



An In-depth Review of Privacy Concerns Raised by the COVID-19 Pandemic

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Human Online Activities in the COVID-19

COVID-19 \implies Quarantine \implies More interactions online



Usage increased 40% [1]



Usage increased 37% [1]



Usage increased 58% [1]

- Compared with interactions in the real world, self-disclosure information can more easily be propagated, searched, saved, and even processed on social media.
- The pandemic is changing people's sensitivity and attitude to privacy including what and how personal information can be disclosed [2]
- Presidential election - political stand, location, family relative
- Advanced data mining/machine learning across multiple social network platforms

Increasing Privacy Threats due to the COVID-19 Pandemic - Mass Surveillance

- Personal data: location, body temperature, facial information, etc.
 - Cellphone, traffic cameras, and other sensors
 - Track human mobility, identify individuals with risk, and monitor the disease spread
 - Examples:
 - United Kingdom and India: smart city infrastructure has been reused to monitor the people's social distance
 - China: cell phone application
 - United States: Apple and Google provided a contact tracing application for their mobile users as well with bluetooth specification [4] and cryptography specification [5]
 - However, as a key part of the extension of the surveillance state, researchers stated that the anonymized data **is not always anonymous** and **location data can exacerbate inequality**.
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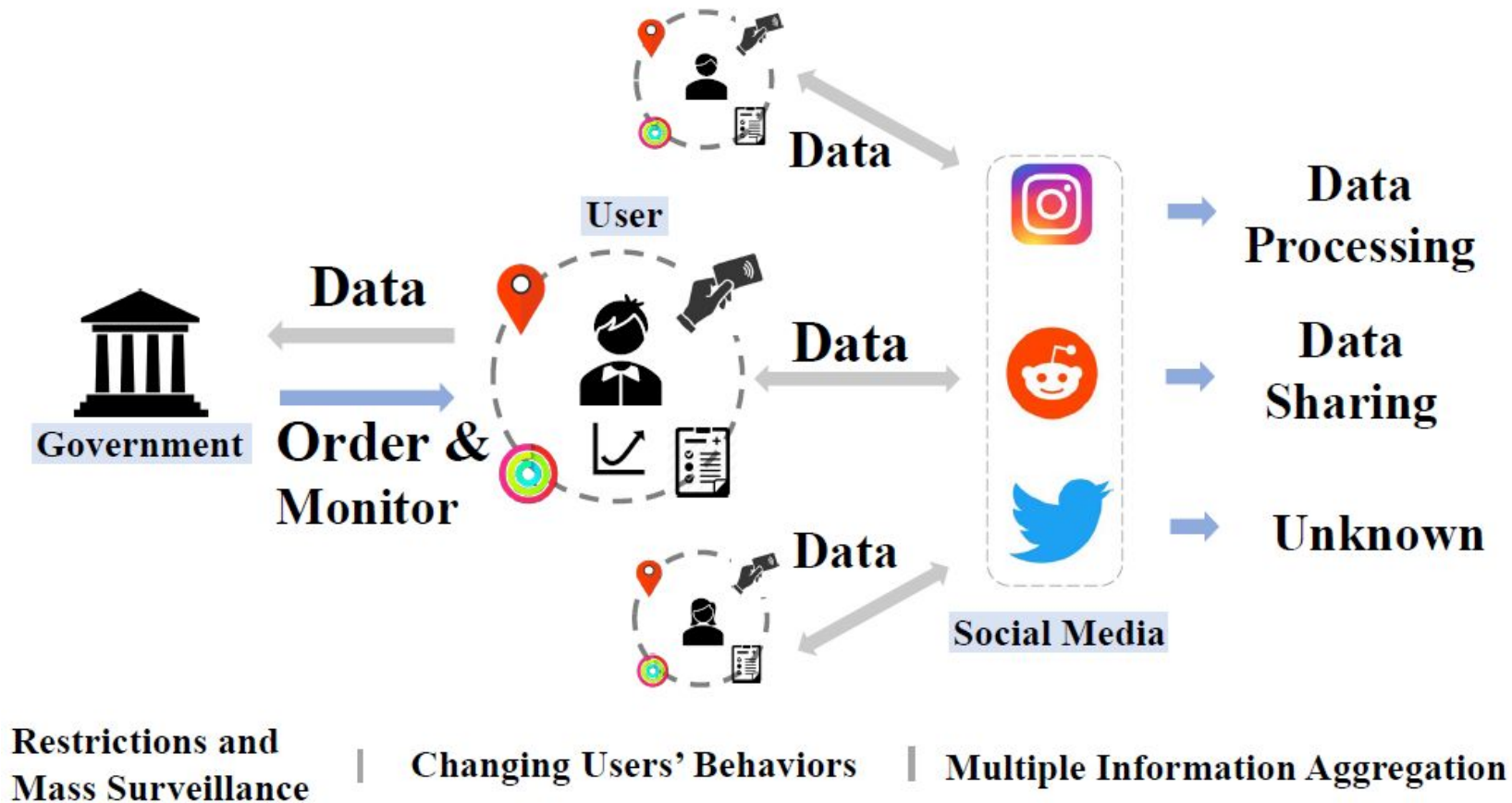
Increasing Privacy Threats due to the COVID-19 - Data Usage across Multiple Platforms

- A lot of released open dataset related to COVID-19 [7][8][9][10]
- More digit records and accounts are being created, such as social media and online shopping accounts
- How to measure privacy disclosure score based on the information across multiple social networks has been discussed extensively [11].
- Zola et al. explored a cross-source cross-domain sentiment analysis with training data from Amazon and Tripadvisor and testing on the data from Facebook and Twitter [12].

Increasing Privacy Threats due to the COVID-19 - Change of Individual Privacy Calculus

- Another observed phenomenon and potential concern is the change of individuals' perception to self-disclosure and privacy.
 - People would more easily sacrifice their private health status information to get suggestions, pre-diagnosis, or contribute to what the government appeals during the COVID-19 pandemic [13].
 - Governments and companies provide convenient tools for people to update their personal information and implicitly convince people that the behaviors are a contribution to the public good [14].
 - However, to my best knowledge, there are not enough official files to remind people about individual privacy issues or broadcast basic knowledge of data usage for people during the COVID pandemic.
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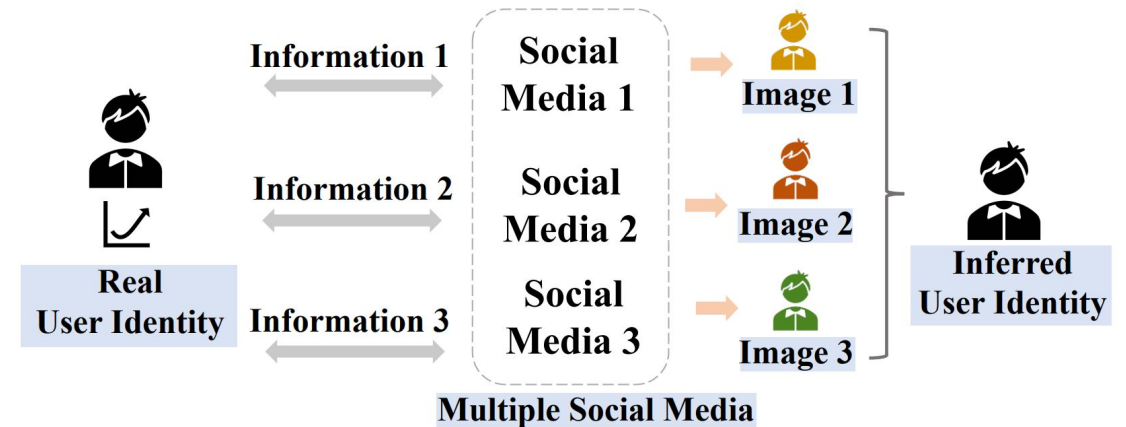
A Systematic Overview



Post-pandemic Potential Privacy Risks - Over-collected Data Abuse

Over-collected Data Abuse

- The COVID-19 pandemic has promoted the development of e-commerce, online education, social media platforms, smart phone applications, and related virtual service.
- The governments could leverage contact tracing information to monitor and analyze citizens' behaviors, e.g. LGBT people identification in South Korea [15].
- User identity inference based on multiple social media.



Post-pandemic Potential Privacy Risks - Public Privacy Concern and Social Trustworthiness

- As the COVID-19 pandemic carries on, debates and laws surrounding surveillance capabilities are at the forefront of many mind
- There is a great possibility that the government will not delete the collected personal data or even continue collecting the data without informing users. Another survey result in [16] shows that 69% U.S. adults thought they should have the right to have the medical data permanently deleted after necessary and legal usage
- Kye and Hwang [17] argued that the government actions do have a huge impact on social trust and government Trustworthiness. The temporal over-disclosed data and privacy data disclosure is gradually causing a stronger public privacy concern and challenging the government social trust.

Potential Research about Pandemic-related Privacy Issues on Social Media

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- Self-disclosure Interaction and Propagation
 - Public Privacy Concern and Attitude Tracing
 - Mental Health in the COVID-19 Pandemic
 - Prevention, Prediction, and Protection
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Thank you

