Ethical issues in research using datasets of illicit origin

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GPG: 5017 A1EC 0B29 08E3 CF64 7CCD 5514 35D5 D749 33D9

Think before using data of illicit origin

- Include an ethics section
- "human participants" not "human subjects"
- Talk to your Research Ethics Board (REB) (IRB / Ethics committee)

We had questions about ethics in our research[1]

- ▶ UDP honeypot DDoS sensors
- ▶ Developed statistical method for estimating coverage
- ▶ Verified using leaked booter databases...

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[1]Daniel R. Thomas, Richard Clayton, and Alastair R. Beresford. 2017. 1000 days of UDP amplification DDoS attacks. In *APWG Symposium on Electronic Crime Research (eCrime)*. IEEE, Scottsdale, AZ, USA.

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Case studies

- ► Malware & exploitation (Carna, ...)
- ► Password dumps
- ► Leaked databases (Booters, Patreon, ...)
- ► Classified materials (Snowden, Manning)
- ► Financial data (Panama papers)

We drew out common justifications, safeguards, potential harms, and benefits.

Ethics are norms of conduct

- Distinguish between acceptable and unacceptable behaviour
- Guidance in Menlo Report[2]
- Enforced by REBs and Program Committees (e.g. IMC[3])
- Minimise harm, maximise benefit.

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[2]David Dittrich, Michael Bailey, and Erin Kenneally. 2013. Applying ethical principles to information and communication technology research: A companion to the Menlo Report. Tech. rep. U.S. Department of Homeland Security, (Oct. 2013) .

[3]Mark Allman and Vern Paxson. 2007. Issues and etiquette concerning use of shared measurement data. In *Proceedings of the 7th ACM SIGCOMM conference on Internet measurement*. ACM, 135–140.

We should consider these ethical issues

- Identification of stakeholders
- Informed consent (where possible)
- Identify harms
- Safeguards
- Justice
- Public interest

Leaked databases: Ethical issues

Sources	Ref	Year	Identify stakeholders	Identify harms	Safeguards	Justice	Public interest
6 underground forums	[6]	2011	✓	✓	✗	✓	✓
3 carding forums	[12]	2013	✗	✗	✗	✓	✓
TwBooter	[4]	2013	✓	✓	✓	✗	✗
TwBooter, 14 others	[9]	2013	✓	✓	✓	✓	✓
Asylum, Lizard, Vdos	[5]	2015	✓	✓	✓	✓	✓
Patreon	[7]	2016	✓	✓	✓	✓	✓
Vdos, CMDBooter	[10]	2017	✓	✓	✓	✓	✓
4 underground forums	[8]	2017	✓	✗	✗	✓	✓

Summary of the ethical issues and the identified by the authors for each paper. ✓ means the issue was discussed, ✗ means it was not.

Legal issues may arise

- Computer misuse
- Copyright
- Data privacy (e.g. GDPR)
- Terrorism
- Indecent images
- National security
- Contracts

IANAL. Just pointers: not even the beginning of advice.

AT&T iPad users database breach

- "Researchers" from Goatse Security found vulnerability in AT&T website
- Obtained email addresses for 114 000 iPad users
- Shared vulnerability, exploit, and email addresses with third parties
- Did not report vulnerability to AT&T
- Went to jail

Unethical and illegal.

- *Mens rea*: lack of criminal intent
- Not in the public interest to prosecute
- REB approval! REB protection?
- Get the law fixed

Bad and good justifications

- Not the first
- Public data

- No additional harm
- Fight malicious use
- Necessary data

Leaked databases: Justifications and oversight

Sources	Ref	Year	Not the first	Public data	No additional harm	Fight malicious use	Necessary data	Ethics section	REB approval
6 underground forums	[6]	2011	✗	✓	✓	✗	✗	✗	✗
3 carding forums	[12]	2013	✗	✗	✗	✗	✗	✗	✗
TwBooter	[4]	2013	✓	✓	✓	✗	✗	✓	✗
TwBooter, 14 others	[9]	2013	✓	✓	✓	✗	✗	✓	✗
Asylum, Lizard, Vdos	[5]	2015	✓	✗	✓	✗	✗	✓	E
Patreon	[7]	2016	✗	✓	●	✗	✓	✓	∅
Vdos, CMDBooter	[10]	2017	✗	✗	✓	✗	✓	✓	E
4 underground forums	[8]	2017	✗	✗	✗	✗	✗	✗	✗

● means that the authors decided that the work could not be justified.
∅ means not applicable and E means exempt.

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Patreon database leak[4]

- Researching crowdfunding on Patreon by scraping the website (complete scrape?)
- Patreon is compromised and full database + source code leaked
- Authors decided there would be additional harm
    - Private vs. public data
    - Legitimize criminal activity
    - Violate privacy

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[4]Nathaniel Poor and Roei Davidson. 2016. The ethics of using hacked data: Patreon's data hack and academic data standards. Data and Society. Tech. rep. Council for big data, ethics and society, (Mar. 2016), 1–7. Retrieved Sept. 28, 2017 from http://bdes.datasociety.net/council-output/case-study-the-ethics-of-using-hacked-data-patreons-data-hack-and-academic-data-standards/.

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Safeguards against potential harm

SS Secure storage
 P Privacy
CS Controlled sharing

Potential harms

I Illicit measurement
PA Potential Abuse
DA DeAnonymisation
SI Sensitive Information
BC Behavioural Change
RH Researcher Harm

- Researchers are participants
- Ethics also protects researchers
- Maltese journalist Daphne Caruana Galizia killed by car bomb used Panama Papers data also used by researchers

Benefits provided

R Reproducibility

U Uniqueness

DM Defence Mechanisms

AT Anthropology & Transparency

Leaked databases: Safeguards, harms and benefits

Sources	Ref	Year	Safeguards	Harms	Benefits
6 underground forums	[6]	2011			U,DM,AT
3 carding forums	[12]	2013			DM,AT
TwBooter	[4]	2013	P	SI	
TwBooter, 14 others	[9]	2013	P	SI	
Asylum, Lizard, Vdos	[5]	2015	P	SI	
Patreon	[7]	2016		SI,RH	U,AT
Vdos, CMDBooter	[10]	2017	P,CS	SI,BC	U,AT
4 underground forums	[8]	2017			R,DM,AT

Safeguards: SS Secure Storage, P Privacy, CS Controlled Sharing.
Harms: I Illicit measurement, PA Potential Abuse, DA De-Anonymization, SI Sensitive Information, RH Researcher Harm, BC Behavioural Change.
Benefits: R Reproducibility, U Uniqueness, DM Defence Mechanisms, AT Anthropology and Transparency.

Privacy: No individuals identified

Controlled Sharing: Under legal agreement

Sensitive Information: Names, email addresses, criminal activity

Behavioural Change: Don't advertise (working) booters

Uniqueness: Ground truth on booter activity

Anthropology & Transparency: Real behaviour of booters

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[5]Daniel R. Thomas, Richard Clayton, and Alastair R. Beresford. 2017. 1000 days of UDP amplification DDoS attacks. In *APWG Symposium on Electronic Crime Research (eCrime)*. IEEE, Scottsdale, AZ, USA.

Lets do ethical research

- Explain why our work is ethical
- Learn from each other
- Improve Research Ethics Board (REB) process

Thank you! Questions?

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`https://www.cl.cam.ac.uk/~drt24/`
GPG: 5017 A1EC 0B29 08E3 CF64 7CCD 5514 35D5 D749 33D9

Cambridge Cybercrime Centre has data to share
`https://www.cambridgecybercrime.uk/`

University support for complex ethics workshop
Oxford 12th December

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