# Systems and Techniques to Characterize Robocalls

1. Who's Calling? Characterizing Robocalls through Audio and Metadata Analysis
   Sathvik Prasad, Elijah Bouma-Sims, Athishay Kiran Mylappan, Bradley Reaves
   USENIX Security Symposium, Aug 2020.
   **Facebook Internet Defense Award – 1st Prize**
   **Distinguished Paper Award**

2. Diving into Robocall Content with SnorCall
   Sathvik Prasad, Trevor Dunlap, Alexander Ross, and Bradley Reaves,
   To appear at USENIX Security 2023 in August 2023

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# Everyone Hates Illegal Robocalls

“Hiker lost for 24 hours ignored rescuers' calls because 'they didn’t recognize the number’“ - NBC NEWS

“..people in their twenties reported losing money to fraud at a higher rate than people in their seventies..” - The FTC May 2023

“..The FTC has stopped a pair of student loan debt relief schemes.. ..bilked students out of approximately $12 million…” - May 2023

https://www.nbcnews.com/news/us-news/hiker-lost-24-hours-ignored-rescuers-calls-because-they-didn-n1282381
https://consumer.ftc.gov/consumer-alerts/2023/05/scam-proof-young-people-your-life
https://www.ftc.gov/news-events/news/press-releases/2023/05/ftc-stops-student-loan-debt-relief-schemes-it-says-bilked-students-out-millions

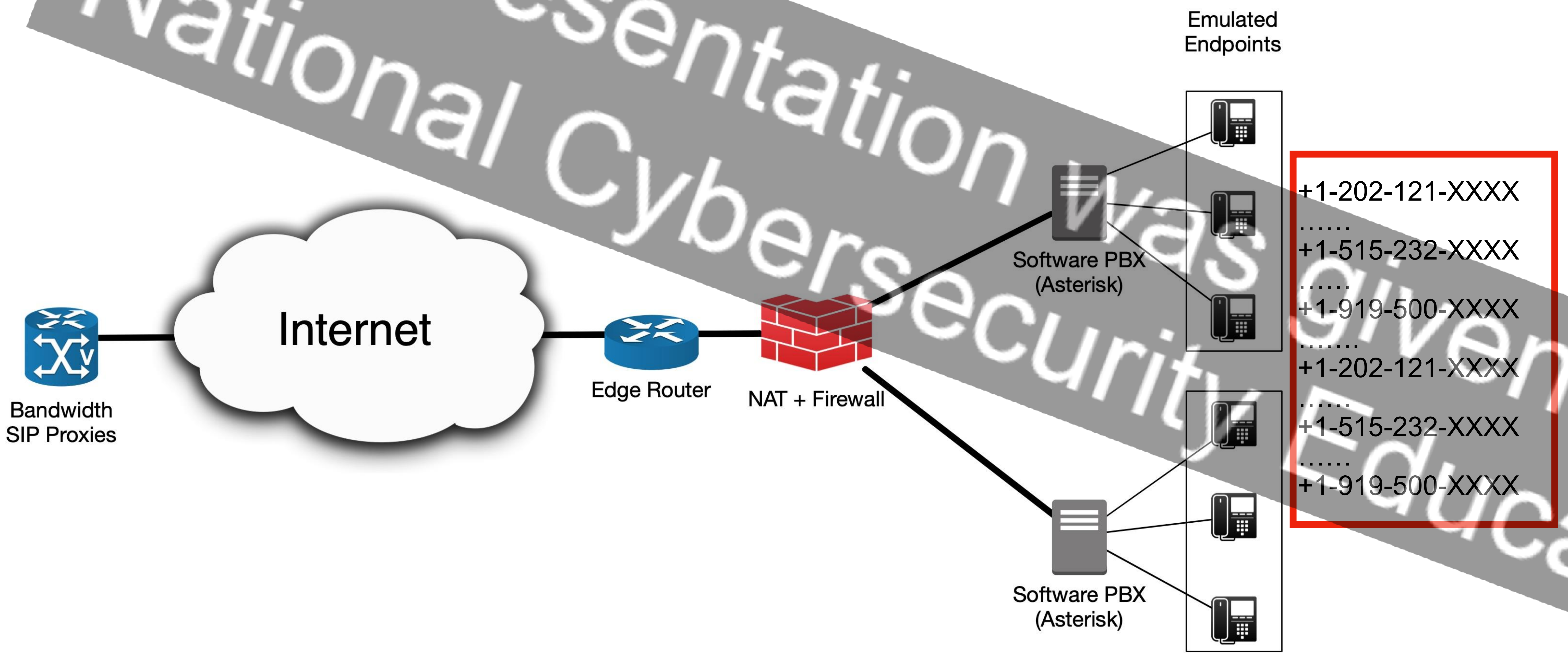
# Why are we still struggling to stop illegal robocalls in 2023?

1. Carriers lack the tools and techniques to combat illegal robocalls at scale

2. Enforcement agencies don't have enough time, human resources, or the tools to take action against every illegal robocalling operation

3. Robocall blocking techniques rely on adversary-controlled metadata

# Data Collection using Telephony Honeypot



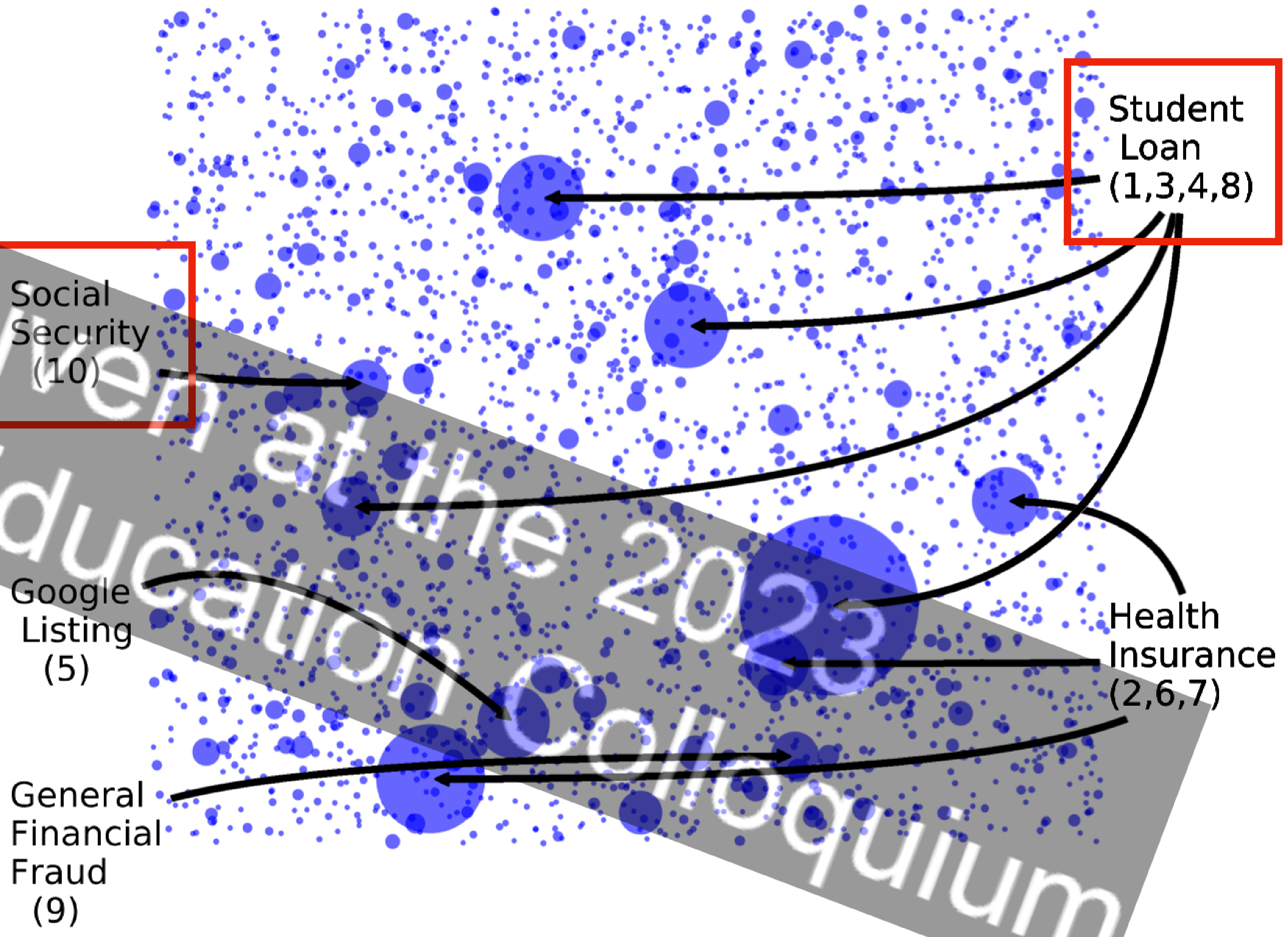
About 4 years

1.3 Million Robocalls

~66k VoIP Phone Numbers

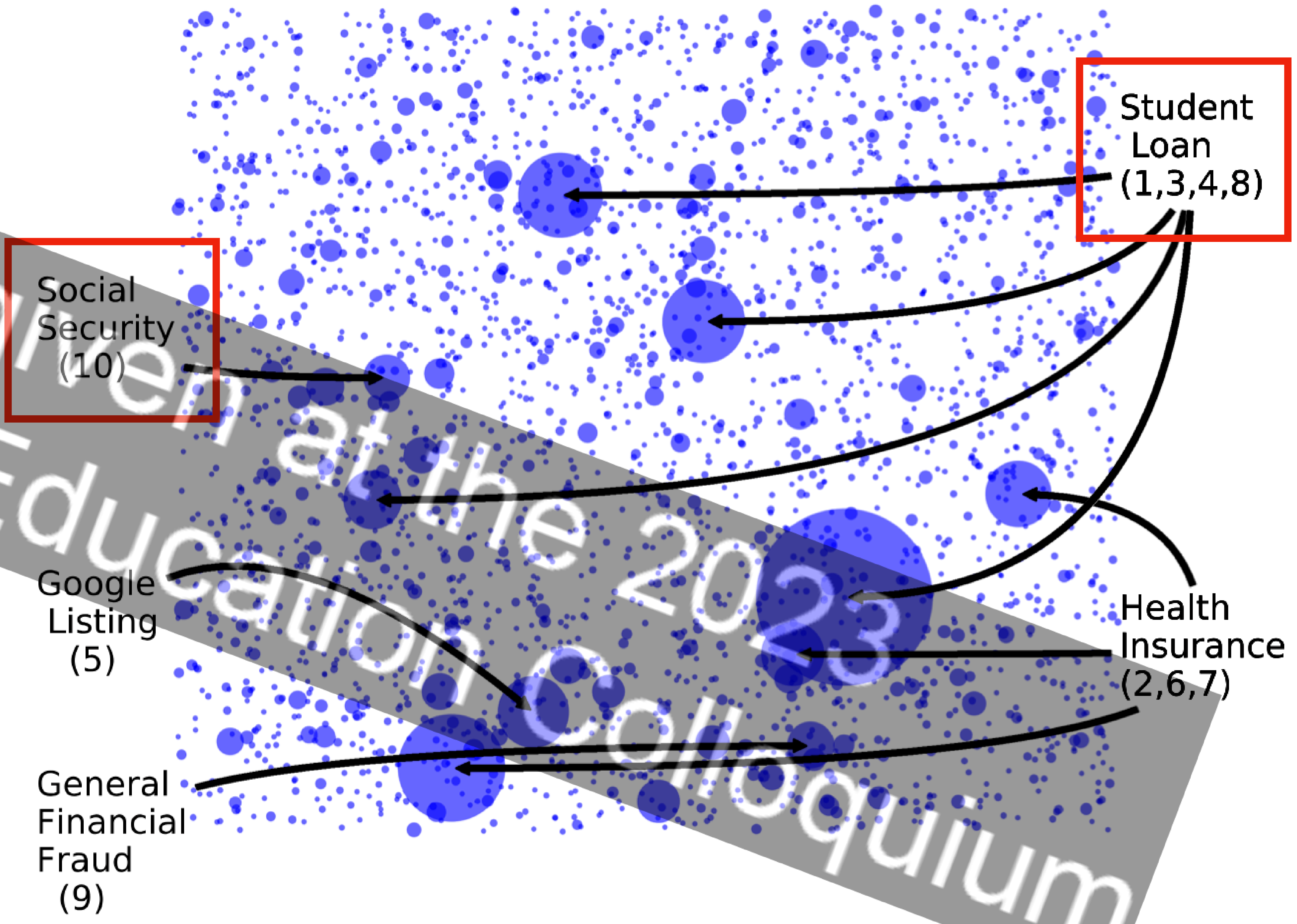
# Who is Calling You?

- A fraudulent Social Security Campaign was the 10th largest campaign we uncovered in our study
- The largest campaign (a student loan robocall) had over 6,000 calls
- Campaign identification through audio clustering allowed us to study campaign specific behaviors which were <u>previously impossible</u> to measure

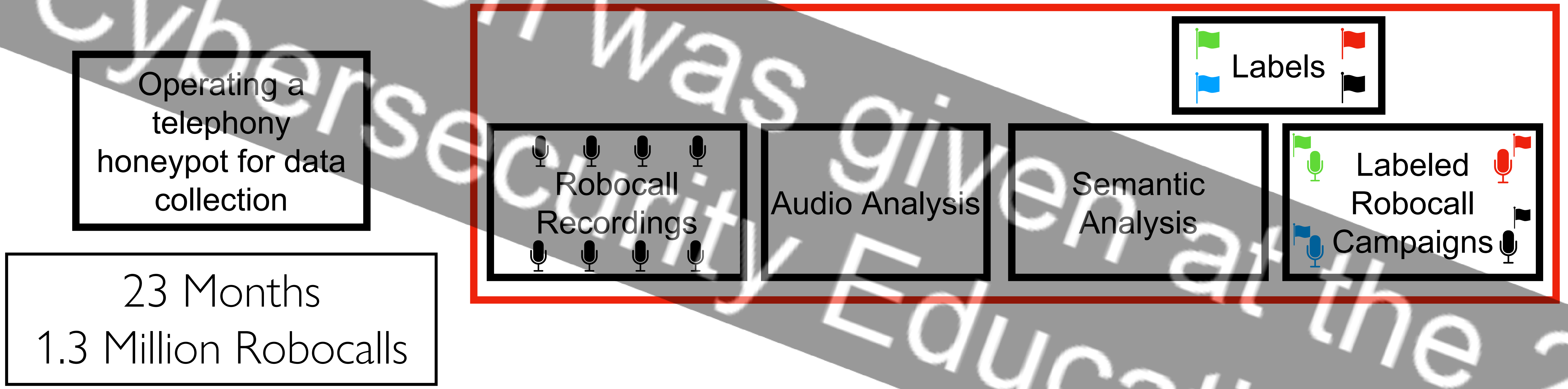


# Who is Calling You?

How can we automatically analyze robocall content at scale?



# SnorCall - A Robocall Content Analysis Pipeline



Operating a telephony honeypot for data collection

23 Months
1.3 Million Robocalls

Robocall Recordings

Audio Analysis

Semantic Analysis

Labels

Labeled Robocall Campaigns

# Social Security Scams Have Evolved Substantially

## Old Tactics (well-known)

1. Impersonate Social Security Administration employees

2. Threaten the victim with dire consequences

3. False sense of authority and urgency

4. Increase credibility by referencing other government entities: FBI, DEA, etc.

*"This call is regarding to your social security number. We found some fraudulent activities under your name and …*

*arrest warrant has been issued and your Social Security would be suspended soon…*

*Please press one to talk with officer right away. I repeat, please press one to talk with officer right away. Thank you."*

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## New Tactics

1. Impersonate Social Security Disability advisors

2. Target the disabled and elderly*: "..eligibility for Social Security disability benefits.."

3. Non-intimidating and seemly well-intended

4. Government impersonation: "…disability advisor with National Disability"

*"Hello, my name is Amy and I'm a social security disability advisor advisors on a recorded line.*

*And my call back number is 866-201-XXXX.*

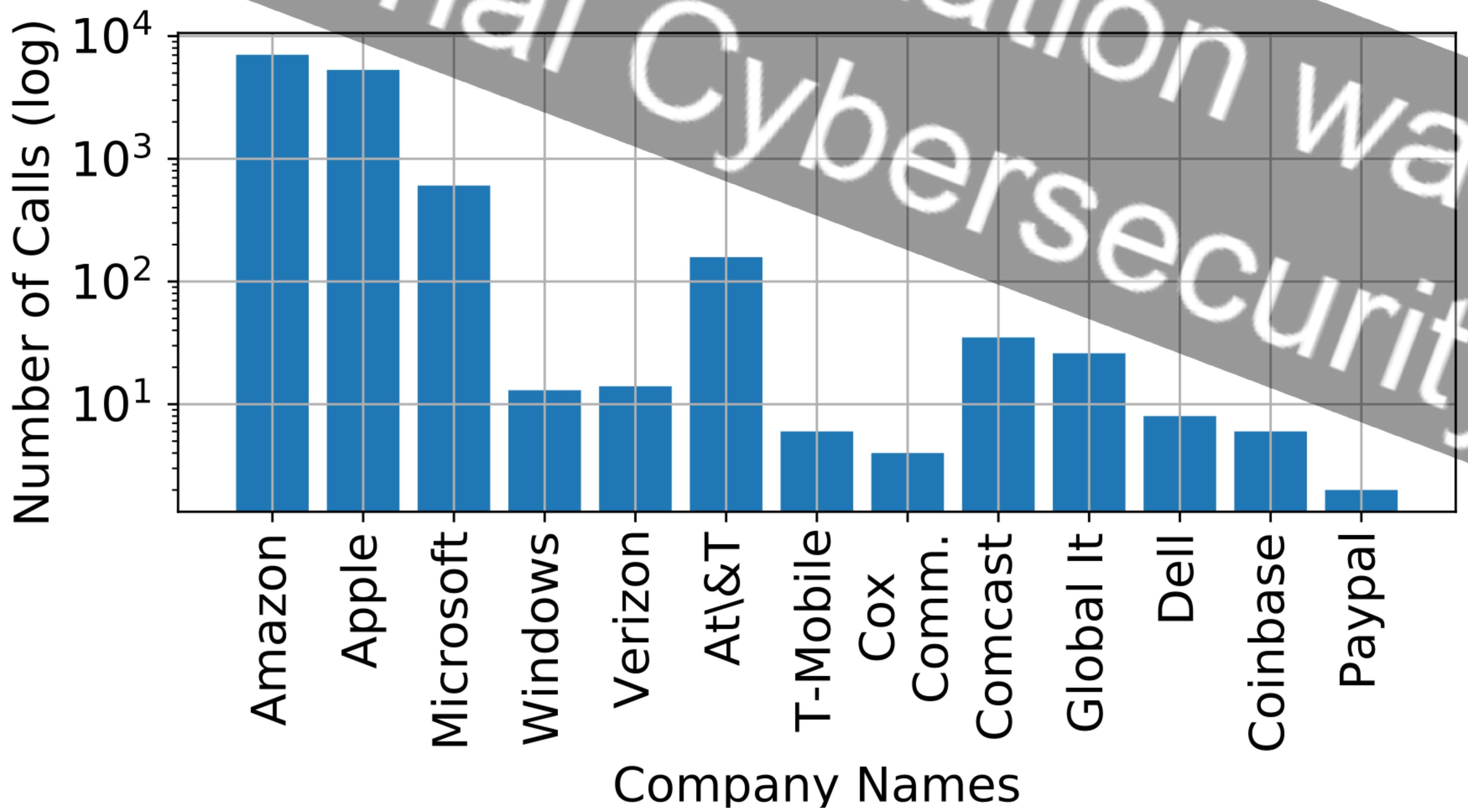
*Now I show here that you were recently inquired about your eligibility for Social Security disability benefits.*

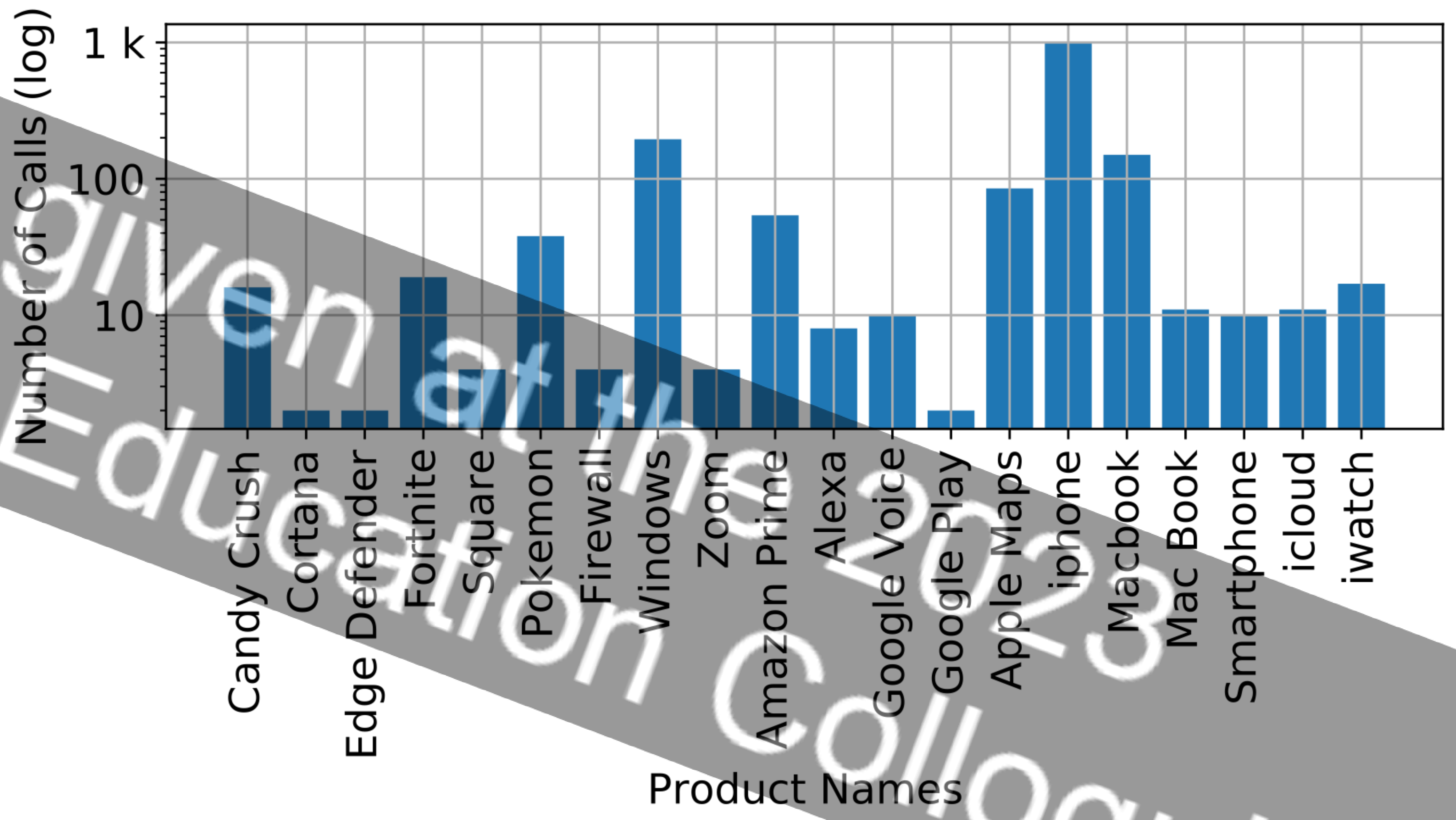
*Can you hear me? Okay?"*

* "Who can get Social Security disability benefits?": https://www.ssa.gov/pubs/EN-05-10029.pdf

# What’s the “Tech” in Tech Support Scams?

**Tactics:** Apart from impersonating well-known tech companies, Tech Support robocalls also impersonate well-known telecom carriers and consumer electronics companies





# Thank you!

- We uncovered robocalling campaigns using audio similarity and observed that they frequently spoof their caller ID to target vulnerable population. (Paper #1)
- SnorCall enabled domain experts to analyze robocall content at scale. We found that illegal robocalls frequently impersonate government agencies and tech companies to defraud their victims. (Paper #2)
- **What's Next?** We are developing an actionable Threat Intelligence framework that empowers stakeholders in the robocalling ecosystem to characterize the operational strategies of robocall originators

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*https://robocall.science*

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*https://sathviknp.org*