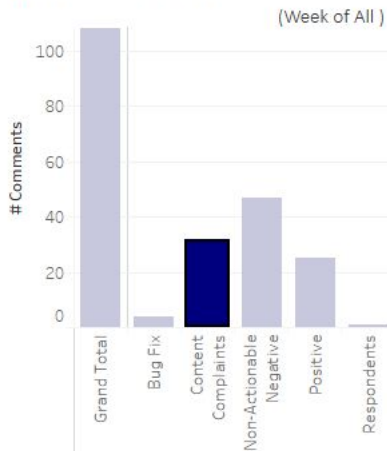
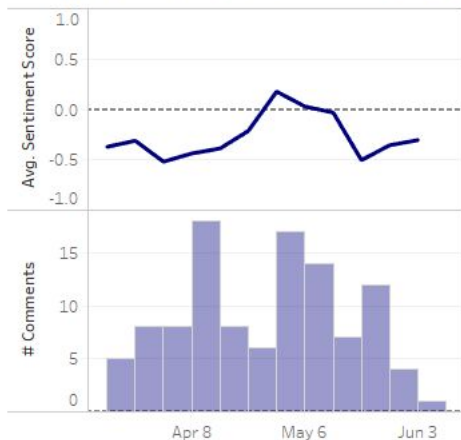
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-- Population Clock: World | May 4, 2018

## Sentiment Score and No. Comments ? Types of Comments



## % Thumbs Up



## To-dos: Quick Bug Fixes

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Website does not show information with many interconnection, website doesn't work with many different wifi areas, needs improvement of being able to acces

## Comment Viewer: Content Complaints

		Sort by	User Rating
A suggestion is that we can click on the map to the left called "A closer look".	Population Clock: World	4/30/2018 3:13:00 PM	1 (Helpful)
add a section to cite the page	Population Clock	4/23/2018 10:31:00 PM	1 (Helpful)
give statistics for other countries	Population Clock	5/29/2018 6:33:00 AM	1 (Helpful)
i dont know if its a little confusing, but how would you know all of this in a second?	Population Clock	4/6/2018 2:04:00 PM	1 (Helpful)
I like turtles and would like to see more turtles on your page. Thanks and have a good turtle-icious day!	Population Clock	5/17/2018	

- 1) filter by program area (url tags)
- 2) filter by date range
- 3) see weekly trends in sentiment score & weekly number of comments
- 4) view quick actionable comments for selected week
- 5) filter by comment category
- 6) sort and view triaged comments



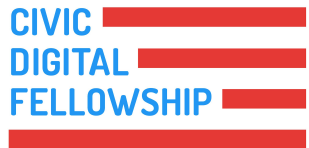
# IMPACT

- Serves as first internal tool for **quick analytics reporting** of customer feedback data for 1.7+ million webpages
- Applies **novel data science approaches** to customer analytics needs in government
- Enables content owners to understand and prioritize **customer pain points**
- Recognize the **positive impact** of data disseminators
- Promotes a **culture shift to prioritize user experience** in the Bureau

# THANK YOU!

## **SPECIAL THANKS TO:**

Francine Krasowska  
Lisa Wolfisch  
Jennifer Cheeseman Day  
Walker Kehoe  
and many more!



MAYUKA SARUKKAI  
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