



Every Rose Has Its Thorn

Censorship and Surveillance on Social Video Platforms in China

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4 most popular social video platforms in China
Over **1 billion** registered users
17,547 sensitive keywords

Research Problem

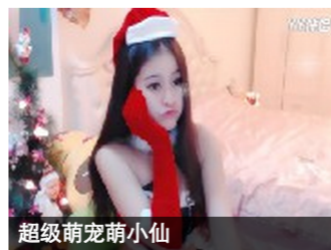
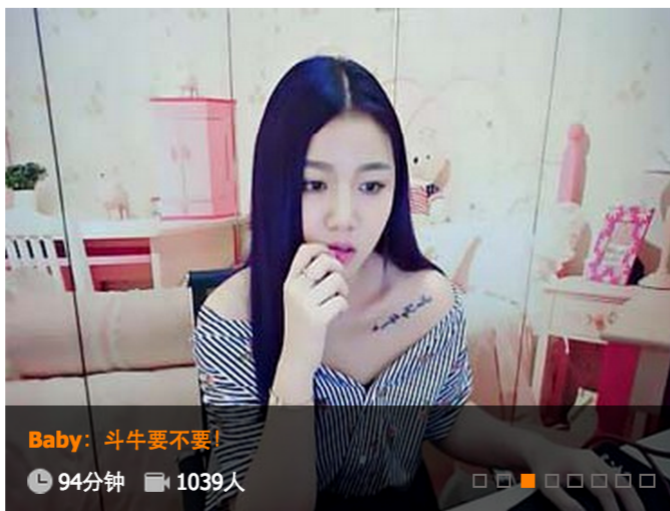
- What are the underlying **mechanisms** and **motivations** behind **ensorship / surveillance on Chinese social media?**

Background

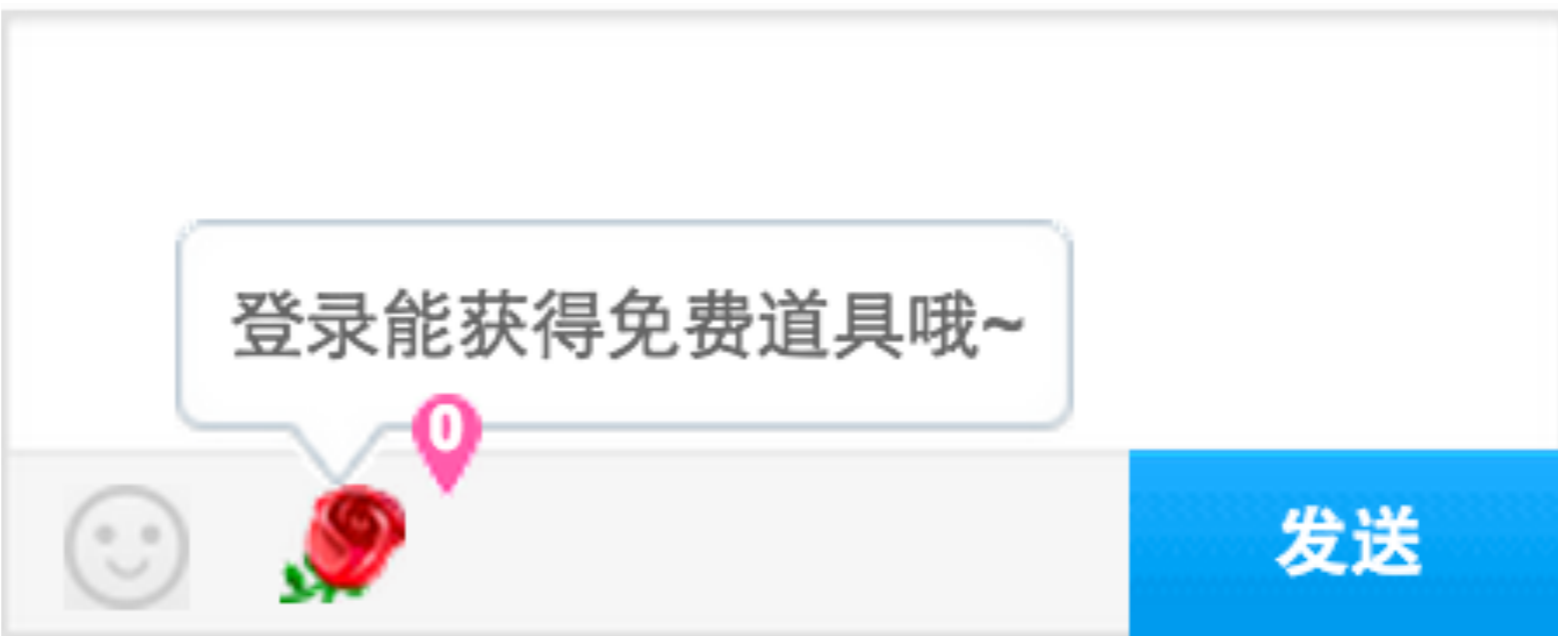
- Previous work shows **inconsistencies in censorship / surveillance of Chinese social media** (Crandall *et al.* 2013, MacKinnon 2008, Villeneuve 2008)
- Suggest **general directives may be given by government, but companies have flexibility in implementation**

Overview

- We reverse engineer four of the most popular Social Video Platforms in China: **YY, 9158, Sina Show, GuaGua**
- Found **client-side keyword censorship** in each SVP, and **keyword surveillance in YY**
- We reveal dataset of **17,547 unique keywords**, largest currently available to researchers!
- **Previously largest dataset 4,256 unique keywords** TOM-Skype + Sina UC (Knockel *et al.* 2012, Crandall *et al.* 2013)



倾情推荐





娱加小水id2413

现场人数: 25470

鲜花: 36348077

欢迎来到我的官方主页, 喜欢我就常来看我吧~

已订阅 | 取消



王haveyao love (17:52)

浪漫烟火

i R. 疯狂的娃娃...祝生日快乐 (17:52)

1

娱加小水~CO♥CO「我不认输」 (17:52)

说了

哈利波特特别大 (17:52)

1

雪娘 (17:52)

卡啊

雪娘 (17:52)

卡啊

娱加小水~小水泡「如鱼得水」 (17:52)

说了

i R. 疯狂的娃娃...祝生日快乐 (17:52)

1

精仿手机全网低价微信wo de 266812 (17:52)

6

点点 (17:52)

那是啥啊

qi tianxiang007 (17:52)

哈哈哈

更多推荐



美女 ★★★★★ 美女 ★★★★★

礼物求歌神 名品皮带包包一折微信: bao06288 M.YY.COM

- 送给 娱加小水id2413 64
- 送给 娱加小水id2413 65
- 送给 娱加小水id2413 66
- 送给 娱加小水id2413 1

礼物 充值

1 发送

发送



Real-time video rooms

Users sing karaoke or chat with each other in the video rooms

Users send virtual gifts to hosts and other users on air

Offer Android and IOS versions for all our major live social communities



Roles in the room

Activities in the room

Mobile Integration





DOTA2

T15 邀请赛

7.28-7.31小组赛 / 8.3-8.8淘汰赛 / 8.9最终决赛

在虎牙直播为心中的第一加油!



炒股赚钱抓涨停
中学股票助你盈



时光 5286

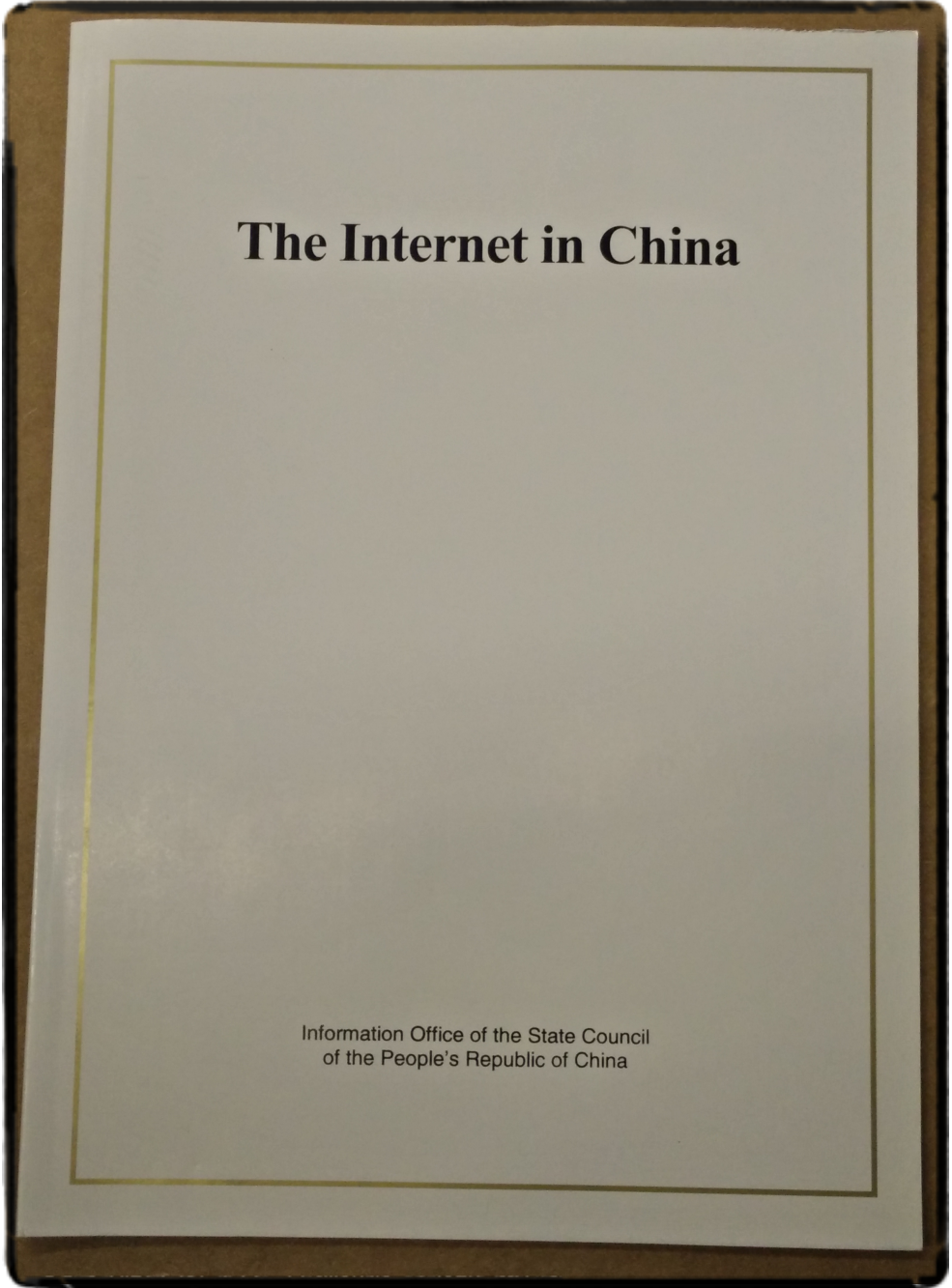
Time 相亲



愿得一人心，自首不相离

	Company	Public / Private	Product	Registered Users	Monthly Active Users
	YY Inc.	Nasdaq	YY	861.4 mn	117.4 mn
 	Tian Ge	SEHK	9158, Sina Show	245 mn	14.4 mn
	Jinhua Changfeng	Private	GuaGua	70 mn	N/A

Prohibited Topics on the Chinese Internet



The Internet in China

Information Office of the State Council
of the People's Republic of China

- Endangering state security
- Divulging state secrets
- Subverting state power
- Jeopardizing state religious policy
- Spreading rumors
- Disrupting social order and stability pornography
- Gambling
- Violence
- Humiliating or slandering others

source: http://www.china.org.cn/government/whitepaper/node_7093508.htm

Sina Is Fined by Chinese Government Over 'Indecent Content'

Weibo Parent Also Says Two Internet Licenses Are Likely to Be Revoked

“We would like to... express our deep regret to the public. Sina is willing to work with other website operators to make vigorous efforts in the country’s anti-porn campaign and create a clean Internet environment”

- Sina Corporation

source: <http://english.cntv.cn/2014/04/27/ARTI1398608144072100.shtml>

YY: “Content posted or displayed on our platform may be found objectionable by PRC regulatory authorities and may subject us to penalties and other severe consequences”

Source: http://files.shareholder.com/downloads/AMDA-NICNI/358818291x0x824505/036DB329-9796-4EED-B792-BE55BF114D54/YY-2014_Annual_Report_-_Final.pdf

Content Filtering and Management

- Strict Terms of Service for users and performers
- Violations lead to fines, account suspensions
- Content Monitoring Teams
- Automated Content Monitoring

Keyword Censorship Technical Analysis

- YY, 9158, Sina Show, GuaGua perform **client-side censorship**
- VV, Six Room, BoBo perform **server-side censorship**

YY Keyword Censorship

- YY v7.1 downloads 3 different keyword lists:
Finance, Normal, High

YY Keyword Censorship

- Finance Keyword List (keywords related to phishing scams)
- <http://do.yy.duowan.com/financekeywordlist>
- Plain text in UTF8-encoded XML
- When received, YY prints the following warning in the chat window:

YY安全提示：聊天中若有涉及财产的操作，请一定要先核实好友身份，谨防受骗！

[YY Security Tip: This chat seems to involve managing assets; please be sure to verify the identity of a friend to avoid being cheated!]

YY Keyword Censorship

- *Normal* Keyword List (sensitive keywords)
- Source: <http://do.yy.duowan.com/NormalKWordlist.txt>
- Base64-encoded list of UTF16-encoded keywords
- Keywords are asterisked out in the message before the message is sent

YY Keyword Censorship

- *High* Keyword List (sensitive keywords)
- Source: <http://do.yy.duowan.com/HighKWordlist.txt>
- Base64-encoded list of UTF16-encoded keywords
- Keywords are never sent. If a message containing one of these keywords is somehow received, then that message will show in the chat window as a blank message.

YY Keyword Surveillance

```
http://sere.hiido.com/do.action?  
id=<id>&content=<content>
```

<id> is a hex encoding of a hash computed as

```
md5(┌ <seconds since unix epoch>/1000 ┐ +  
    " ;username=report" +  
    " ;password=pswd@1234").
```

YY Keyword Surveillance

<content> is a base64 encoding of the following string:

```
type=2
;uid=<sending user id#>
;toid=<receiving user id#>
;keyword=<triggering keyword>
;txt=<entire triggering message>
```

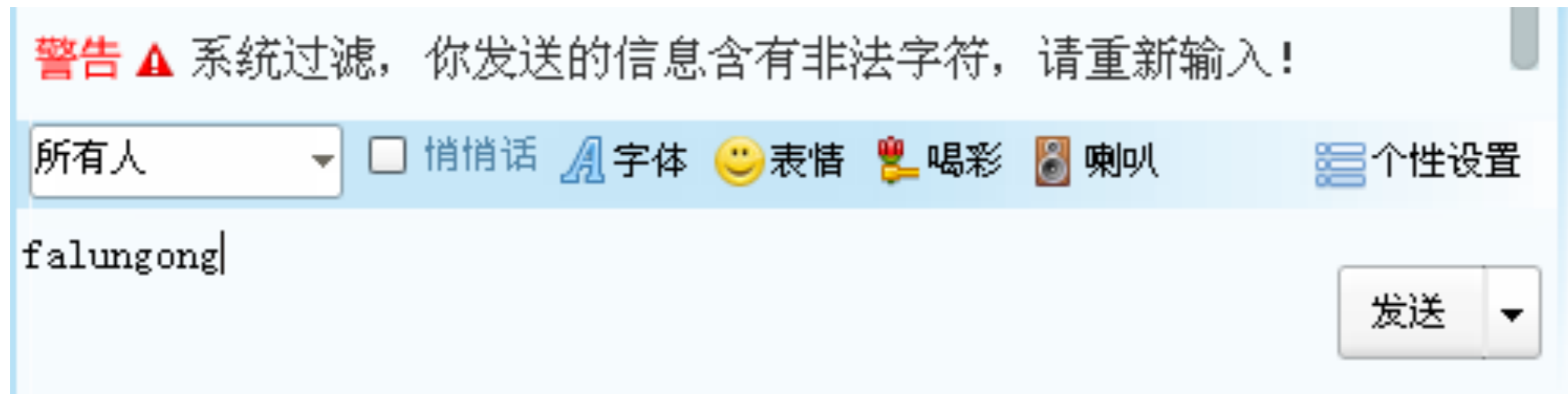
Sina Show Keyword Censorship

- SinaShow v3.4 includes:
 - Built-in and pre-installed keyword lists
 - Downloaded lists

Sina Show Keyword Censorship

Outgoing censored message warning:

“系统过滤, 你发送的信息含有非法字符, 请重新输入!” [System filter: the message you sent contains illegal words; please re-enter!]



Sina Show Keyword Censorship

Incoming censored message warning:

“发送的消息有非法词汇,已经被自动屏蔽”

[The message sent contains illegal vocabulary; it has been automatically blocked]

Sina Show Keyword Censorship

- Installed with binary keyword database in `Word_410.ucw`
- Downloads updates from http://www.51uc.com/uc_interface/down_policy/Word_410.ucw
- Custom binary container stores GBK-encoded keywords
- Encryption: Blowfish in ECB mode with 8-byte key `Dey,1b1E`

Sina Show Keyword Censorship

- Sina Show has keywords built into many of its binary files, stored in the plain GBK-encoded
- `SinaShow.exe`, `ChatRoom.dll`, `Props.dll`
- `UCClient.dll`

9158 Keyword Censorship

- Analyzed 9158 v6.9
- Installed with two keyword lists: `filnick.xml`
`filter.xml`
- `filnick.xml` replaces keywords with asterisks in usernames
- `filter.xml` replaces keywords with asterisks in incoming and outgoing messages. Downloads updates: <http://mimtenroom.9158.com/web9158/filter.zip>
- If chat message contains 6+ English letters all of the letters are replaced with asterisks

GuaGua Keyword Censorship

- Analyzed GuaGua v6.2.38
- Keywords built into RuleCenterPlug.dll
- Plain text, GBK-encoded
- Outgoing messages containing keywords are not sent, displaying warning message:

“消息发送失败,含有违法或不文明字符!”

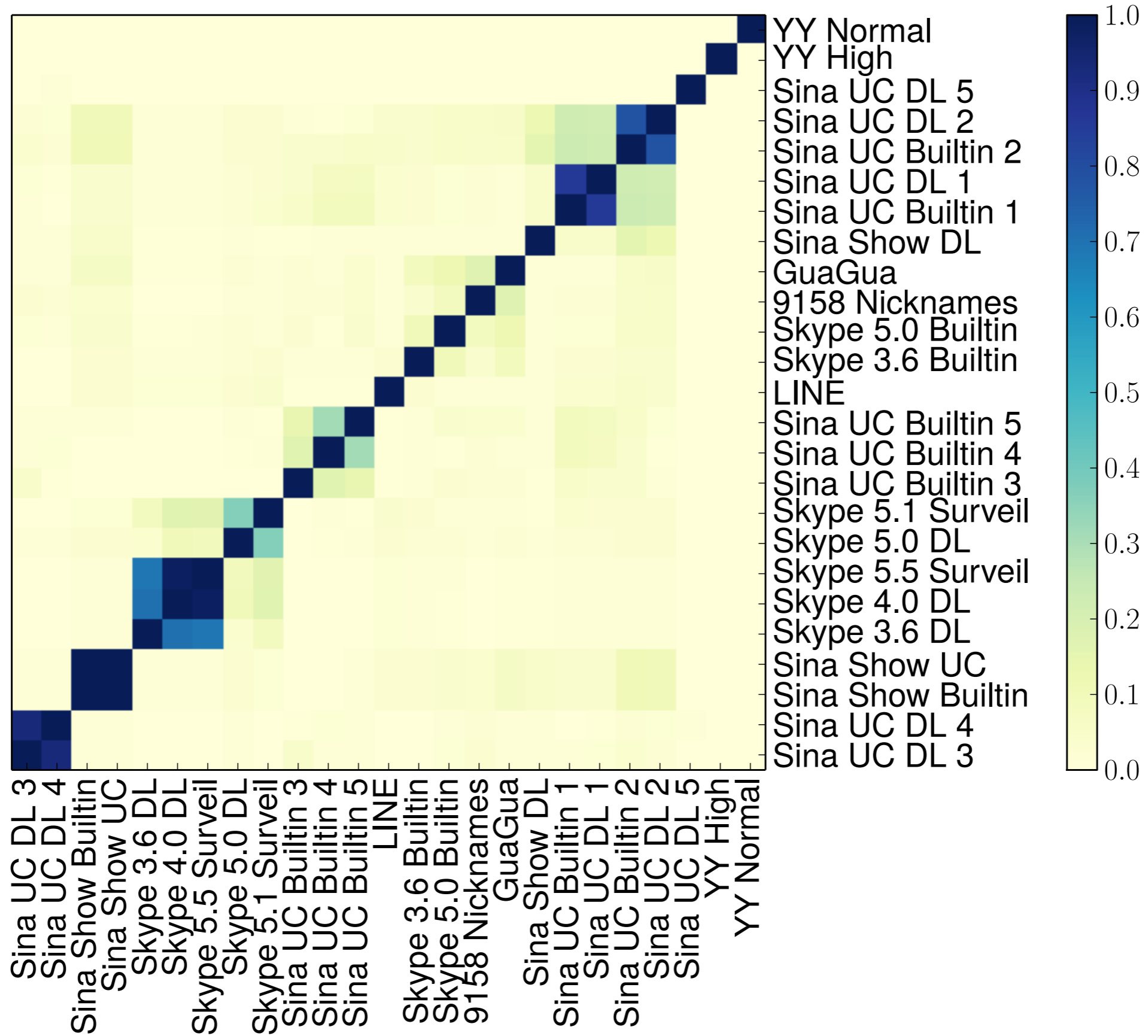
[Failed to send message; it may contain illegal or uncivilized words!]

Our Results

Keyword List Size (May 17 2015)

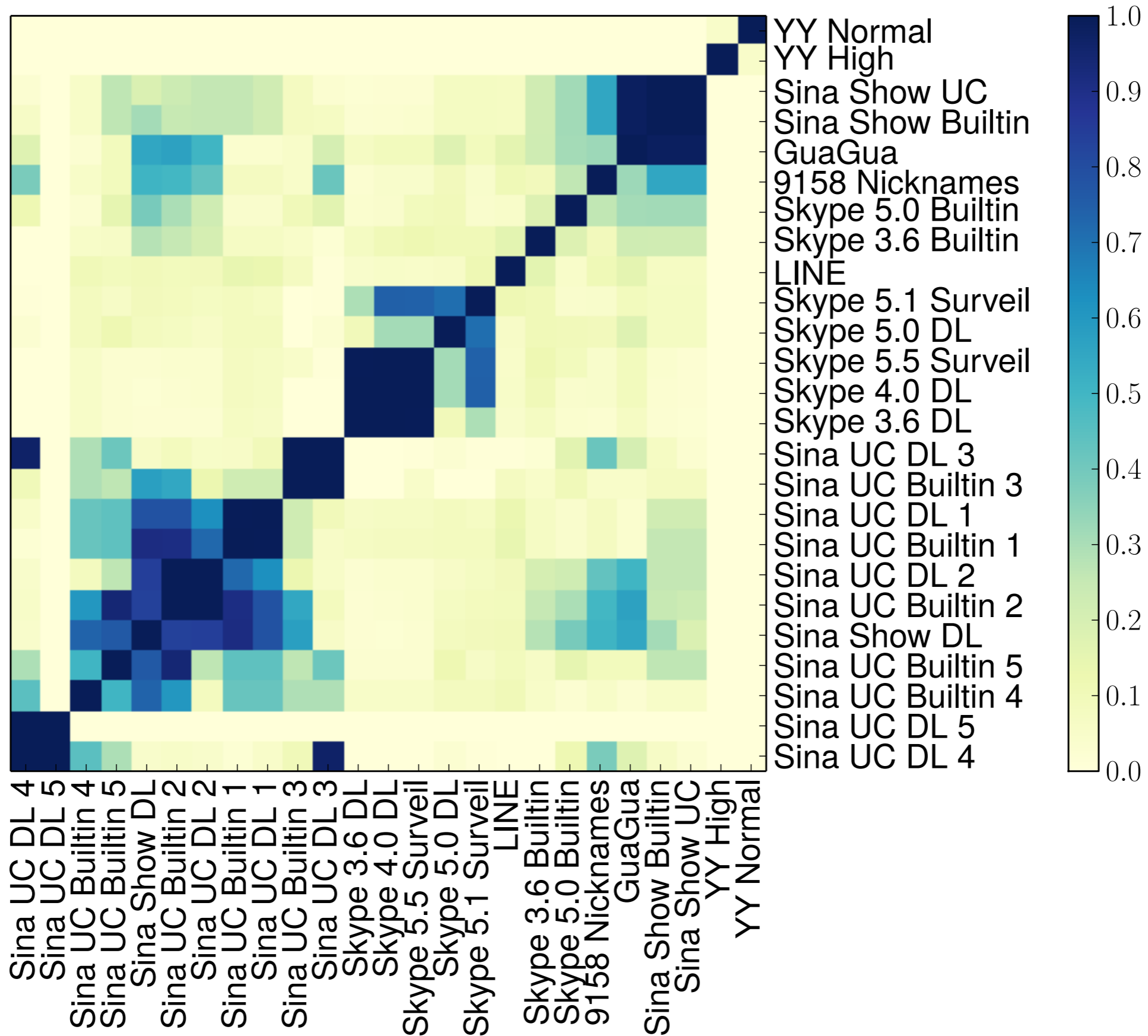
List	Keywords	Unique
YY Finance	48	18
YY Normal	20	20
YY High	13,482	13,242
9158 Nick	65	59
9158 Chat	318	318
Sina Show SinaShow.exe	1,224	910
Sina Show UCClient.dll	910	910
Sina Show Downloaded	3,711	3,206
GuaGua	58	58

Keyword lists clustered by Jaccard Similarity



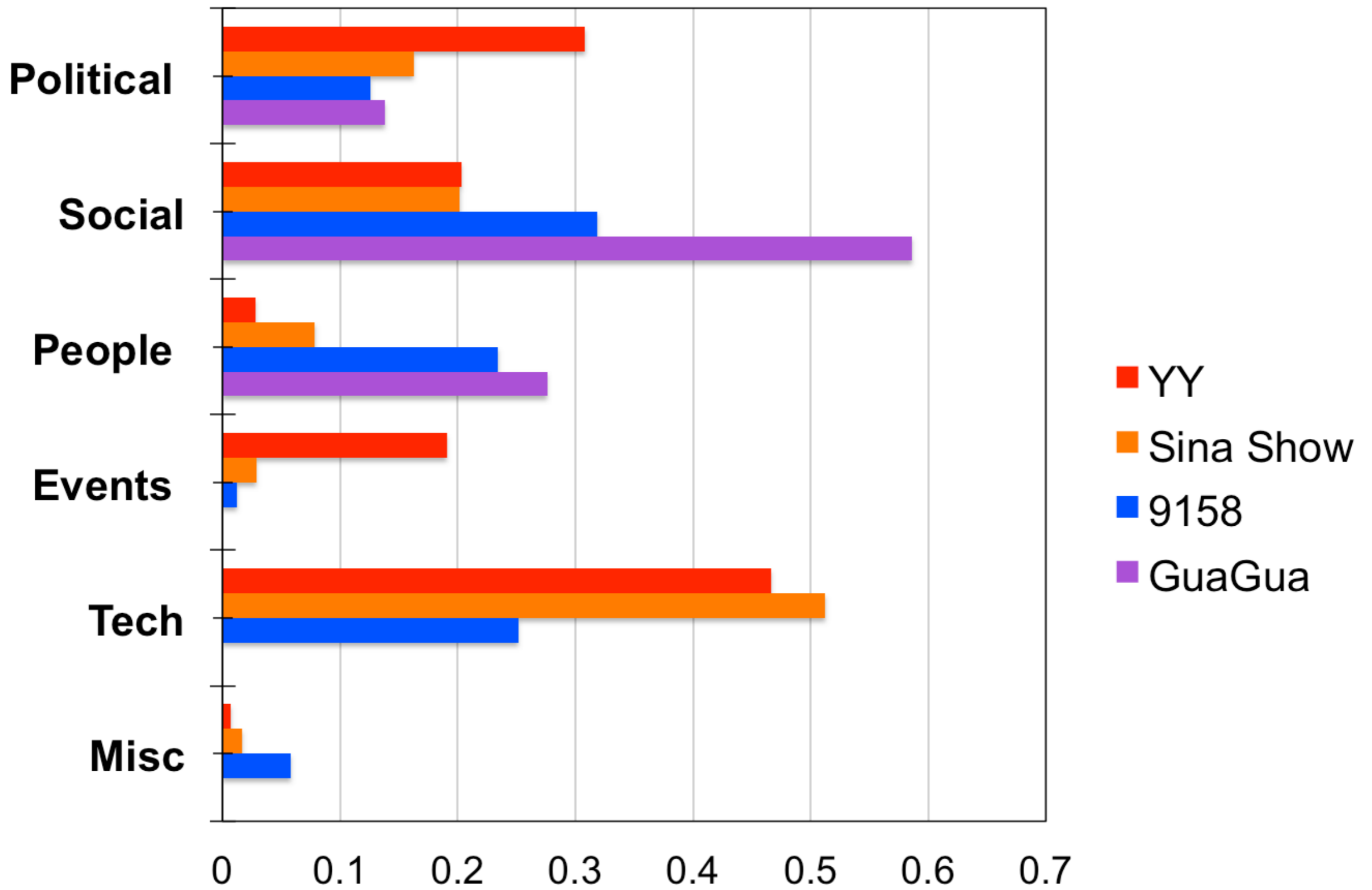
Keyword lists clustered by

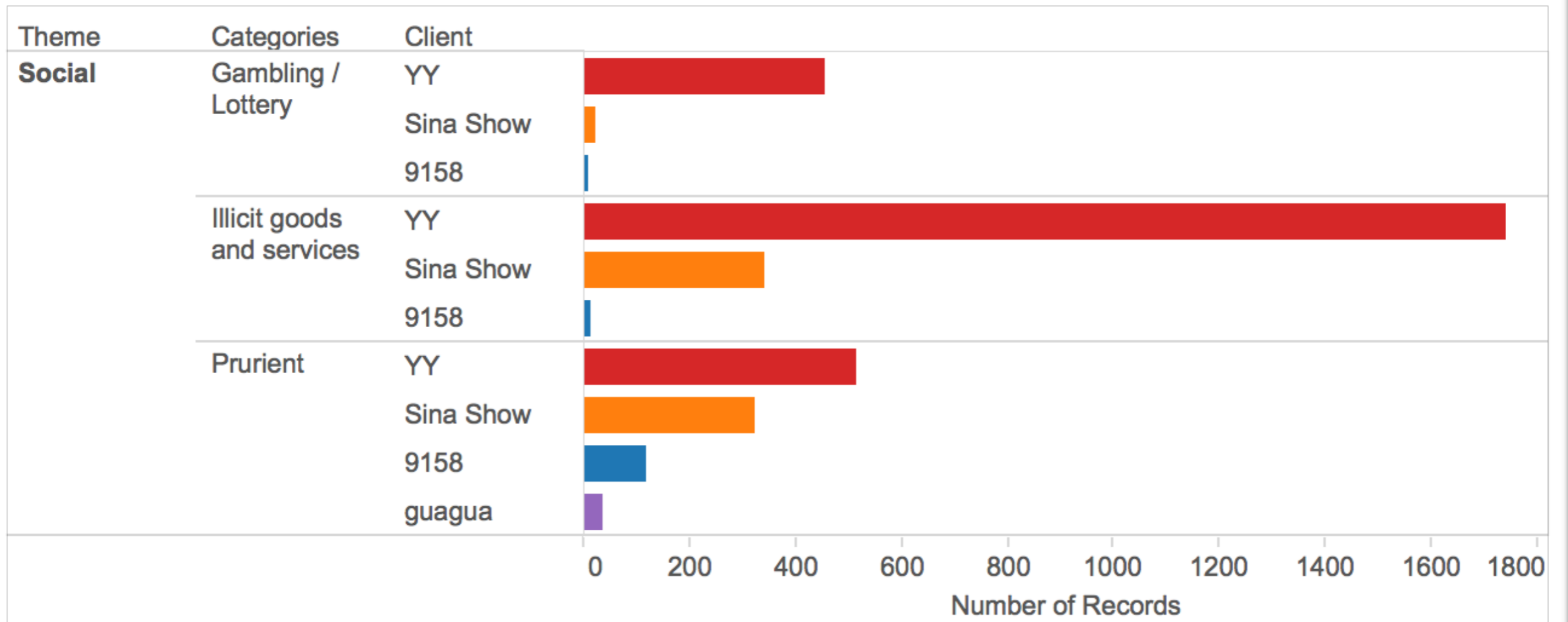
similarity(x, y) = max(% of x in y, % of y in x)












































Content Analysis

- Keywords human / machine translated, contextual analysis
- Grouped into 80 content categories under six themes based on code book developed by Crandall *et al.* (2013)



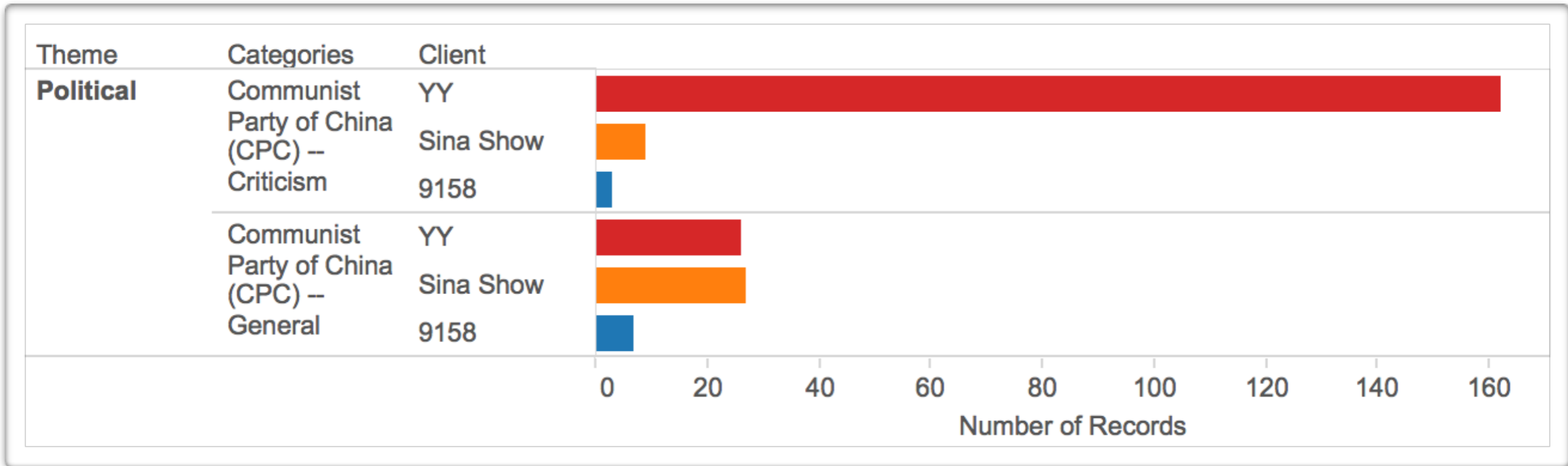


- Gambling. e.g., 多伦多娱乐城 “Toronto casino”
- Drugs, firearms, other illicit goods, e.g., 冰毒制作 “Methamphetamine production”
- Prostitution, sexual interests. e.g, 妓女 “Prostitute”
性伴侣 “Sexual partner”

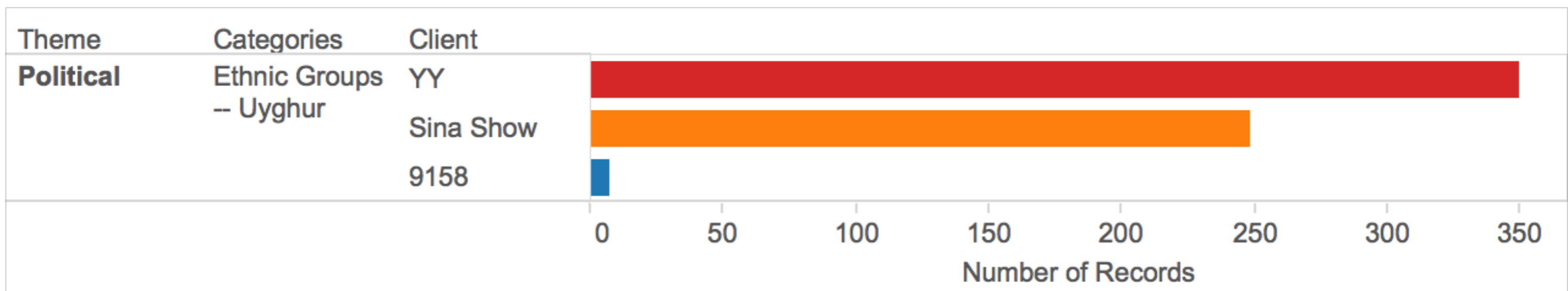
Theme	Categories	Client	
Political	Censorship -- Censorship / Surveillance in China	YY	
		Sina Show	
	Censorship -- Circumvention	YY	
		Sina Show	
	Charter 08	YY	
		Sina Show	
	China	YY	
		Sina Show	
		9158	
	Communist Party of China (CPC) -- Criticism	YY	
		Sina Show	
		9158	
	Communist Party of China (CPC) -- General	YY	
		Sina Show	
		9158	
	Corruption Scandals	YY	
		Sina Show	
		9158	
	Democracy (Chinese Democracy Movement)	YY	
		Sina Show	
9158			
Detention	YY		
Domestic relations -- Hong Kong	YY		
	Sina Show		
Domestic relations -- Taiwan	YY		
	Sina Show		
	guagua		
Ethnic Groups -- Hui	Sina Show		
Ethnic Groups -- Tibetan	YY		
	Sina Show		
Ethnic Groups -- Uyghur	YY		
	Sina Show		
	9158		
Government	YY		
	Sina Show		
	9158		
Health / Disease	YY		
	Sina Show		
Human Rights -- General	YY		
	Sina Show		
Human Rights -- Organizations	YY		

Political Theme

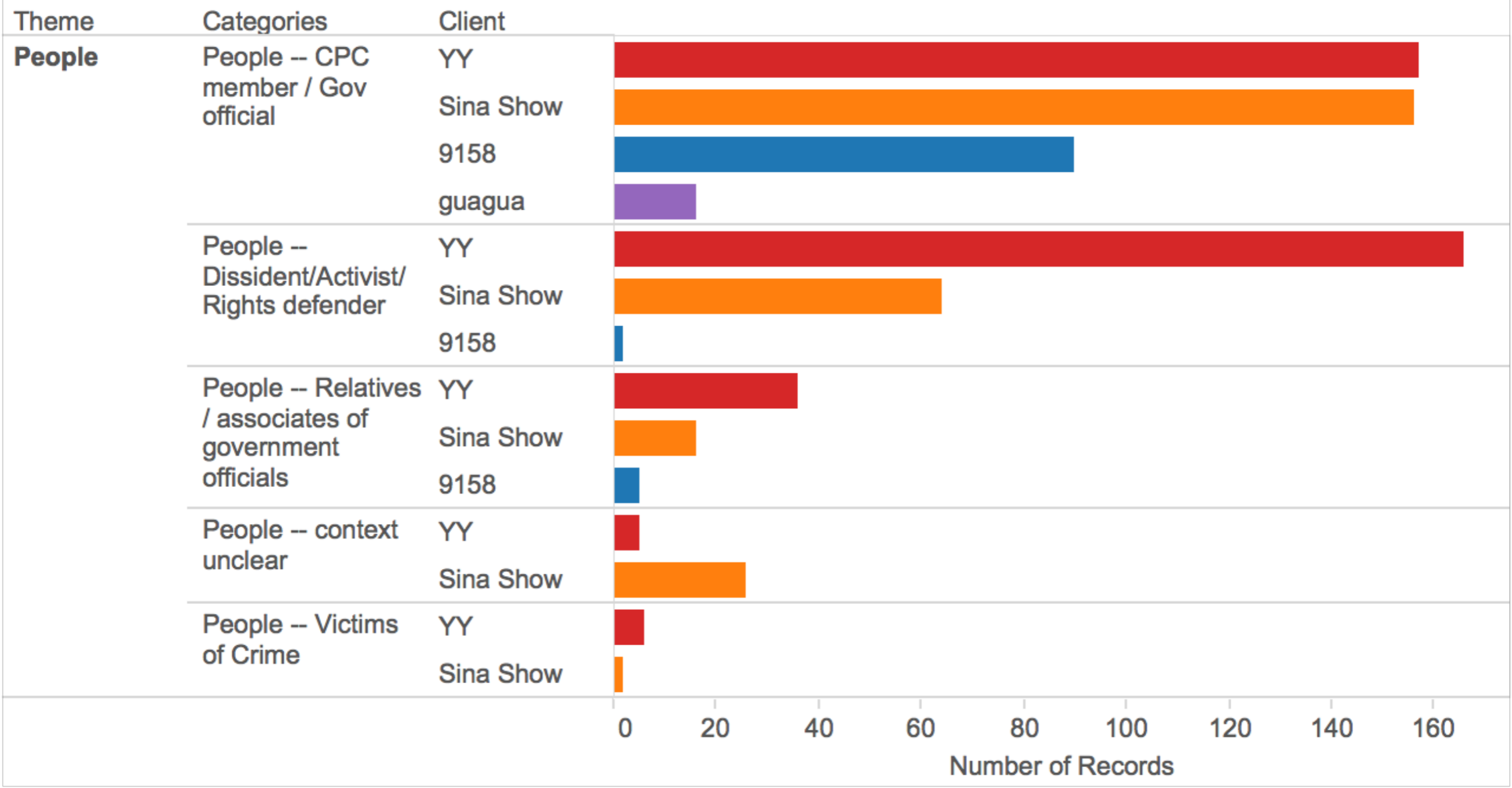
- **37 content categories**
e.g., CPC, religious movements, ethnic minorities, corruption, democracy groups, and terrorism

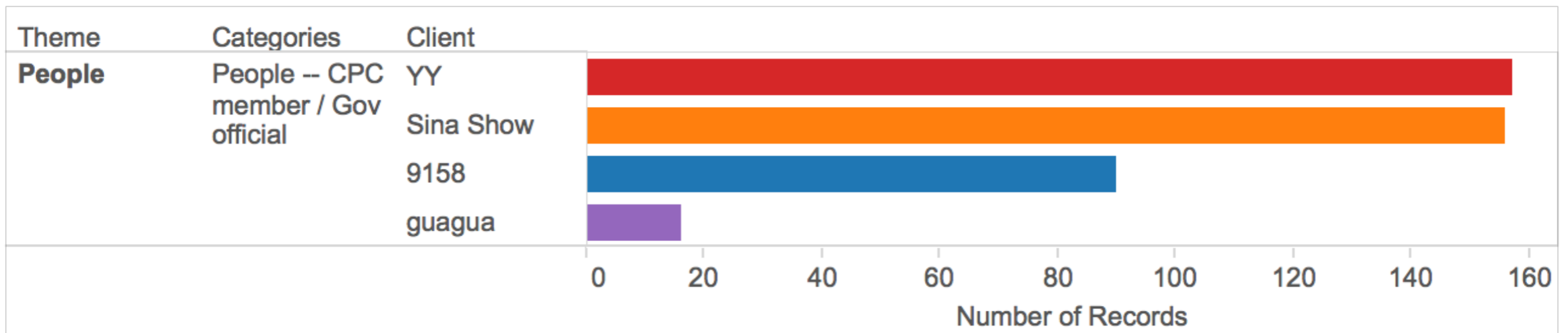


- CPC General: 共产党 “Communist Party”
- CPC Critical: 共匪 “Communist gangsters”



- Includes references to Islam, Uyghur groups and culture, terrorism, and general terms
- English: uyghurcanadian
- Chinese: 突厥斯坦 “Turkestan”
- Uyghur: türkistan “Turkestan”
- Arabic script: پارتلقۇچ ياساش دهرسلېكى “instructions to make explosives”

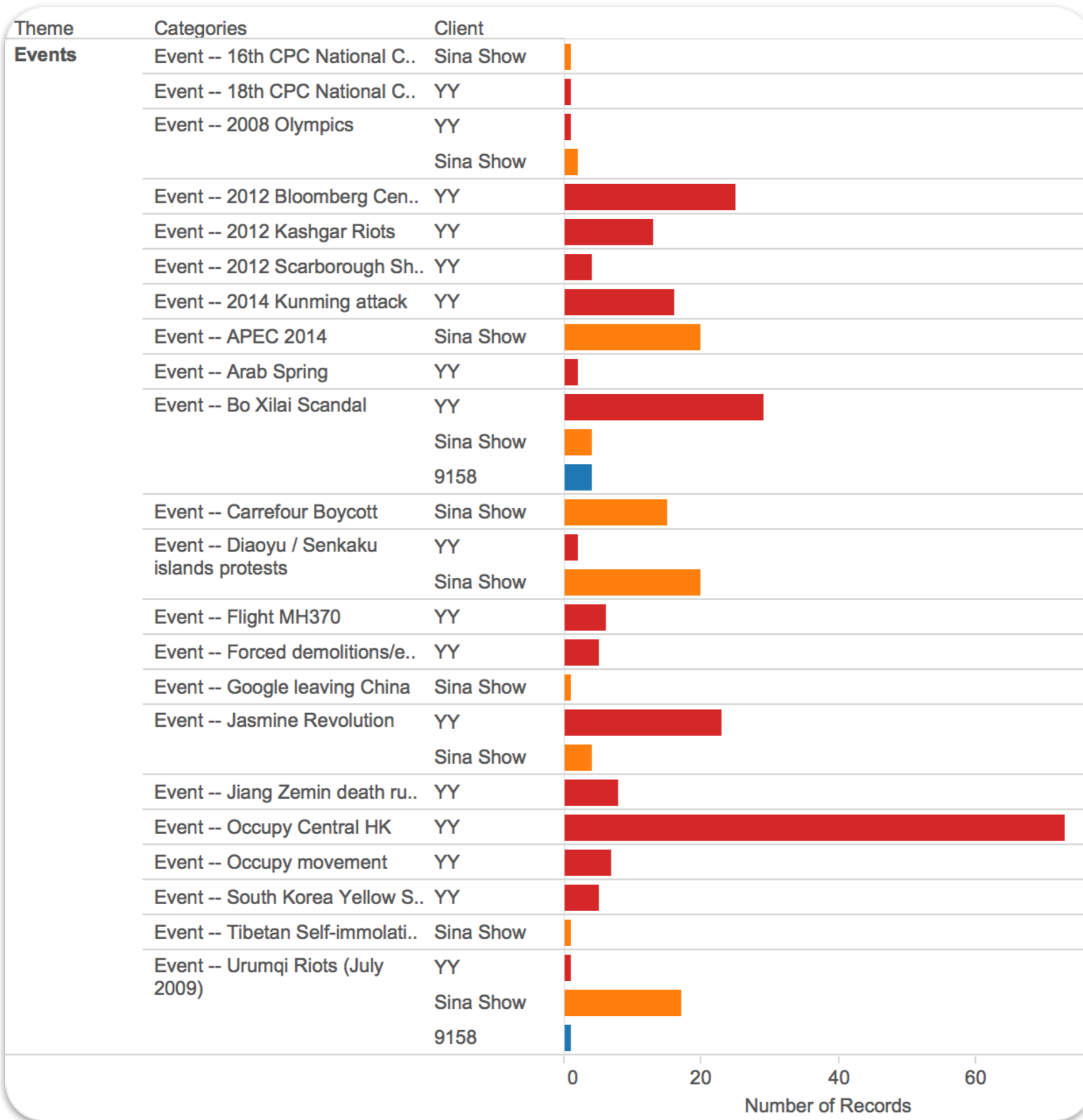


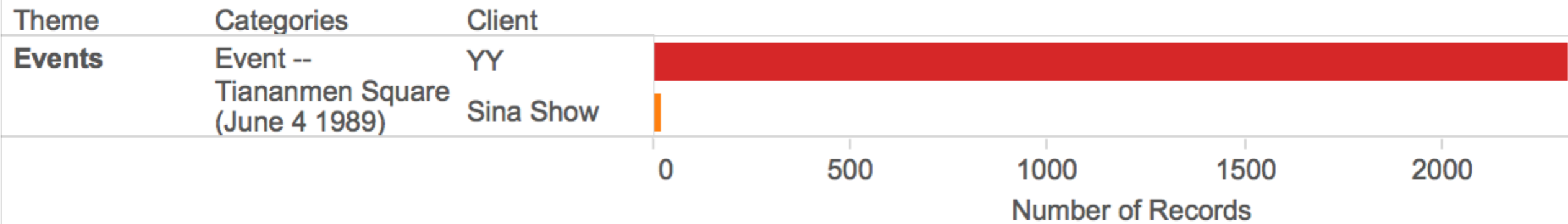


- CPC Leaders: 习近平 “xí jìn píng”
- Homonyms: 习尽平 “xí jǐn píng”
- Nicknames: 习包子 “Steamed Bun Xi”

习包子 “Steamed Bun Xi”







YY: references largest number of events (18)
 90% of YY event keywords related to June 4 1989

Recent Events in Keyword Lists



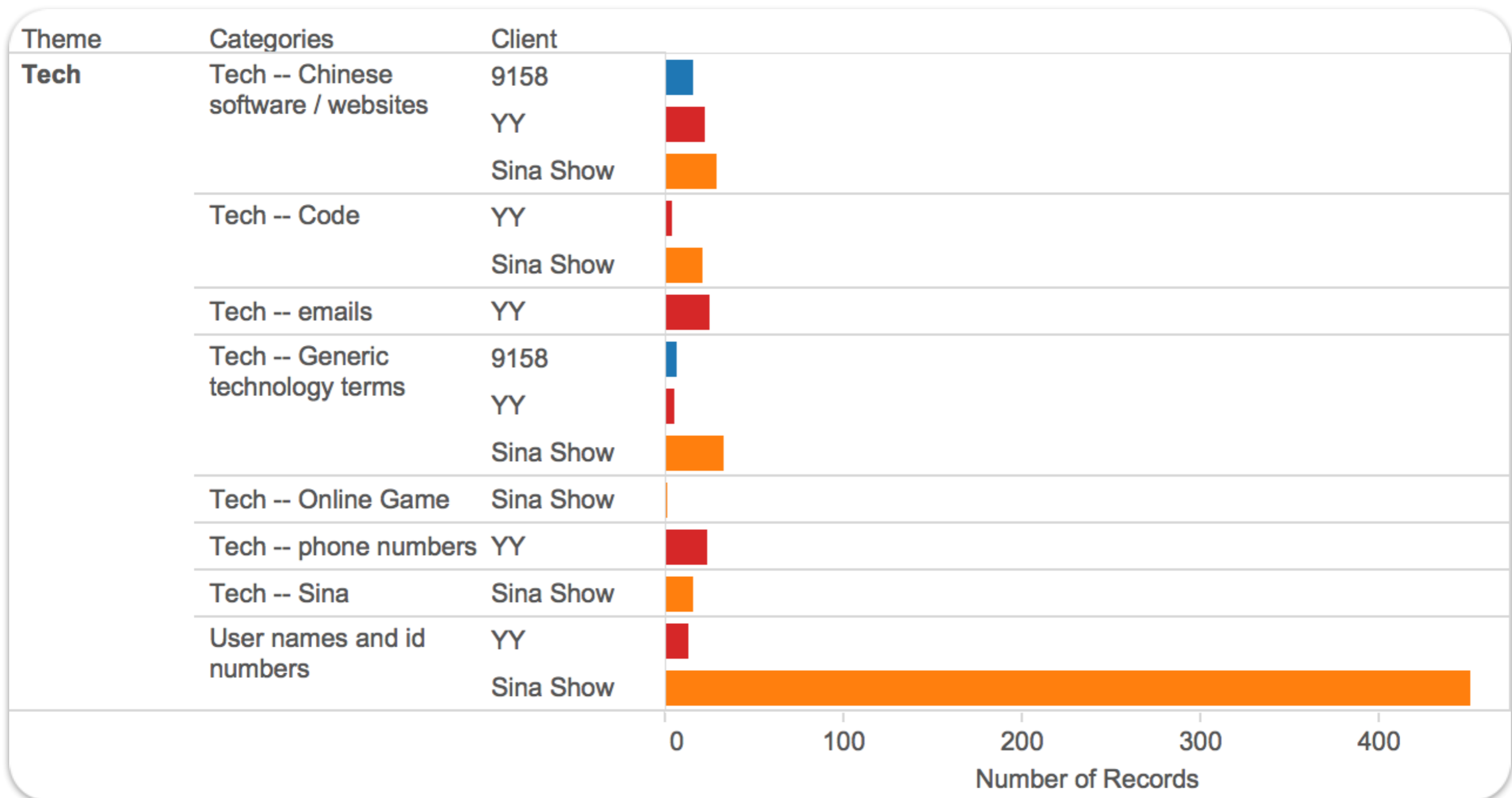
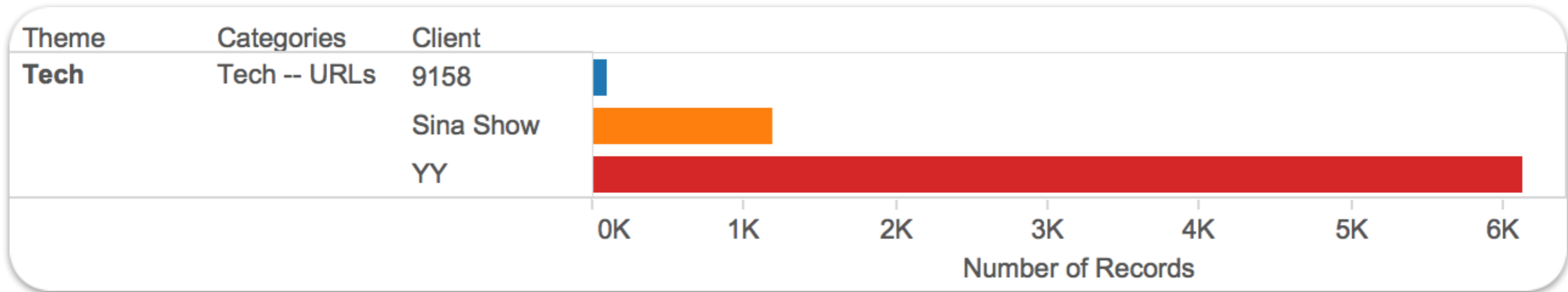
2014 - Occupy Central Protests



2014 - APEC Summit

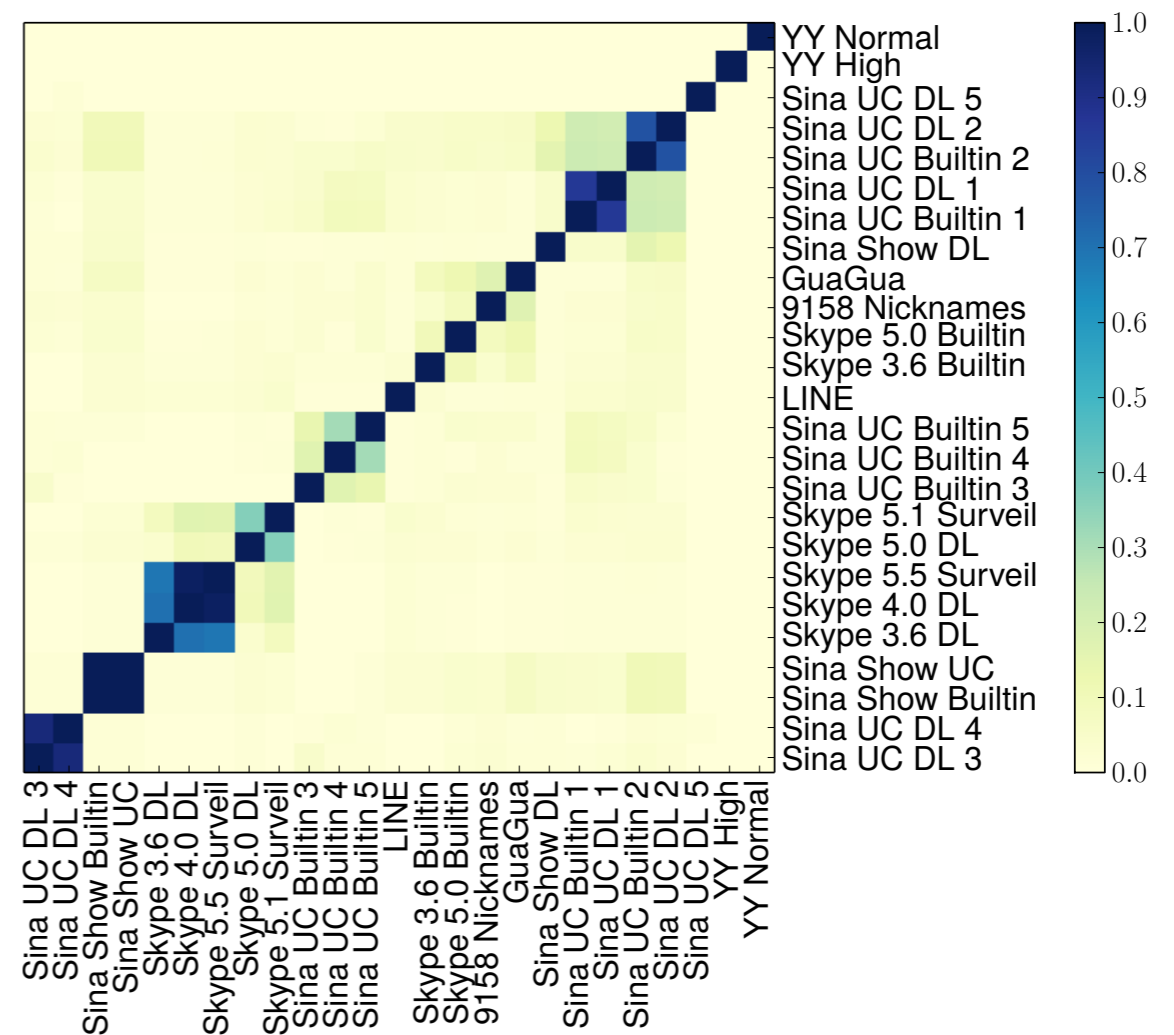


2014 - Kunming Terrorist Attack



Discussion

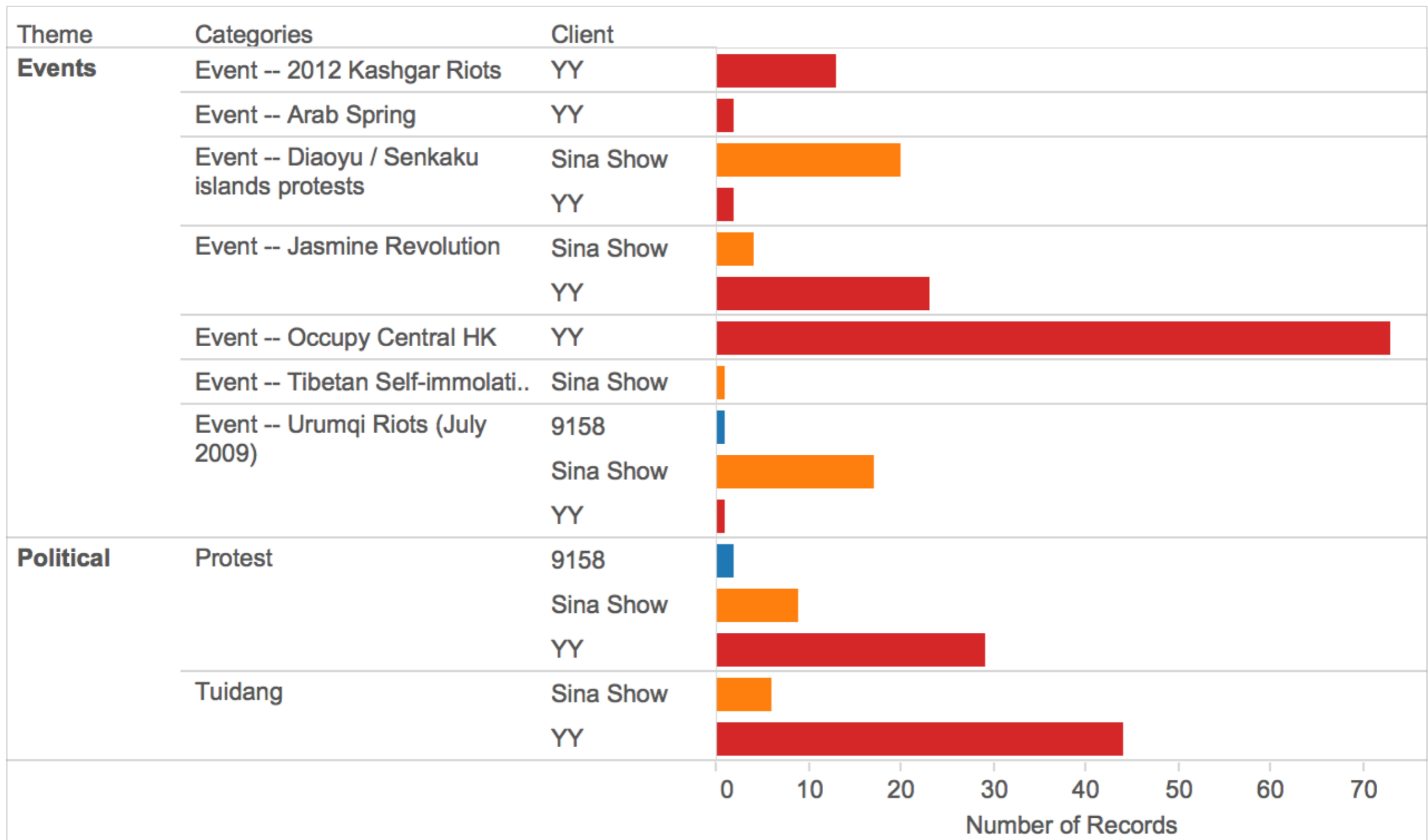
- **Inconsistencies in the content and implementation in keyword lists across companies and platforms**
- **Very limited overlap** within SVPs and in comparison to chat clients
- Supports theories that **companies are under general pressure from the government to perform censorship and surveillance, but have flexibility in implementation**



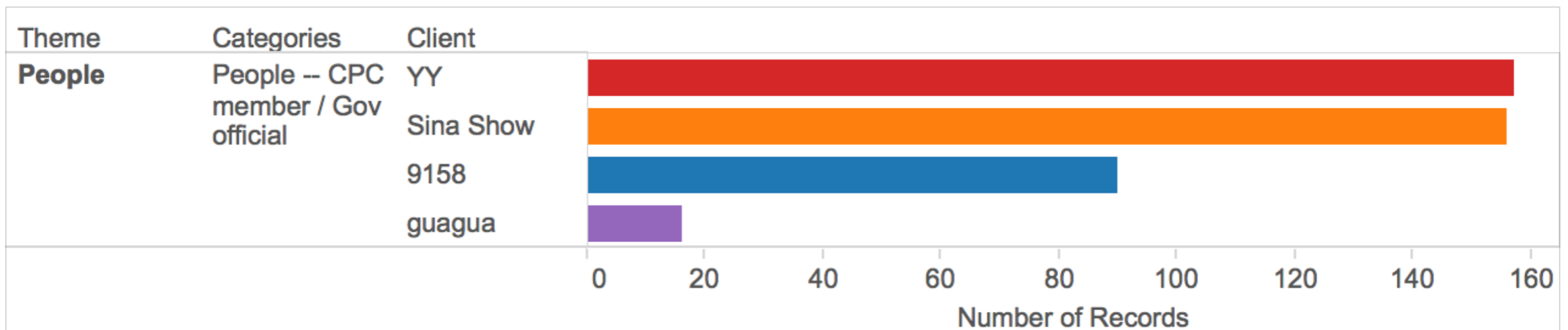
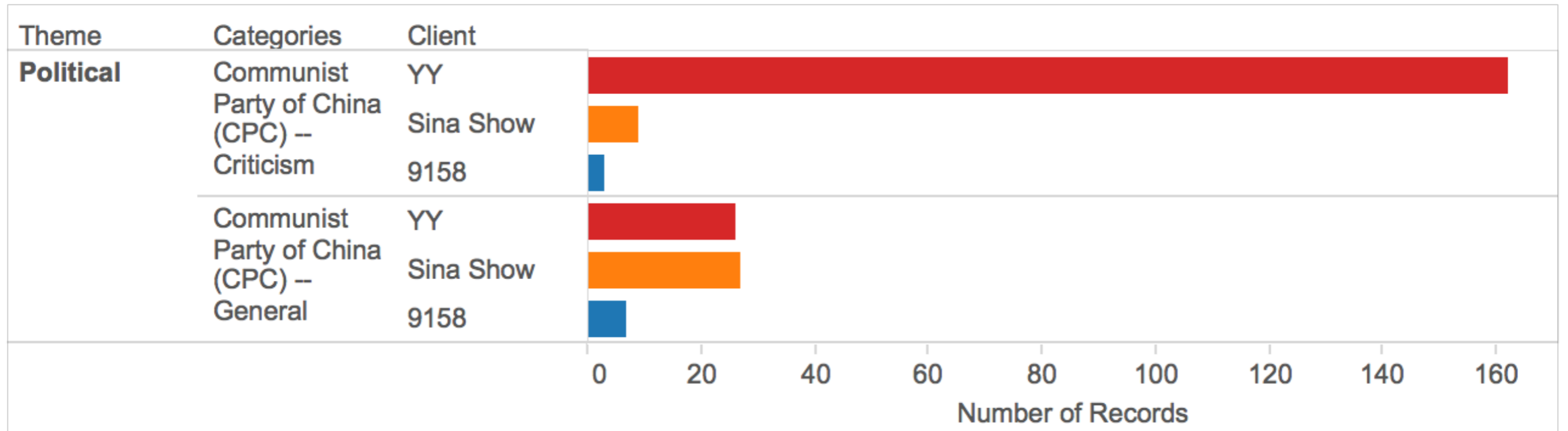
Discussion

- **Targeted content relates to government criticism and collective action**
 - King *et al.* analyze post censorship in 1,382 Chinese social media sites.
 - Content related to **collective action censored but content critical of government permitted**
 - Our results reveal sensitive **keywords** in SVPs and chat clients **related to collective action *and* government criticism**
 - Calls into question generalizability of King *et al.* theory

Collective Action Keywords



General / Critical Government Keywords



Keyword List Updates

- Hourly data collection: YY (Feb. 7, 2015), 9158 (Feb. 24 2015), Sina Show (March 11 2015)
- YY *Normal* (3 updates), YY *High* (21 updates)
- 9158 *Chat* (8 updates)
- Sina Show *Downloaded* (0 updates)
- GuaGua does not download updates

YY Updates


- 32 keywords referencing names of Christian songs added April 23, removed April 30 (YY *Normal*)
- e.g, 主耶稣永远陪伴我 “Jesus is always with me”
- May have been in response to controversy over recent church demolitions



9158 Updates

- Keywords added on May 28 2015
- 戴建勇 “Dai Jianyong” (name of Shanghai artist)
- 麻痹哥 “Paralysis brother”





Data: <https://github.com/citizenlab/chat-censorship>

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