

Call Me MayBe: Understanding Nature and Risks of Sharing Mobile Numbers on Online Social Networks

Prachi Jain, Paridhi Jain, Ponnurangam Kumaraguru (PK)

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INDRAPRASTHA INSTITUTE of
INFORMATION TECHNOLOGY
DELHI

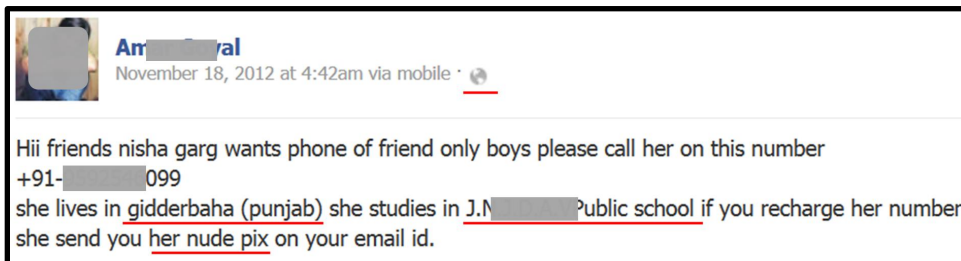
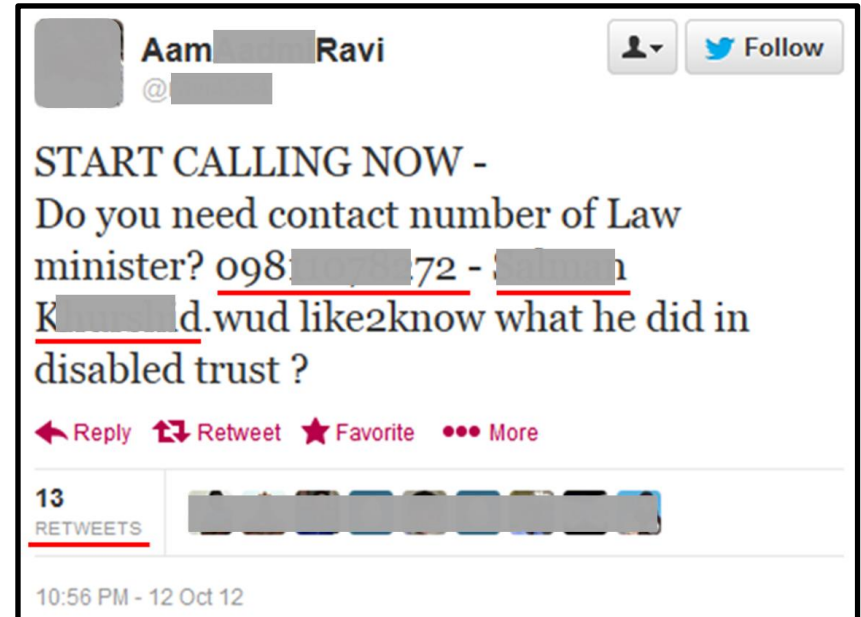
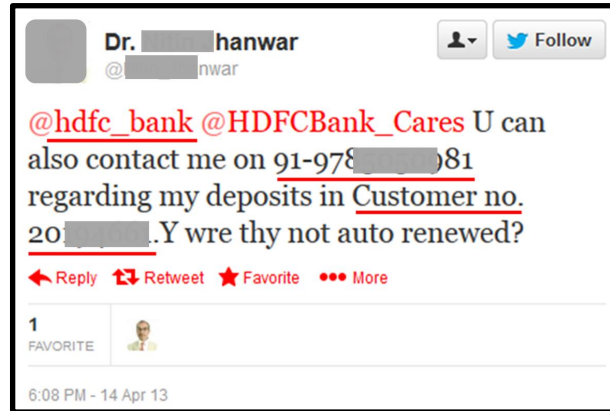


Motivation


**How many of you have posted
mobile numbers on Online Social
Networks?**

**How many of you have seen
mobile numbers being posted on
Online Social Networks?**

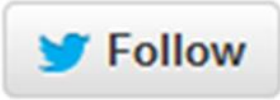

Sample posts







Sample posts




Dr. [redacted] hanwar
@[redacted]nwar



@hdfc_bank @HDFCBank_Cares U can also contact me on 91-978[redacted]981 regarding my deposits in Customer no. 20[redacted].Y wre thy not auto renewed?

 Reply  Retweet  Favorite  More

1
FAVORITE



6:08 PM - 14 Apr 13


 Follow



d in

Am
Novem





Hii friends nisha
+91-[redacted]099
she lives in gidde
she send you her

Sample posts

**Dr. [redacted]hanwar**
@[redacted]nwar



@hdfc_bank @HDFCBank_Cares U can also contact me on 91-978[redacted]81 regarding my deposits in Customer no. 20[redacted].Y wre thy not auto renewed?



**Aam [redacted]Ravi**
@[redacted]



START CALLING NOW -
Do you need contact number of Law minister? 098[redacted]72 - [redacted]1




Am [redacted]al

November 18, 2012 at 4:42am via mobile · 

Hii friends nisha garg wants phone of friend only boys please call her on this number +91-[redacted]099 she lives in gidderbaha (punjab) she studies in J.N [redacted] Public school if you recharge her number she send you her nude pix on your email id.

Sample posts

 **Dr. [redacted]hanwar**
@ [redacted]nwar

@hdfc_bank @HDFCBank
also contact me on 91-97
regarding my deposits in
20 [redacted]. Y wre thy not


← Reply ↻ Retweet ★ Favorite ⋮



1
FAVORITE

6:08 PM - 14 Apr 13

 **An [redacted]al**
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 **Aam [redacted]Ravi**
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START CALLING NOW -
Do you need contact number of Law
minister? 098 [redacted] 72 - [redacted]
K [redacted]d.wud like2know what he did in
disabled trust ?

← Reply ↻ Retweet ★ Favorite ⋮ More

13
RETWEETS

10:56 PM - 12 Oct 12

Is it a good idea?

Explore mobile number sharing behavior on Online Social Networks

- Focus on Indian Mobile Numbers
“India has the **second-largest telecom market** in the world” – Economic Times
- Focus on two most popular social networks – **Facebook & Twitter**

Methodology

Indian Mobile Number format

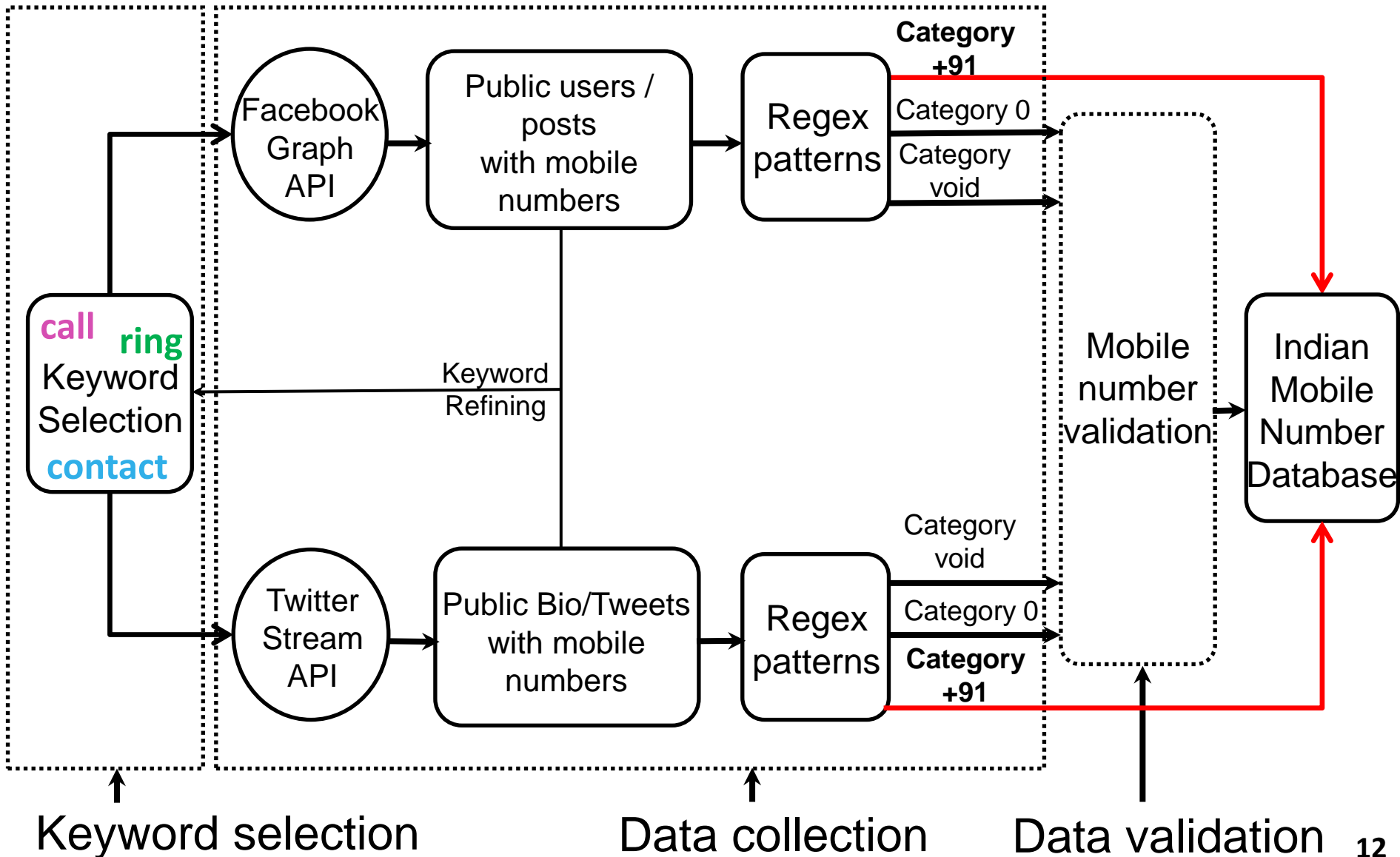
- 10 digit number, start with 7 / 8 / 9
- **Country code:** +91 (Example: +91 9123456789)
- **Trunk Code:** 0 (Example: 0 9123456789)

No standard way of sharing mobile numbers on OSN!

+91- 9123456789 91.91.23.456.789 0 9123456789

+91- 91-2345-6789 (91)23.456.789 (91234)56789

System architecture



Data statistics

Twitter: 12th October 2012 – 20th October 2013

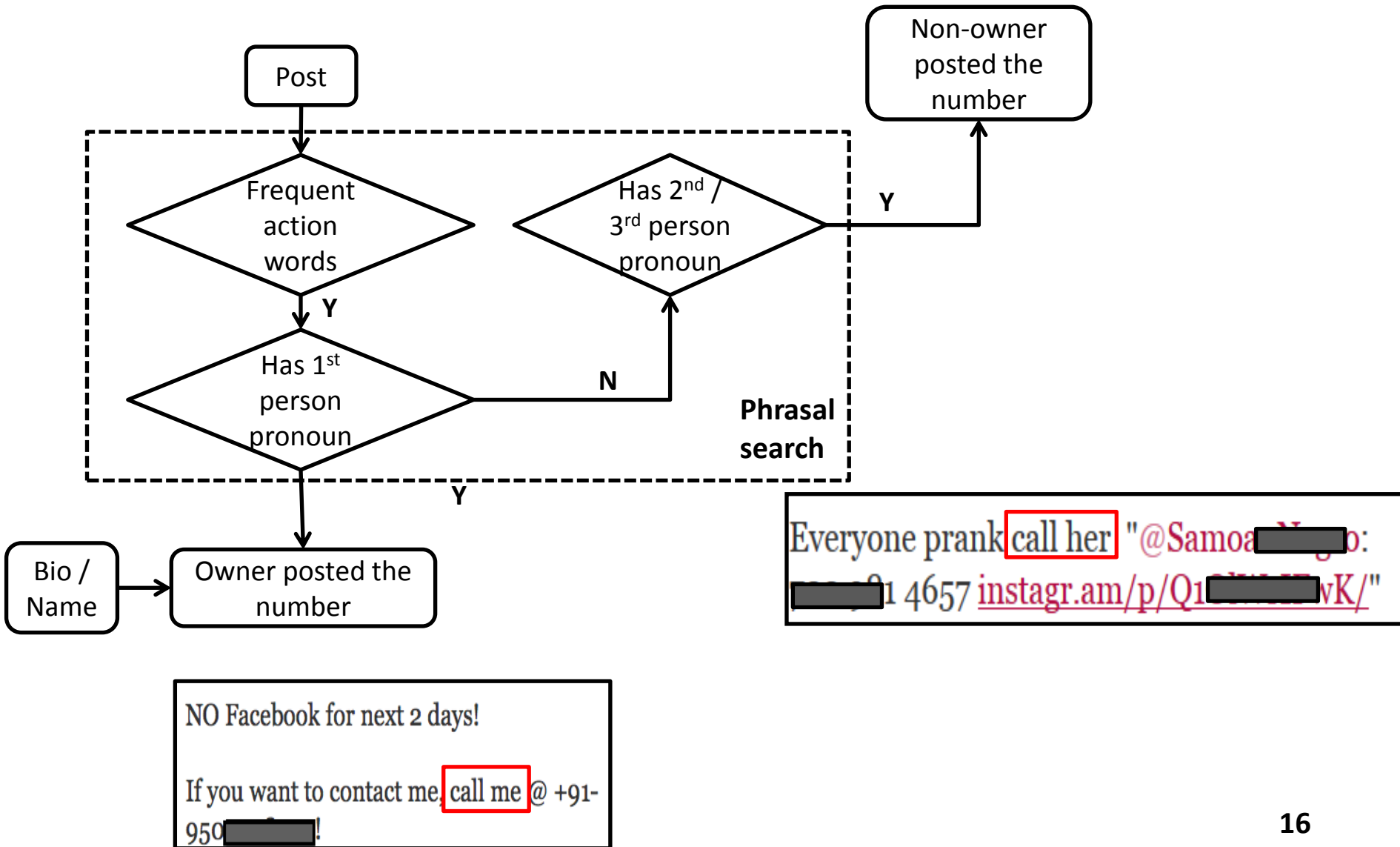
Facebook: 16th November 2012 – 20th April 2013

Numbers	Category +91		Category 0		Category void		Total	
	Twitter	Facebook	Twitter	Facebook	Twitter	Facebook	Twitter	Facebook
Mobile Numbers	885	2,191 100%	14,909	8,873 85%	25,566	25,294 85%	41,360	36,358
User profiles	1,074	2,663	17,913	9,028	31,149	25,406	49,817	36,588



Analysis

Ownership Analysis

Ownership analysis



Ownership Analysis: Results

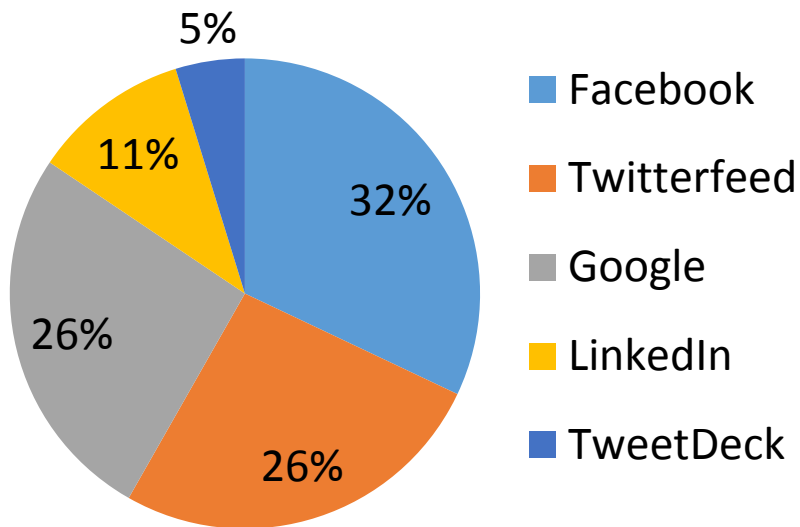
	Social Network	Mechanism	Mobile Numbers	Total
	Twitter: Owner	Bio	155	291/885 (33%)
		Tweet	136	
	Non-owner	Tweet	18	18/885 (0.02%)
	Facebook: Owner	Post	468	485/2191 (22%)
		Name	17	
	Non-owner	Message	25	25/2191 (0.01%)

Users share their own mobile numbers on OSNs!

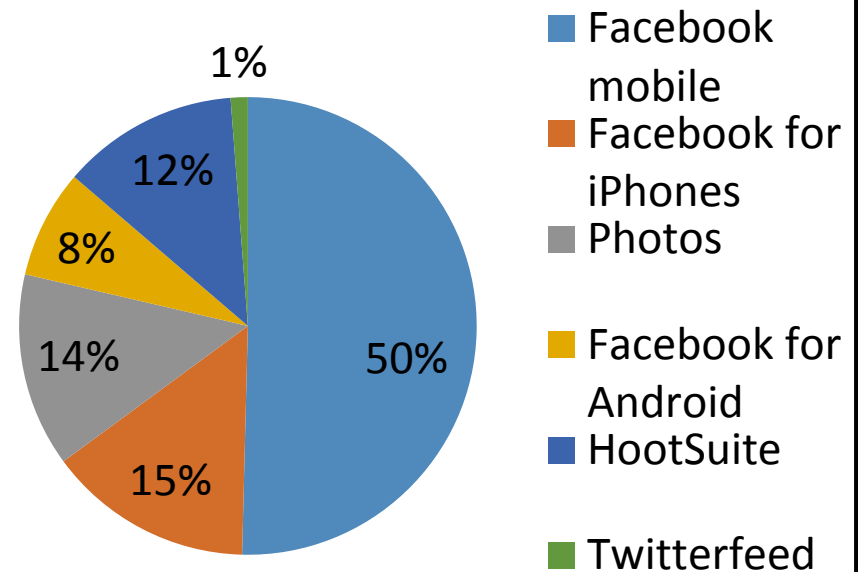
Source Analysis

Source analysis

Which applications are used to share mobile numbers on Twitter?



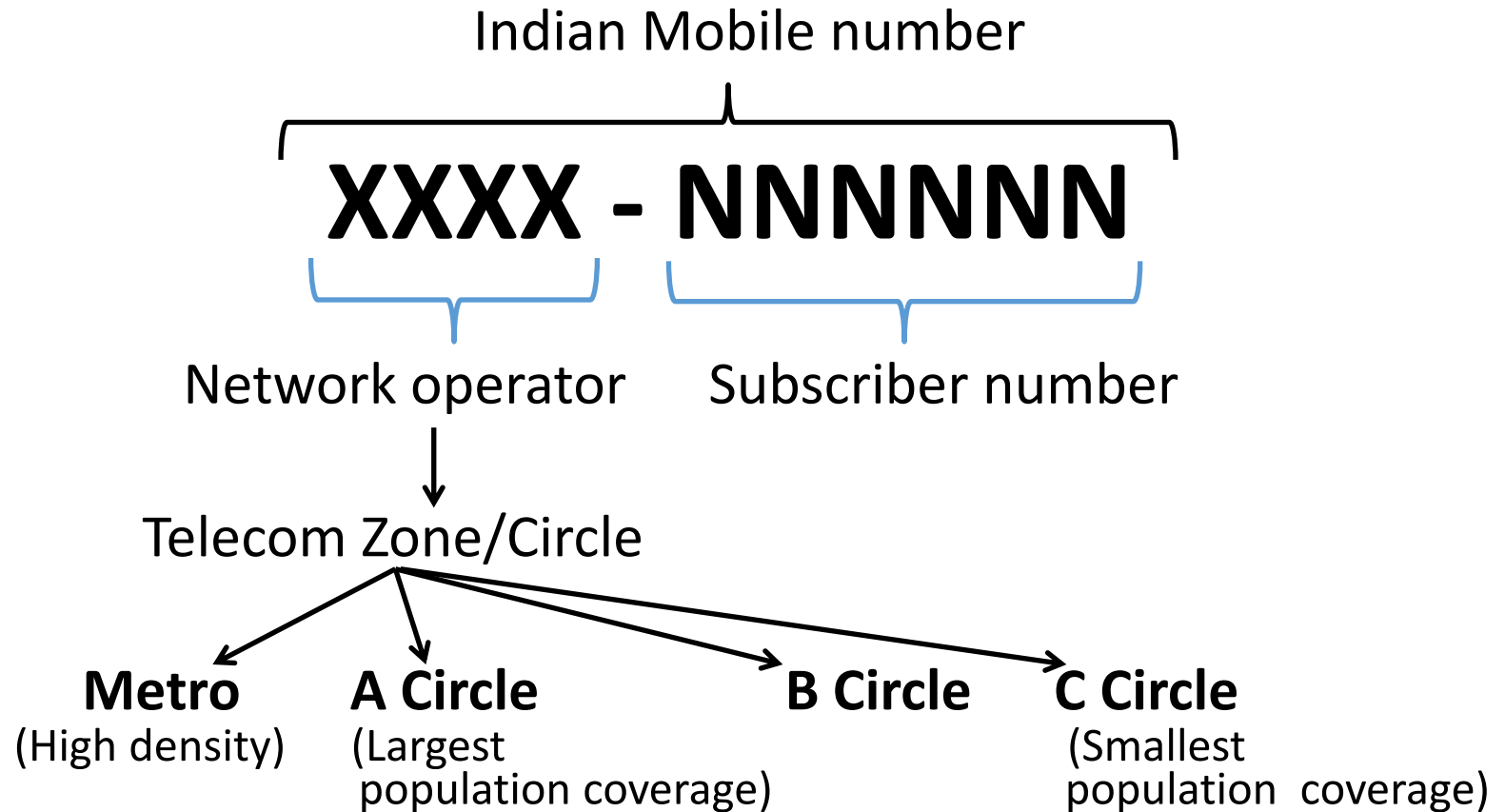
Which applications are used to share mobile numbers on Facebook?



Users posted same mobile numbers on multiple OSNs !

Topographical Analysis

Topographical analysis



Topographical analysis

Telecom Circle	Category	# of Mobile Numbers
Delhi	Metropolitan	582
Mumbai	Metropolitan	312
Karnataka	"A" Circle	233
Punjab	"B" Circle	226
Rajasthan	"A" Circle	171
Andhra Pradesh	"B" Circle	164
Kerala	"A" Circle	158
Maharashtra	"A" Circle	140
Gujarat	"A" Circle	135
Tamil Nadu	"A" Circle	102

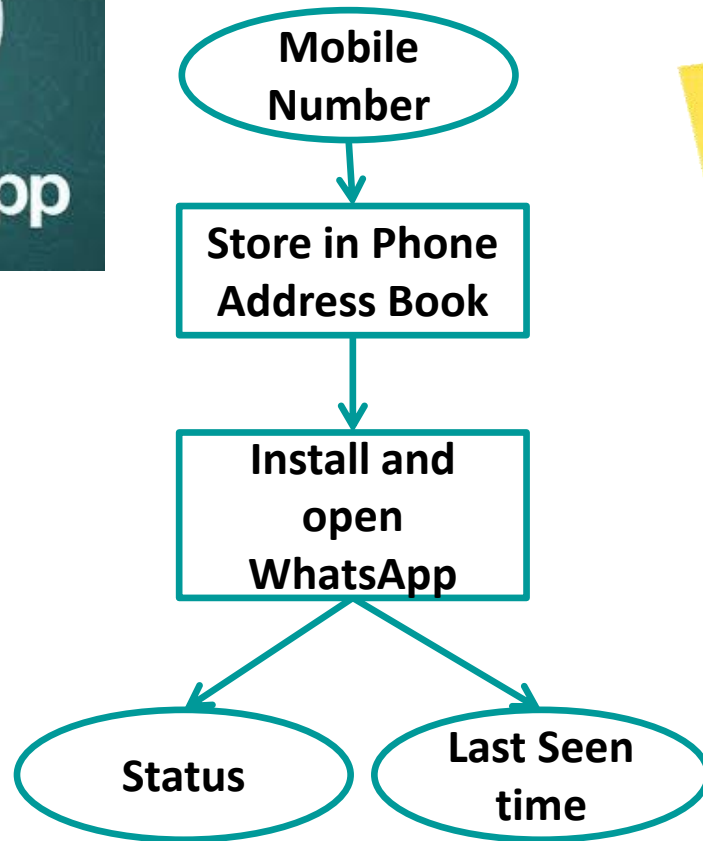
Users of **metropolitan cities** in India actively posted mobile numbers on OSNs !

Risk Assessment

Risk of Collation



Methodology



Sample Status

"www.faceb
ook.com/iak
rfi***"

"100%
Single"

"New BBM
Pin:
25C7xxxx"

"No longer in
India. UK: # +44
75xx 81xxxx
US#610xxxxxxx
as of June 10"

Risk of Collation

OCEAN:

Open
Government
Data
Repository



true



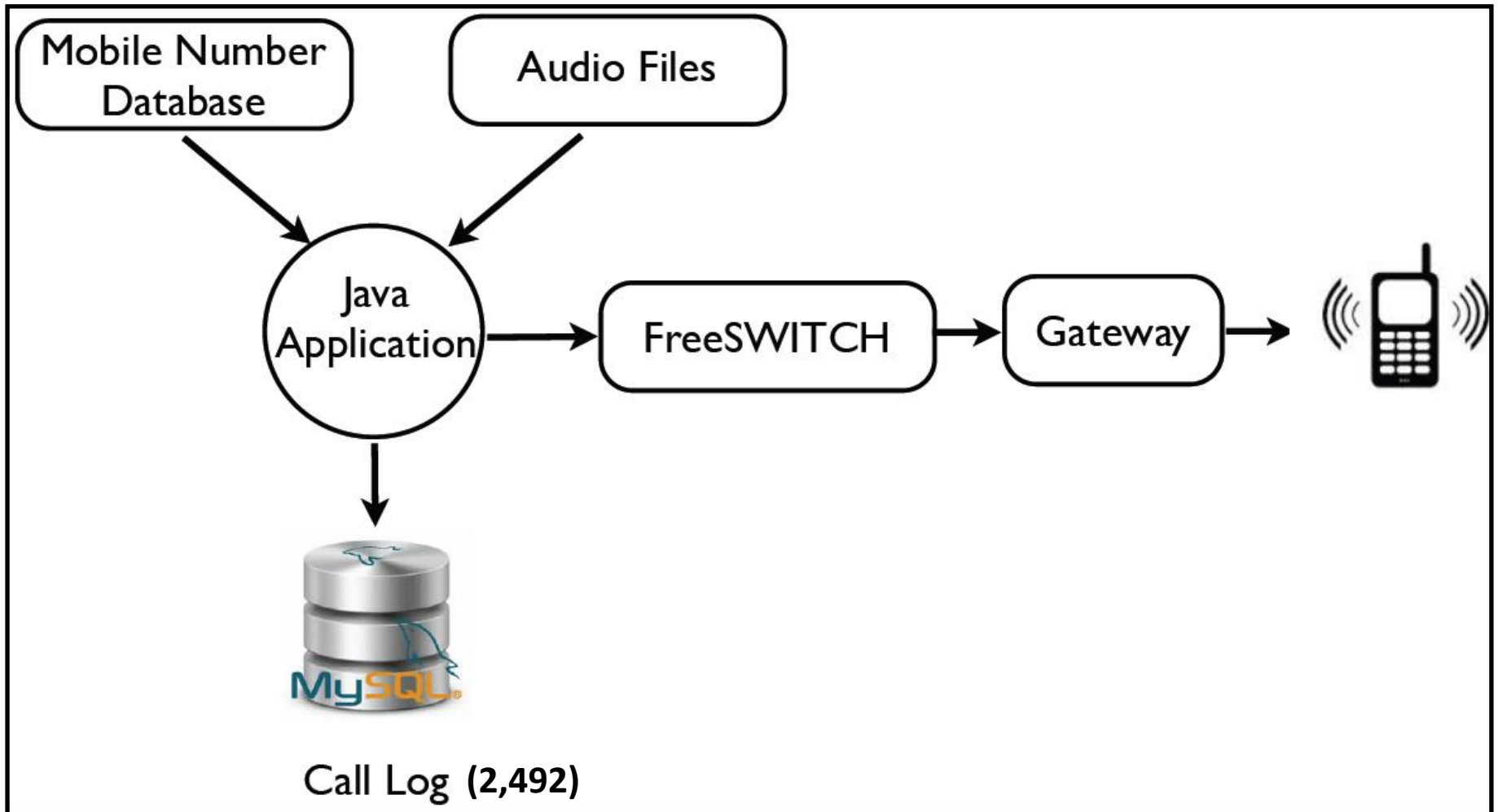
Age Address
Mobile number Name
Father's name
Voter ID Gender

Details	User 1	User 2
Mobile Number	+9199xxxx2708	+9198xxxx5485
Full Name	x Gambhir	xxxxxx Jeswani
Age	23	53
Gender	Male	Male
Father's Name	xx Gambhir	x x Jeswani
Address	***, xxxx Bagh, Delhi	***, Mig Flats, xxxxx Vihar Phase-I
ID	Voter ID: NLNxxx5696	Driving License: DL/04/xxx/222668
Shared by Owner?	No	Yes

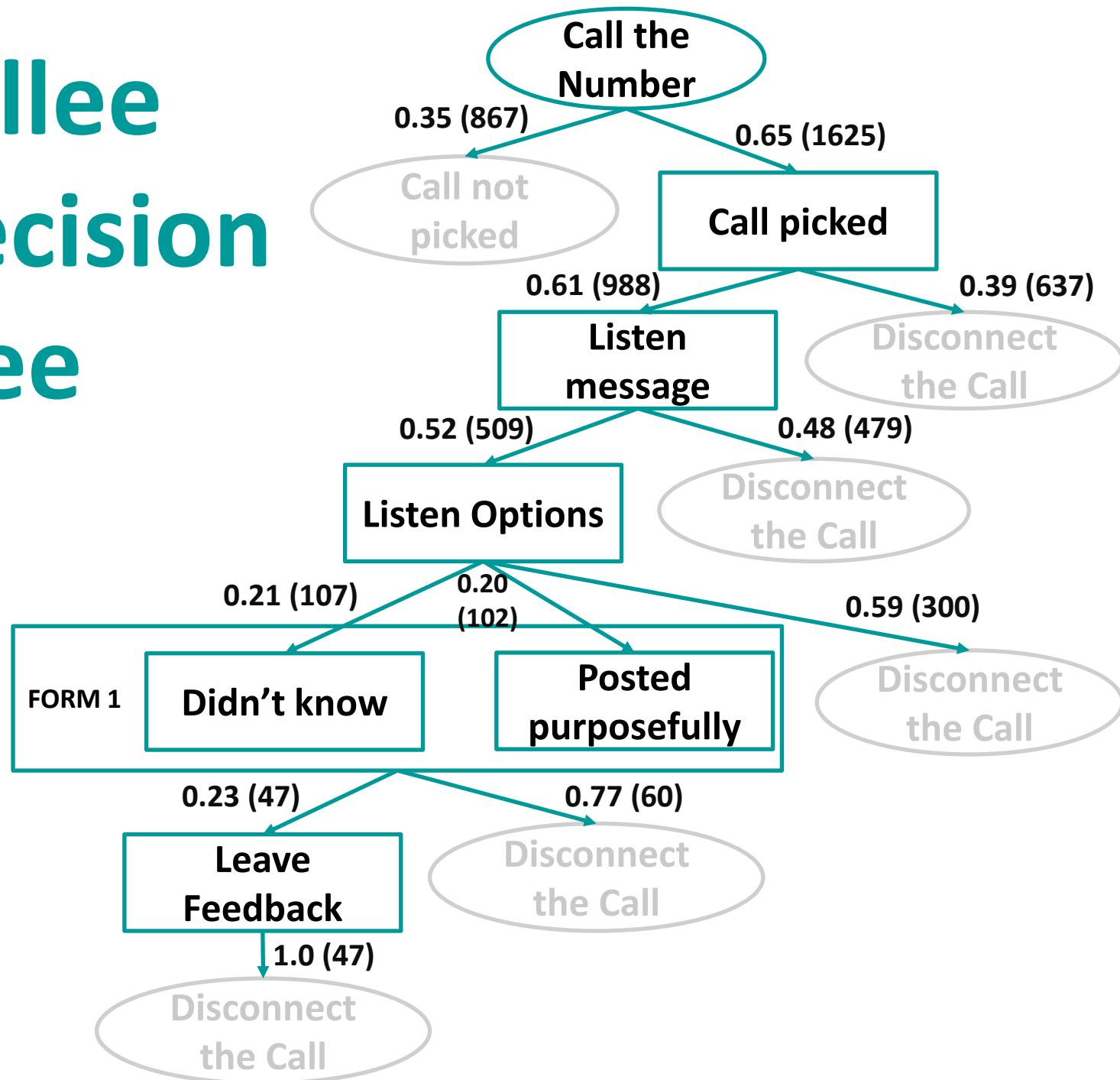
**8 Delhi
Users
Identified
Uniquely**

Risk Communication

IVR System



Callee Decision Tree



Feedback

“**Thank you** for information, I **have deleted**, I will not post my number online.”



“I want to know **how to remove my number** and I don't know, I haven't put my number purposely but if it is there, where exactly it is there I would also like to know that. **Please get in touch with me asap.** Thank you!”

“It is a very nice process that you are doing and **making people aware** about online frauds and telephone number frauds but **your system is basically calling business houses**”

Take
Aways

Take Aways

- Most **users share** their own mobile numbers on OSNs.
- Users post same **mobile numbers on multiple OSNs**.
- A publically shared mobile number can expose sensitive details (**age, ID, family details and full address**) of its owner, from multiple sources.
- We should **communicate the risks** of sharing mobile numbers online, to their owners.
 - Few users were unaware of the online presence of their number.

Future work

Build technological, people and process oriented solutions to **forewarn users and raise the awareness** towards risks of exposing mobile numbers leaks.

Thank You!

Questions?

prachi1107@iiitd.ac.in

paridhij@iiitd.ac.in

pk@iiitd.ac.in