**Manolis Terrovitis**
ATHENA Research Center

AMNESIA

Data anonymization

@openaire_eu

- GDPR limits the usage of personal data
    - according to law and contracts
        - Consent
    - Can be used for research

    - Using Personal data
    - Consent might not be given or withdrawn
        - Difficult to manage
    - Usage for research purposes requires strict internal processes
    - Cannot share with third parties
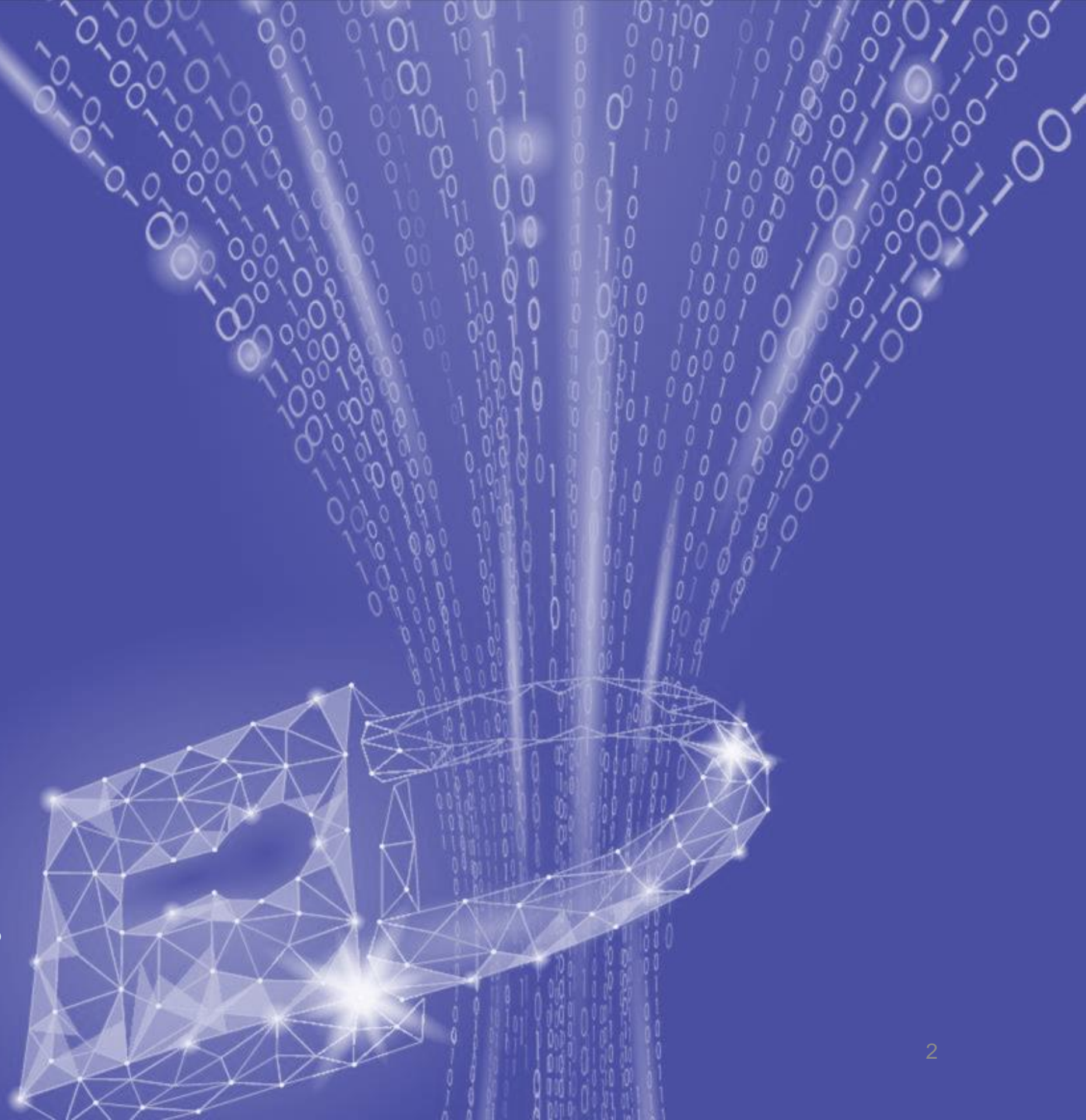
Unlock the information

- **Research and studies need statistical information and properties**

- **Personal identification is not necessary in most fields**

- **Low reduction in data quality is tolerable**
  - **Or can be mitigated by using larger amounts of data**

- Anonymization unlocks the valuable information in data
  - The anonymized data are **different from the original data**
  - Anonymization is a one-way transformation of data
  - Original data cannot be retrieved

  - Pseudo-Anonymization is not Anonymization
  - In Pseudo-Anonymized data there is a way to retrieve the original data
  - Pseudo – Anonymized data are still personal data

Why anonymize?

Anonymized data are outside the scope of GDPR

Anonymization provides a statistical guaranty about the risk of information leakage

It is the most suitable way to give information to third parties, without revealing personal data

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Limitations of Anonymization

Anonymized data have lost some information

- The key idea of a good anonymization algorithm is to minimize this loss and limit it in the least important information

There are gray boundaries between anonymized and pseudo-anonymized data

Formal privacy guaranties provide a statistical guaranty for the anonymized data

- This is only an interpretation of the notion of "privacy"

It cannot easily be fully automated

- User input is needed

When to anonymize

- When you are a practitioner, and you want to share data with researchers and third parties without compromising the privacy of the user
  - After the data is anonymized, you do not need consent
- When you want to give data to recipients you do not fully trust
  - Encryption will reduce the risks of data leaks to unauthorized third parties, it will do nothing for untrusted recipients
- When you want to openly publish data and you are not fully aware of the audience
- When reduction in information quality is acceptable

Why Amnesia

📱 User friendly

🗄 Works locally, no data transfer risk

👤 Allows users to customize the solution

🛠 The only tool to offer anonymization for set-valued data

⚒ The only tool to support k^m-anonymity

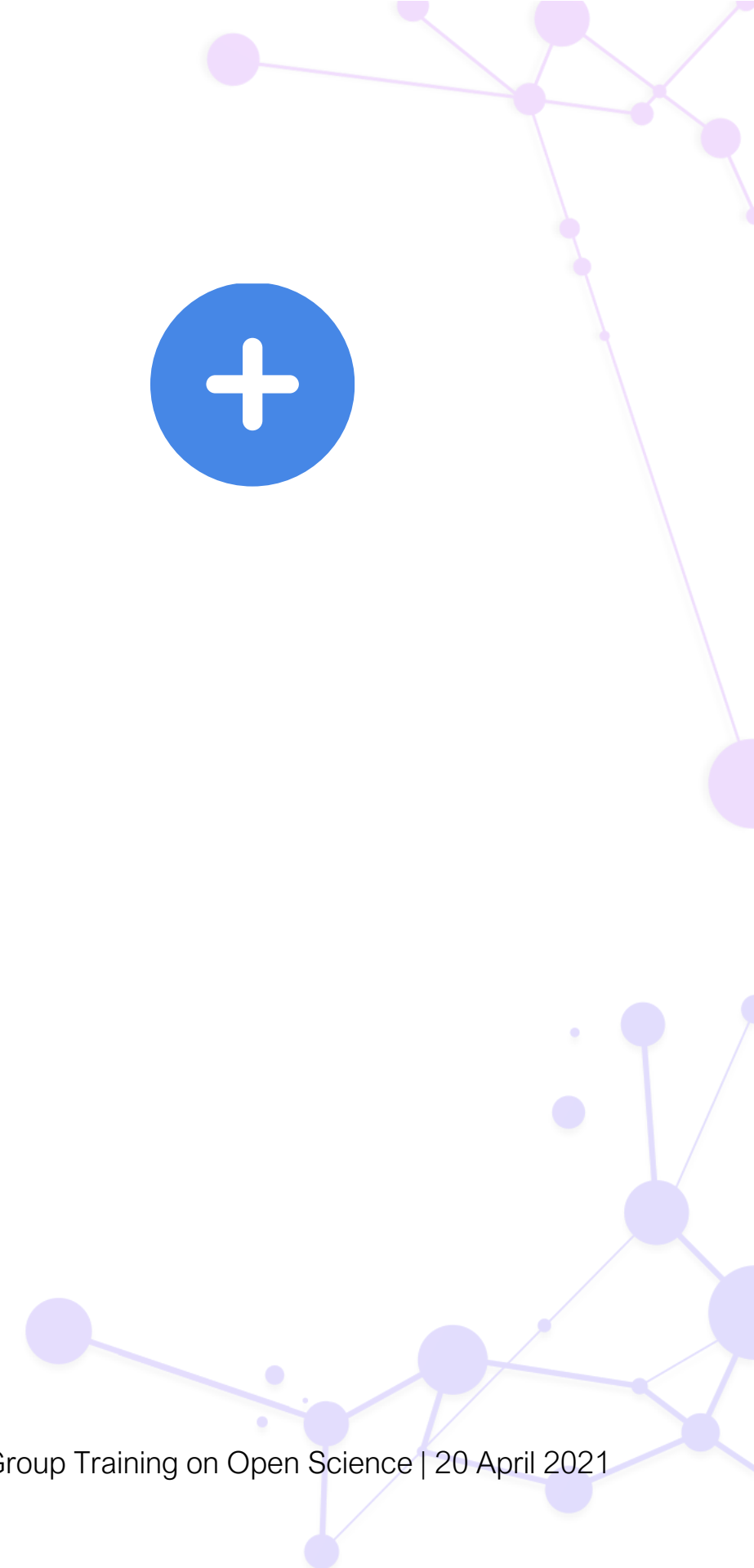✓ Easy to incorporate to third party information systems

Stats

63k visitors

190k page views

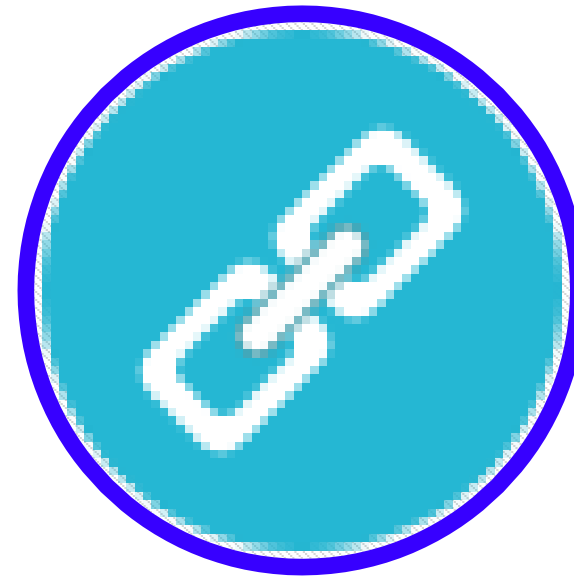3.1k unique downloads

https://amnesia.openaire.eu

Status

Methods and models

K-anonymity

Km-anonymity

Object relational datasets

Disk based algorithm

API

ReST and command line
API exist to help
programmers

Bugs

Diminished - Queries in
helpdesk are less about
bugs these days

k-anonymity

Each entry becomes indistinguishable from other k-1 entries

id	Zipcode	Age	National.	Disease
1	13053	28	Russian	Heart Disease
2	13068	29	American	Heart Disease
3	13068	21	Japanese	Viral Infection
4	13053	23	American	Viral Infection
5	14853	50	Indian	Cancer
6	14853	55	Russian	Heart Disease
7	14850	47	American	Viral Infection
8	14850	49	American	Viral Infection
9	13053	31	American	Cancer
10	13053	37	Indian	Cancer
11	13068	36	Japanese	Cancer
12	13068	35	American	Cancer

id	Zipcode	Age	National.	Disease
1	130**	<30	*	Heart Disease
2	130**	<30	*	Heart Disease
3	130**	<30	*	Viral Infection
4	130**	<30	*	Viral Infection
5	1485*	≥40	*	Cancer
6	1485*	≥40	*	Heart Disease
7	1485*	≥40	*	Viral Infection
8	1485*	≥40	*	Viral Infection
9	130**	3*	*	Cancer
10	130**	3*	*	Cancer
11	130**	3*	*	Cancer
12	130**	3*	*	Cancer

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Generalization Hierarchy
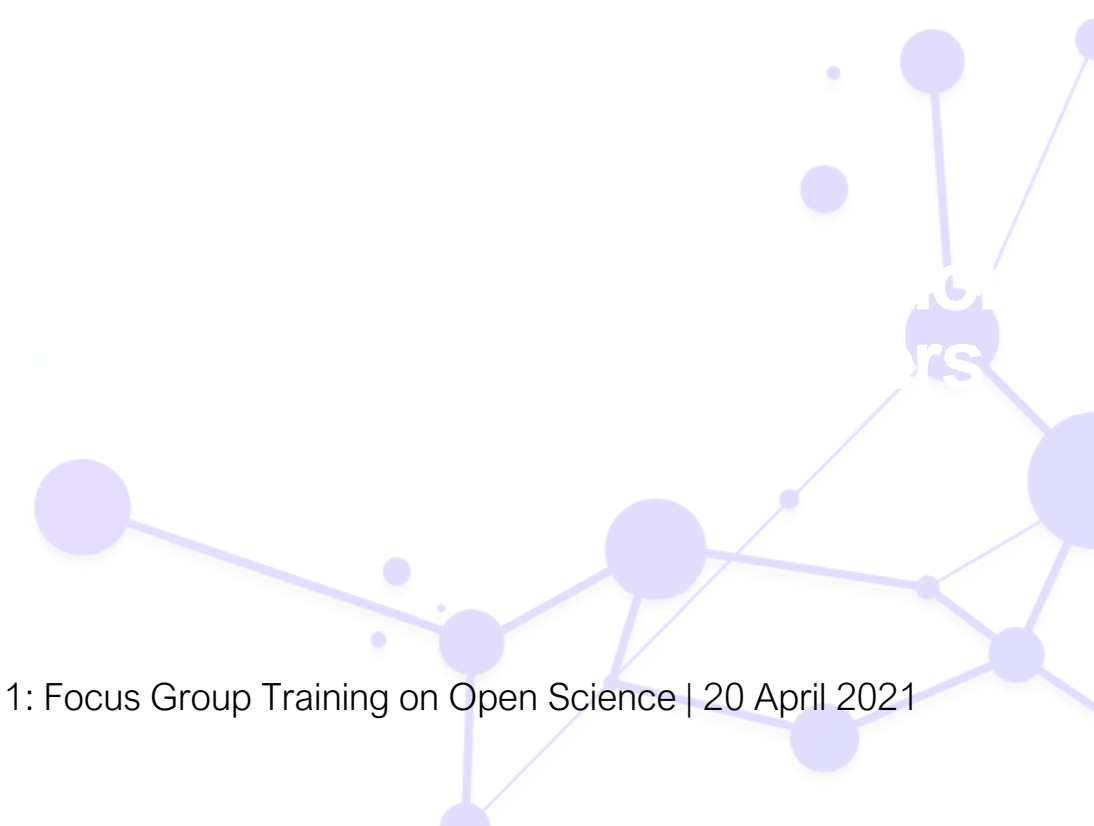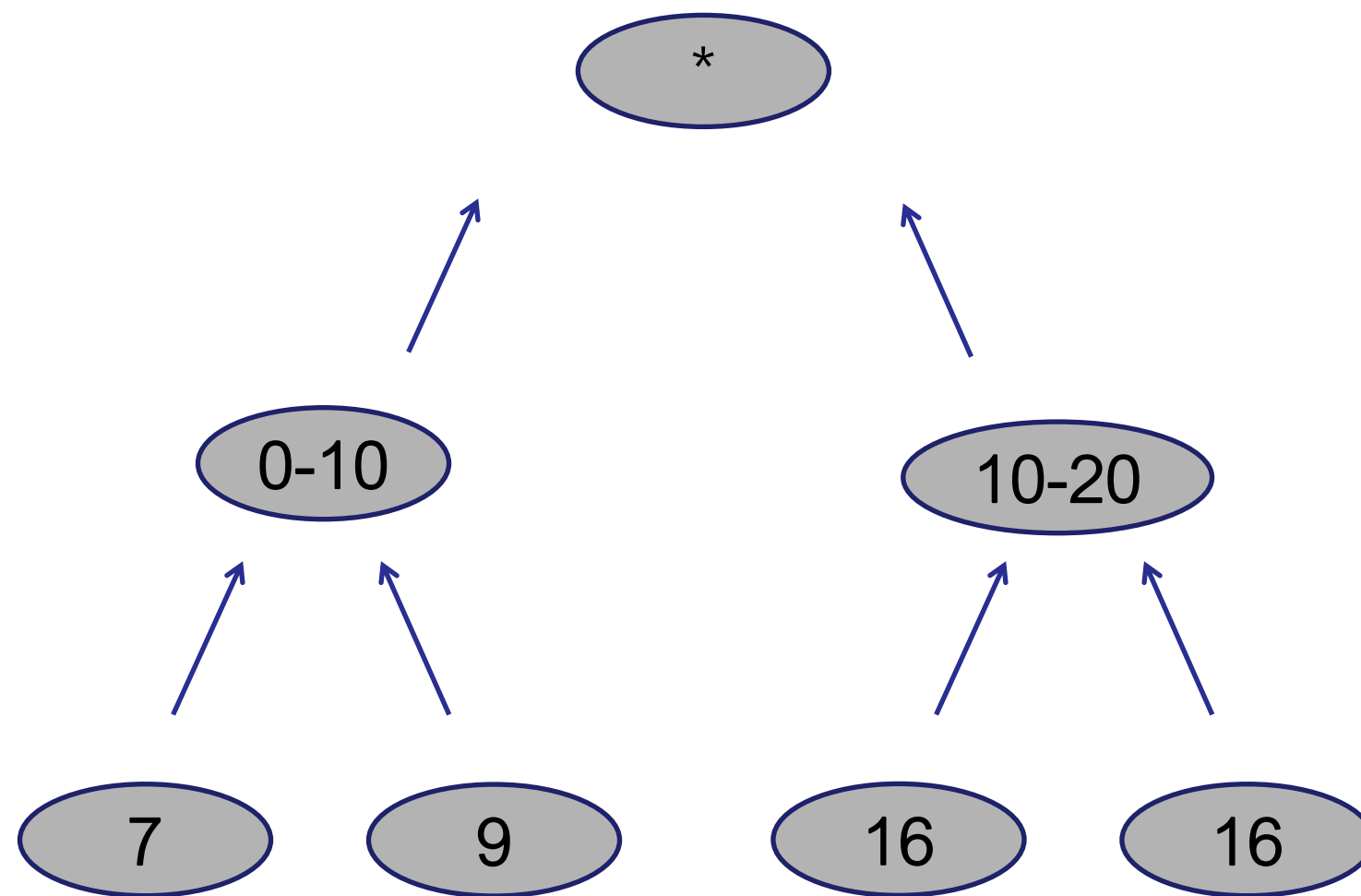
km-anonymity

	Fruits	Meat	Vegetables	Fish
Vassilis	X	X		
Manolis	X	X	X	
Eleni			X	
Maria		X	X	
Kostas	X			X

	Fruits	Meat	Other food
Vassilis	X	X	
Manolis	X	X	X
Eleni			X
Maria		X	X
Kostas	X		X

- 2^2-anonymous
- Any combination of m items will not appear less than k times
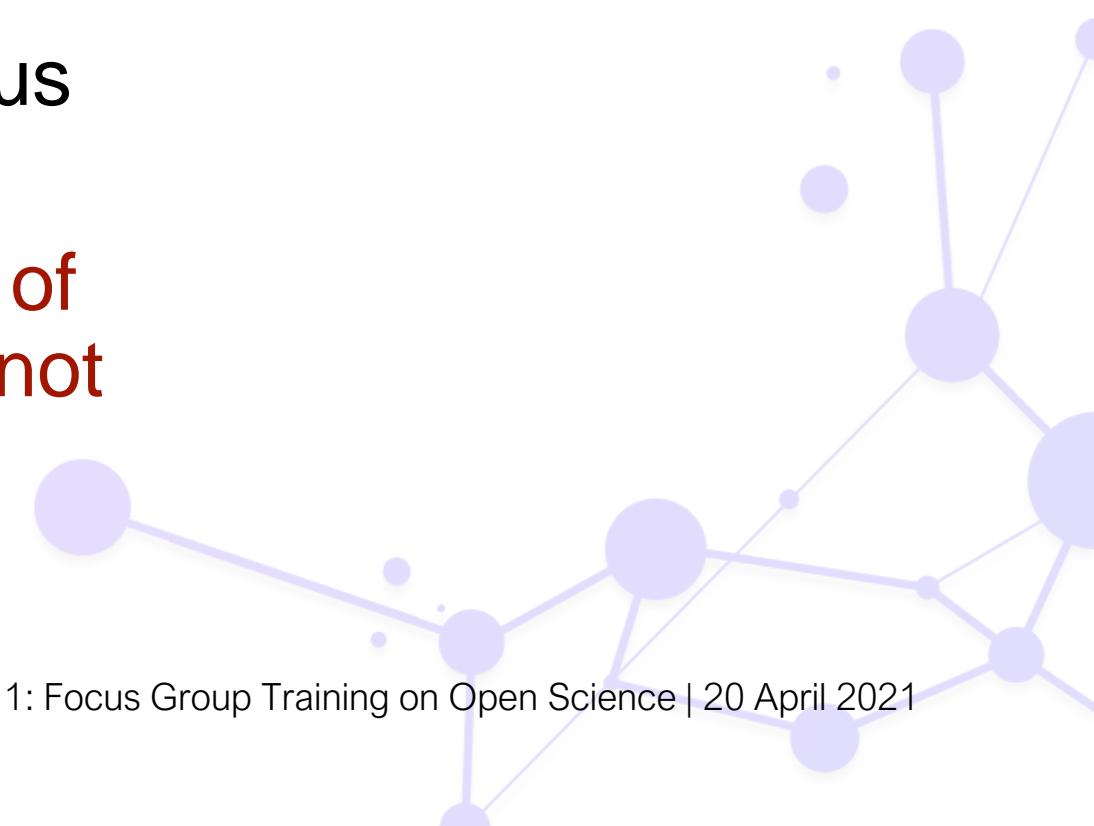
Amnesia limitations

- Users are not familiar with anonymization techniques

- The process is novel and requires effort from the user's part

- Amnesia cannot decide on privacy parameters

- K-anonymity does not protect from every type of attack

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curacy Data
nization.
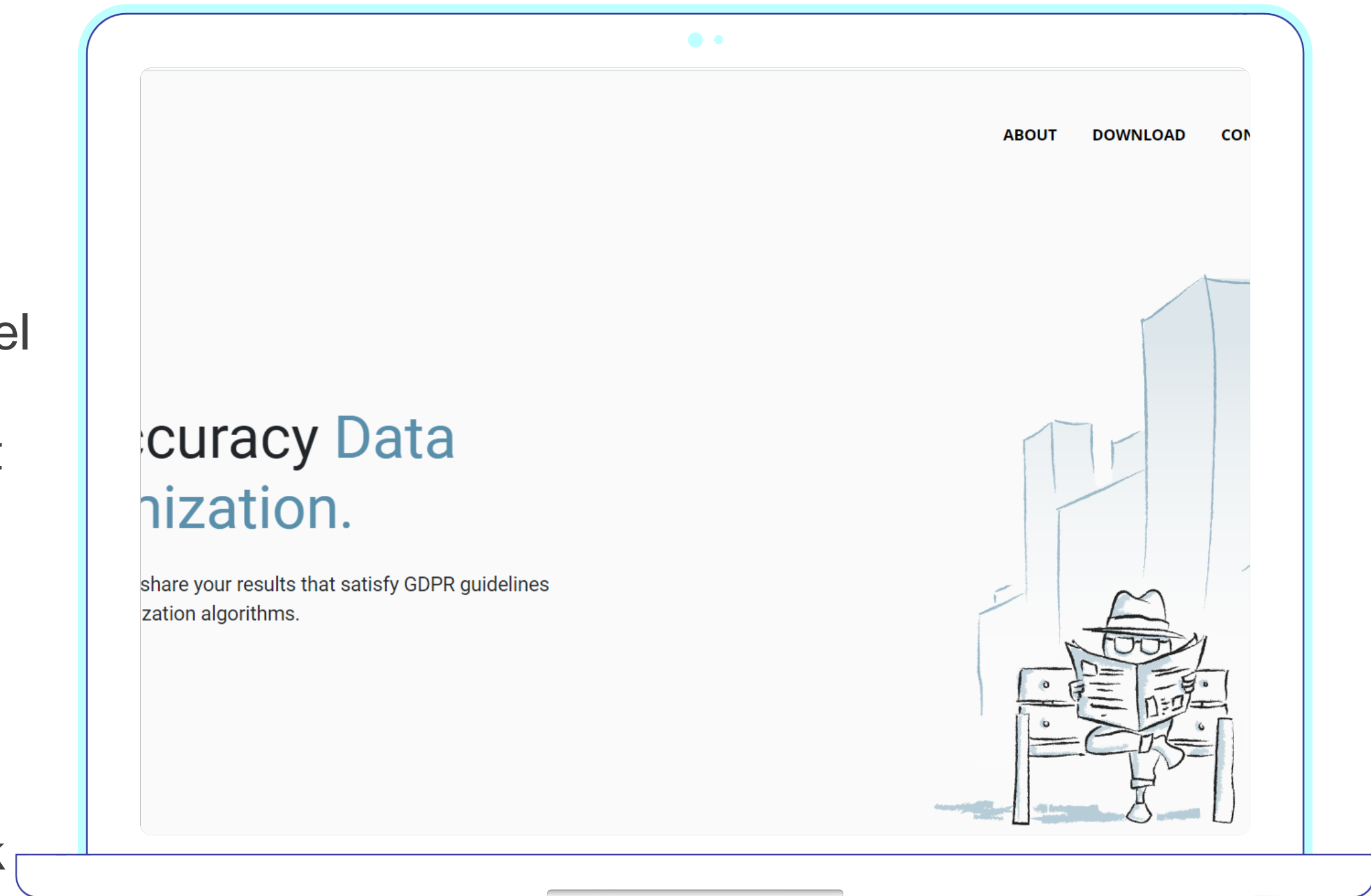
share your results that satisfy GDPR guidelines
zation algorithms.

THANK YOU

Manolis Terrovitis

mter@athenarc.gr

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