Hiroshi Fujiwara Cyber Security Research Center

TECHNION Israel Institute of Technology

The 8th Summer School on Cyber and Computer Security

PRIVACY IN CHALLENGING TIMES

Quick Introduction to Contact Tracing

Orr Dunkelman (University of Haifa)

Shamelessly based on Eyal Ronen/Benny Pinkas' presentation (with explicit consent)

September 7-10, 2020

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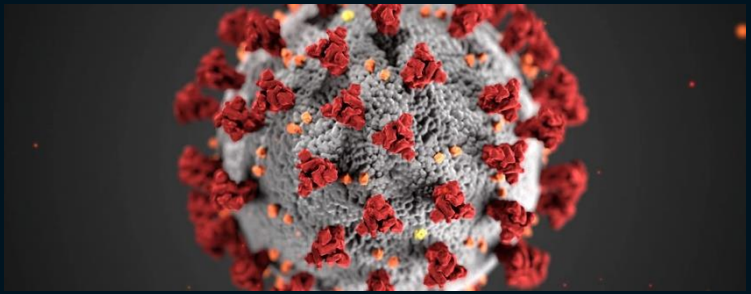
COVID-19



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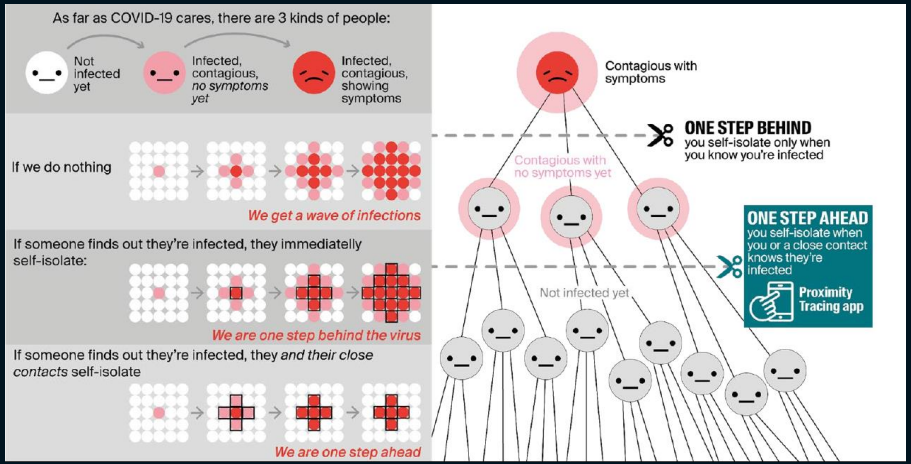

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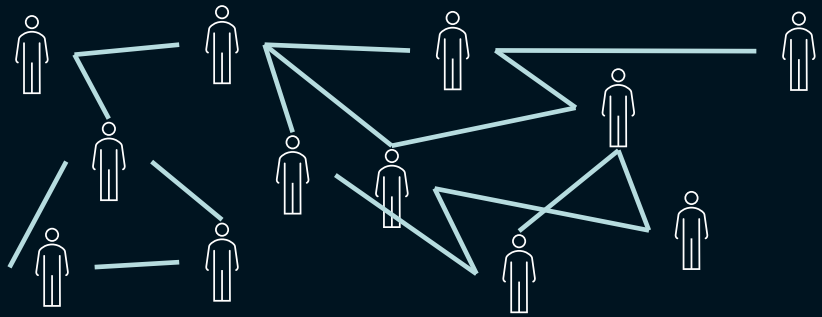

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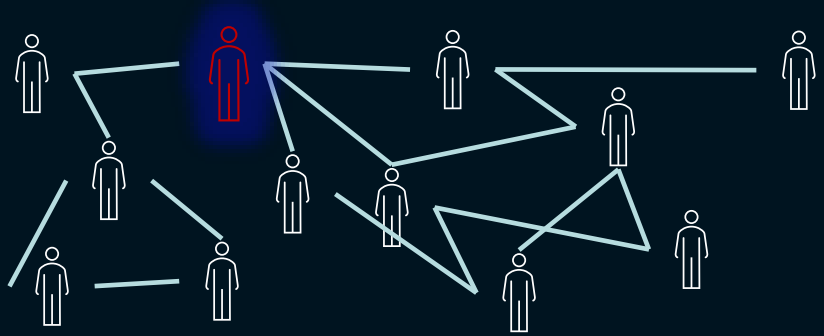

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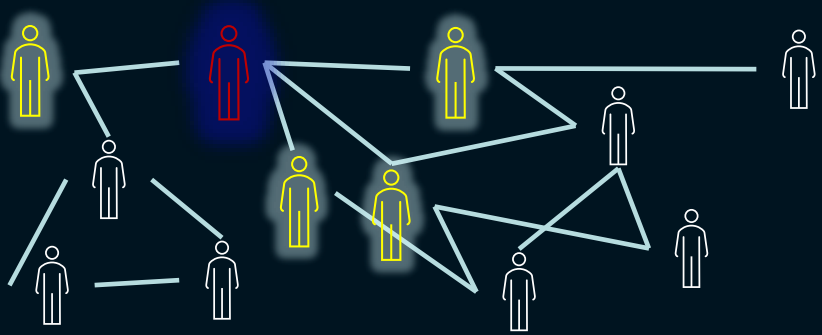

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Manual Contact Tracing

- Hard to remember **exact** location and times
- Exposure defined as under 2 meter for over 15 minutes
- Some contacts are unknown
- A labor intensive and inefficient process
  - Very coarse grain and inaccurate information
  - Hard to scale to a large number of new positives

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PRIVACY IN CHALLENGING TIMES

Let's Automate!

- Use the cellphone (and other sources), Luke!
  - GPS, WiFi and other location information
  - Collect all Data
  - Process all Data
  - Win!

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Ideally

I met X at time Y

Trusted 3rd Party

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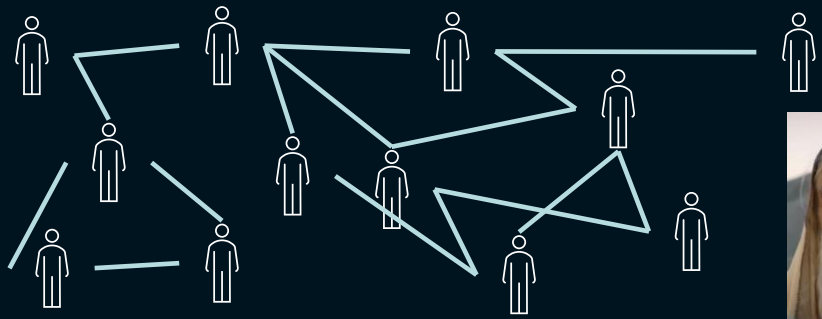

Knows all contacts (but not locations)

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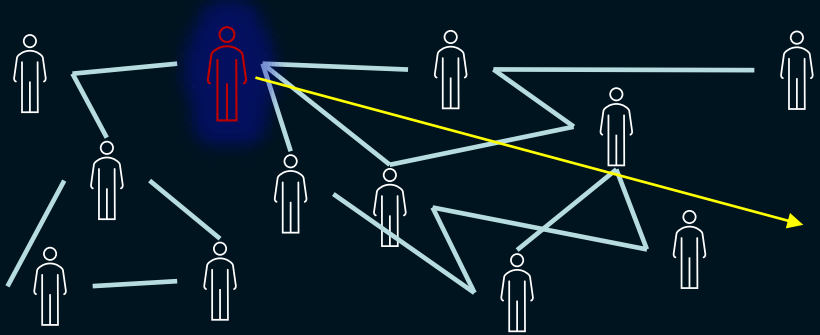

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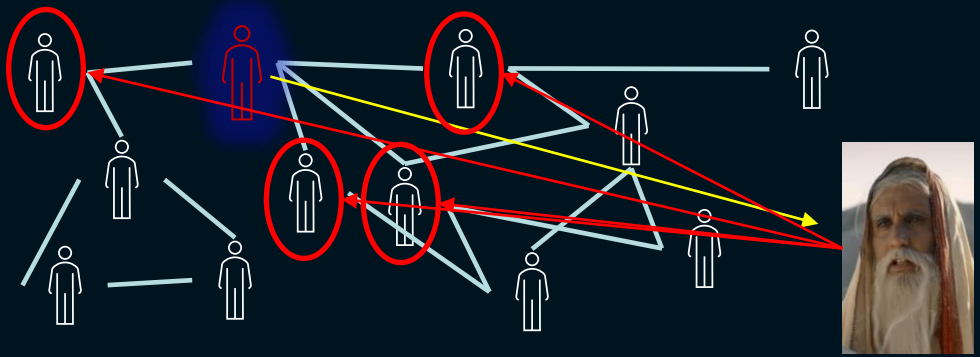

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Centralized solution:

- Everybody sends their information all the time to some server
- Knows all contact information all the time

- Possible “masking”: one server knows all contacts, and outputs only infected people’s contacts to a second server

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De-Centralized solution:

- Allows people to learn that they were exposed
- Government learns nothing (unless someone wishes to report)

- User's responsibility to isolate

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PRIVACY IN CHALLENGING TIMES

The two main questions:

- Who controls the data (government vs. users)
- Who gets the output (government vs. users)

- Centralized: Trust the government not to misuse its power
- Decentralized: Trust the users to do the right thing