

Privacy and Security in Online Social Media

Course on NPTEL

NOC21-CS28

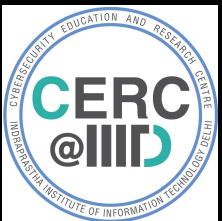
Week 5.3

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Measuring Human Behavior

- Exploring the feasibility of social media in quantifying attributes of communication
- Identifying behavioral attributes like affective expression, engagement and social and cognitive response processes



Citizen to Citizen



Police to Citizen



Police to Police



Citizen to Police

Research Questions

● *RQ 1: Topical Characteristics*

- Nature of content and topics that characterize social media discussion threads

● *RQ 2: Engagement Characteristics*

- How do citizens and police engage in social media discussion threads?

● *RQ 3: Emotional Exchanges*

- Nature of emotions and affective expression that manifest on social media

● *RQ 4: Cognitive and Social Orientation*

- What are the linguistic attributes that characterize cognitive and social response processes?



Methodology

85 Public and official Police Department

Average age 3 years (from 2010 – April 2015)

47,474 wall posts and 85,408 status updates

Data Categorization

	Total Posts	w/ ≥ 1 Comment	P&C	C
	85,408	46,845	5,519 $P_{P\&C}$	41,326 P_C
	47,474	24,984	17,196 $C_{P\&C}$	7,788 C_C

Measures of Behavior

Topics

- N Gram Analysis
- K-means Clusters

Engagement

- No. of police and citizen who comment in posts
- Distinct citizens who comment in posts
- Average no. of likes and comments

Emotional

- Valence
- Arousal

LIWC and Anew Dictionary

Social and cognitive

- Interpersonal Focus
- Social Orientation
- Cognition

LIWC Dictionary

Topic Characteristics



Focus on advisories, the status of different cases being investigated



Unigram	Freq.	Unigram	Freq.
rules	0.015	safety	0.012
safety	0.014	following	0.011
violations	0.014	notice	0.010
challans	0.011	prosecuted	0.009
please	0.011	movement	0.008
citizens	0.01	complaint	0.008

($U = 700, p < .05, z = -3.57$)

Topic Characteristics



Most posts tend to request police to take action on their complaints



Unigram	Freq.	Unigram	Freq.
please	0.026	people	0.022
take	0.021	please	0.02
action	0.019	one	0.019
people	0.019	take	0.016
one	0.019	action	0.015
time	0.017	time	0.015
near	0.017	number	0.013

Higher Reference to “people”

Clusters of Topics

- Police initiated discussions are more focused than citizen initiated.

Awareness drive / safety campaigns

Road sense is the offspring of courtesy and the parent of safety



Prosecuted / action taken reports

Action taken by [Withheld], Reg your tweet petition, @[withheld]; 33 parking tag & 6 no parking, 1 foot path parking. Cases booked on hospital road

Advisories on situations

Good -- Morning to all the Commuters of Shillong City, there is heavy movement over NH - 40 – 44 and Madanrting down side, Lumdiengjri area stretch. Please do not overtake

Clusters of Topics

- Police initiated discussions are more focused than citizen initiated.

Appreciation

Heartiest congratulations to [withheld] police for nabbing [withheld] agent within 24hrs. wow!!! Kudos and respect

Newspaper articles

Please ACT: <http://timesofindia.indiatimes.com/videos/news/...>

Citizen tips and complaints

4th Nov 2014 [withheld]: Driving in wrong side at Teghoria U Turn

Neighbourhood problems

"Learn from the Delhi incident and ensure that no buses in Kolkata have tinted glasses. One such bus was spotted on Gariahat road Regn. #. [Withheld]. Kindly take appropriate action. Thank you

Missing people

"Sir plz help find my nephew, he is missing since today morning, he is from kodagu, contact [withheld]



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- Nature of emotions and affective expression that manifest on social media

● *RQ 4: Cognitive and Social Orientation*

- What are the linguistic attributes that characterize cognitive and social response processes?

Engagement / Comments Characteristics

● Content Generators

	Police		Citizen		
					
Police + Citizens	55,028	1,79,176	17,124	12,630	26% lower
Citizens Only	54,982	1,79,176	17,081	12,630	

Engagement / Comments Characteristics



	Comments*		Likes**	
	Avg.	Std. dev	Avg.	Std. dev
Cp&c	3.34	19.19	9.4	253.85
Cc	3.69	13.79	13.38	201.57

9.49% lower

29.75% lower

Citizen post: “My family and I are getting the unwanted calls from the given number [withheld]. Especially he is misbehaving with a female member. My Number is - [withheld]”

Police reply: “Dear [withheld], Please visit at your nearest Police Station and lodge a complaint with details and they will assist you in this regard... Thankyou”

Police suggests an appropriate action and the discussion tends to close early, resulting in lower interaction

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Emotional Expressions

- Negative sentiment higher in citizen initiated threads



	$C_{P\&C}$		C_C	
	Avg	Std. dev	Avg	Std. dev
Negative Affect	0.021	0.03	0.018	0.04
Anxiety	0.001	0.01	0.003	0.02
Anger	0.006	0.02	0.005	0.02
Arousal	4.4	1.74	3.9	2.16

16.67%
higher in $C_{P\&C}$

Emotional Expressions

- Negative sentiment higher in citizen initiated threads



	Cp&c		Cc	
	Avg	Std. dev	Avg	Std. dev
NA**	0.021	0.03	0.018	0.04
Anx**	0.001	0.01	0.003	0.02
Anger**	0.006	0.02	0.005	0.02
Arousal**	4.4	1.74	3.9	2.16

200% higher
in Cc

*I am just **worried** if Hyderabad Traffic Police [HTP] makes things worse like always and create more chaos. Frankly speaking... it's the lower income group or the people who are not aware using high beams. Try to educate people on road.*

Emotional Expressions

- Negative sentiment higher in citizen initiated threads

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Arousal**	4.4	1.74	3.9	2.16



12.82%
higher in Cpc

Higher arousal and negative affect to be markers of sensitisation because of crime!

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Social and Cognitive Orient.

- Discussion threads involving just the citizens are highly self-attention focused



	$C_{P\&C}$		C_C	
ppron	0.062	0.059	0.045	0.056
i	0.008	0.017	0.014	0.033
shehe	0.002	0.01	0.003	0.003
they	0.005	0.013	0.008	0.008

75% More

Likely citizens mostly express their own concerns that they face with others

I have lived in the UK and all the time I have never heard anyone honking. Honking is not required if you know how to drive [...] Can anyone advise me where to complain if I see anyone who don't comply ?

Why it matters?

- Helps police improve policing and community sensing
 - Facebook can be used to record and sense behavioural attributes such as engagement, emotions, and social support
- Enable police and citizen community to enhance emotional support to residents experiencing safety issues
 - Discussion threads with police and citizen commentary showed reduced levels of anxiety, showing police interactions can be calming to citizens.

Technological Implications

- Helping communities to make consensus based decisions regarding support and actions they seek from police
- Help gauge changing emotions and behaviour among citizens
 - Timely and early predictive analytical systems
- Sense and record the reactions of citizens and share these records with decision makers
 - Take timely measures and gain better insights

Thank you

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