



Citizen Scientists
Investigating Cookies
& App GDPR Compliance

Complying with the general data protection regulation (GDPR): *How hard is it to design privacy-by-default?*

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School of Computing, Electronics & Mathematics



**“The Internet wasn't built to track people across websites:
... everything you do online is logged in obscene detail”**

(Manjoo, 2020)

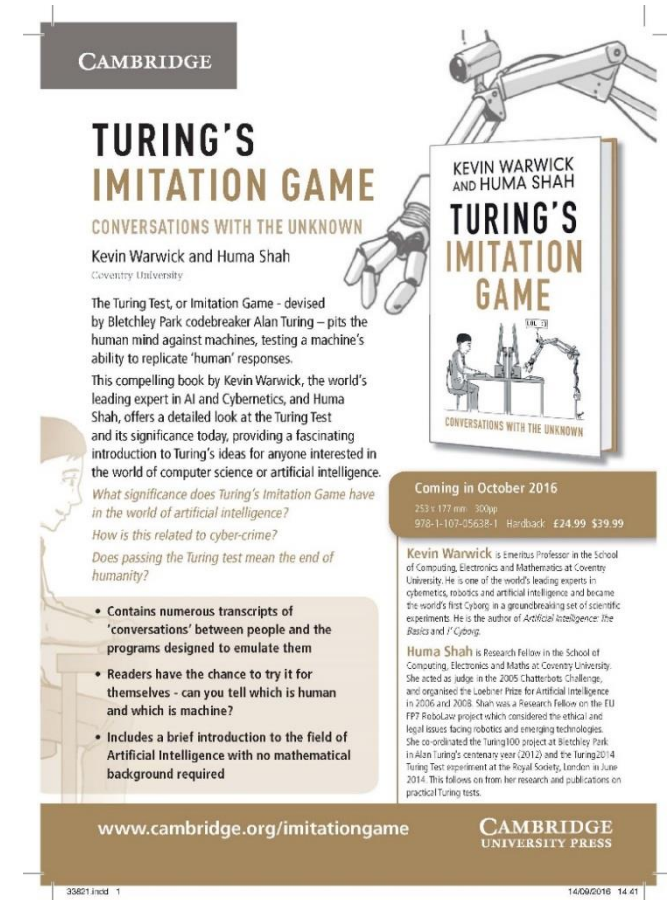
Today's talk

- Quick introduction about my previous work
- A brief look at the extent of the online privacy problem
- Relation to current project: EU H2020 **CSI-COP** R&I project
- €1.999m 30month; Jan 2020-June 2022

My Activities include....

- **Science Director** (Col), **EU Horizon2020 SwafS15-2019** project **CSI-COP** (Coventry University coordinating €2m eleven-partner international consortium – in grant agreement phase)
- **EU Horizon2020** project proposal **Reviewer**
- **International project proposal Reviewer**
- Reviewer Q1 journal *Computers in Human Behavior*
- **Member of the EU AI Alliance**
- Member of the **European Platform for Women Scientists (EPWS)**
- West London **STEM Ambassador**

Book:
published by
Cambridge University Press, 2016



20 Artificial intelligence (AI): Mari x

slideshare.net/LuminaryLabs/hype-vs-reality-the-ai-explainer/20-20Artificial_intelligence_AI_Marketing_term

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The big picture

Artificial intelligence (AI): Marketing term that describes a continuum of non-living analytical power, fueled by fast processing and data storage's declining costs. Applications today are termed *weak AI* (like IBM Watson), which are algorithms built to accomplish a specific task. *Strong AI* (like Skynet) is a term for hypothetical future applications that will replicate human intelligence.

Big data: Buzzword alluding to a machine's ability to generate insights and learn from massive data sets, because sensors, software, and recordkeeping generate a lot of data. For example, The Weather Company and IBM researched weather's impact on business by analyzing millions of data points from weather sensors, aircraft, smartphones, buildings, and vehicles.

Clip slide

Recommended

- Sign up for our free email course to learn about how you can secure your online store and maintain PCI compliance. Sucuri Inc. **Sponsored Content**
- Learning PowerPoint 2016 Online Course - LinkedIn Learning
- Educational Technology for Student Success Online Course - LinkedIn Learning
- Teaching Techniques: Project-Based Learning Online Course - LinkedIn Learning
- TEDx Manchester: AI & The Future of Work

20

17:48 20/10/2019

AI is not a marketing term!!!
It is a scientific field

https://www.slideshare.net/LuminaryLabs/hype-vs-reality-the-ai-explainer/20-20Artificial_intelligence_AI_Marketing_term

Tweets with replies by Turing2014 x

twitter.com/Turing2014/with_replies

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Turing2014
20.1K Tweets

Turing2014 @Turing2014 · Sep 25
Tweet below example of AI hype "how to implement #AI faster".

Manoj Suvarna @msuvarna · Sep 25
Still wondering how to implement #AI faster? Join #HPE #Nvidia and #BlueData at the #AISummit this week. Booth #510 #Unlockyourdata



18:17
29/09/2019

Promising
magic by
“unlocking
data”.


<https://twitter.com/msuvarna/status/1176936163581386752>

Cheat. Dress better.

Get new ideas for what to wear this autumn.
We combine expert stylists with clever A.I. to
find great clothes in your style, size and budget.

It's so easy it feels like cheating.

Shop over 500 brands and get £15 off
your first order at thread.com/tube

 **THREAD**

Clever AI?

Ad on Metropolitan Line
tube,
Thursday October 17,
2019

Artificial Intelligence meets Natural Stupidity

Article by **Drew McDermott**

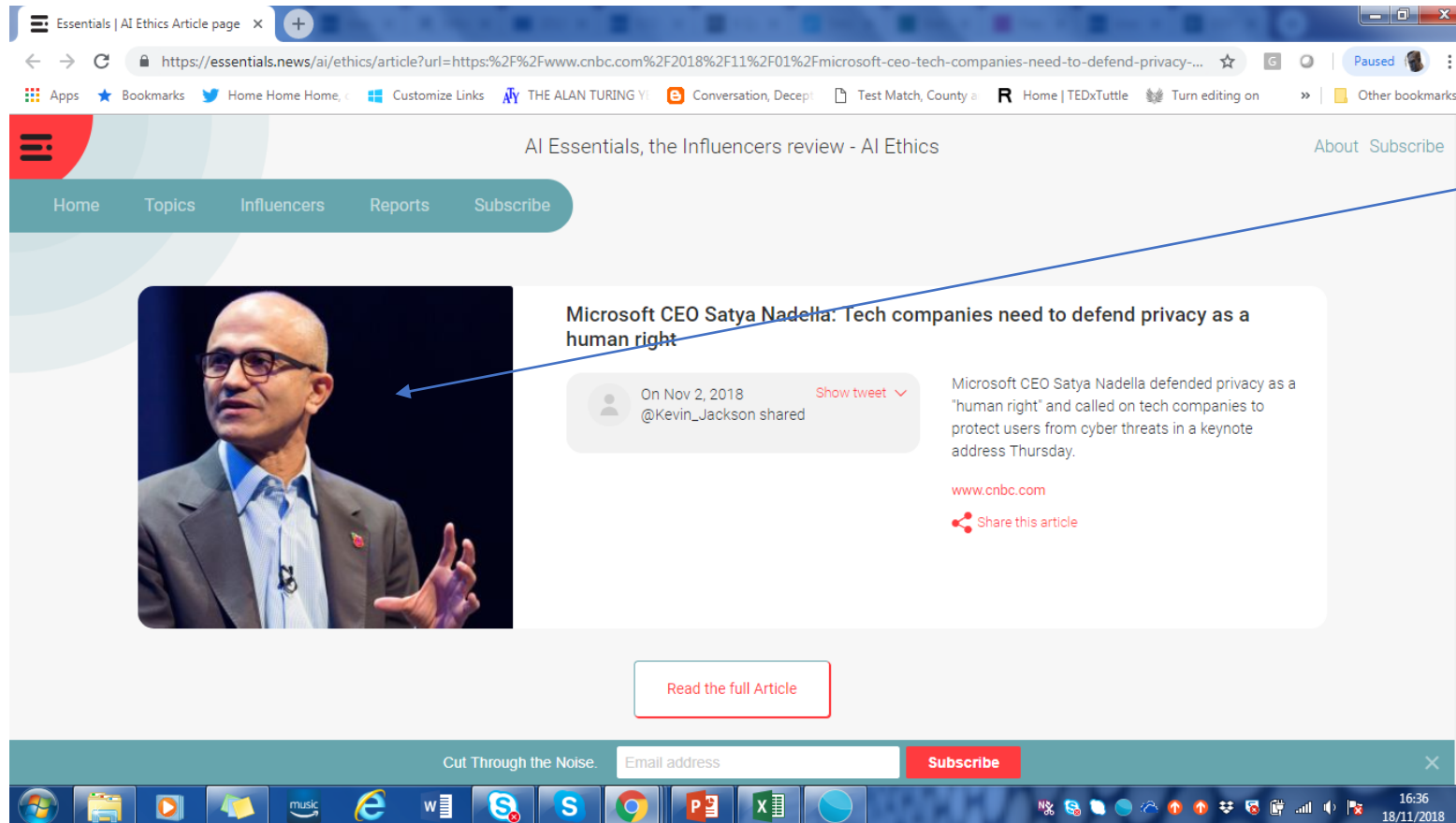
published in

ACM SIGART Bulletin Issue 57, April 1976: pages 4-9

Relevance of Turing's Question-answer test



Privacy is a human right



**Microsoft CEO
Satya Nadella:**

- “Tech companies
need to defend
privacy as a human
right”

Microsoft Privacy Statement

- **“Microsoft collects data from you, through our interactions with you and through our products.** You provide some of this data directly, and we get some of it by collecting data about your interactions, use, and experiences with our products. The data we collect depends on the context of your interactions with Microsoft and the choices you make, including your privacy settings and the products and features you use. **We also obtain data about you from third parties.”**

<https://privacy.microsoft.com/en-US/privacystatement#mainnoticetoendusersmodule>

Privacy as a fundamental right

- **“Privacy is a fundamental right:**
 - **Essential to autonomy**
 - **Protection of human dignity**
 - **Serving as the foundation upon which many other human rights are built.”**

<https://privacyinternational.org/explainer/56/what-privacy>

Logging by Cookies

- Digital cookies:
 - “... are small text files that websites place on your device as you are browsing”;
 - “... can store a wealth of data, enough to potentially identify you without your consent”;
 - “ ... are a primary tool that advertisers use to track your online activity so that they can target you with highly specific ads”

Link to GDPR EU Horizon2020 funded project for further information: <https://gdpr.eu/cookies/>



Cookies, the GDPR, and the ePrivacy Directive

Cookies are an important tool that can give



GDPR compliance is easier with encrypted email

[Learn more >](#)

GDPR Cookies, the GDPR, and the ePriv Privacy Policy - GDPR.eu

gdpr.eu/privacy-policy/

GDPR.EU

Home Checklist FAQ GDPR

Statistics

The website uses a minimal build of Google Analytics, a service which transmits website traffic data to Google servers in the United States and allows us to notice trends to improve the user experience on our website. This minimal build processes personal data such as: the unique User ID set by Google Analytics, the date and time, the title of the page being viewed, the URL of the page being viewed, the URL of the page that was viewed prior to the current page, the screen resolution, the time in local timezone, the files that were clicked on and downloaded, the links clicked on to an outside domain, the type of device, and the country, region, and city.

You may opt out of this tracking at any time by activating the “Do Not Track” setting in your browser.

Embedded content from other websites

Articles on the Website may include embedded content (e.g. videos, charts, etc.). Embedded content from other websites behaves in the exact same way as if the visitor had visited the other website.

These websites may collect data about you, use cookies, embed additional third-party tracking, and monitor your interaction with that embedded content, including tracing your interaction with the embedded content if you have an account and are logged in to that website.

<https://gdpr.eu/privacy-policy/>

We use cookies to ensure that we give you the best experience on our website. If you continue to use this site we will assume that you are happy with it. [Ok](#) [No](#) [Privacy policy](#)

Search here

12:18 PM 6/16/2020

“... website uses... Google Analytics, a service which transmits website traffic data to Google servers...”

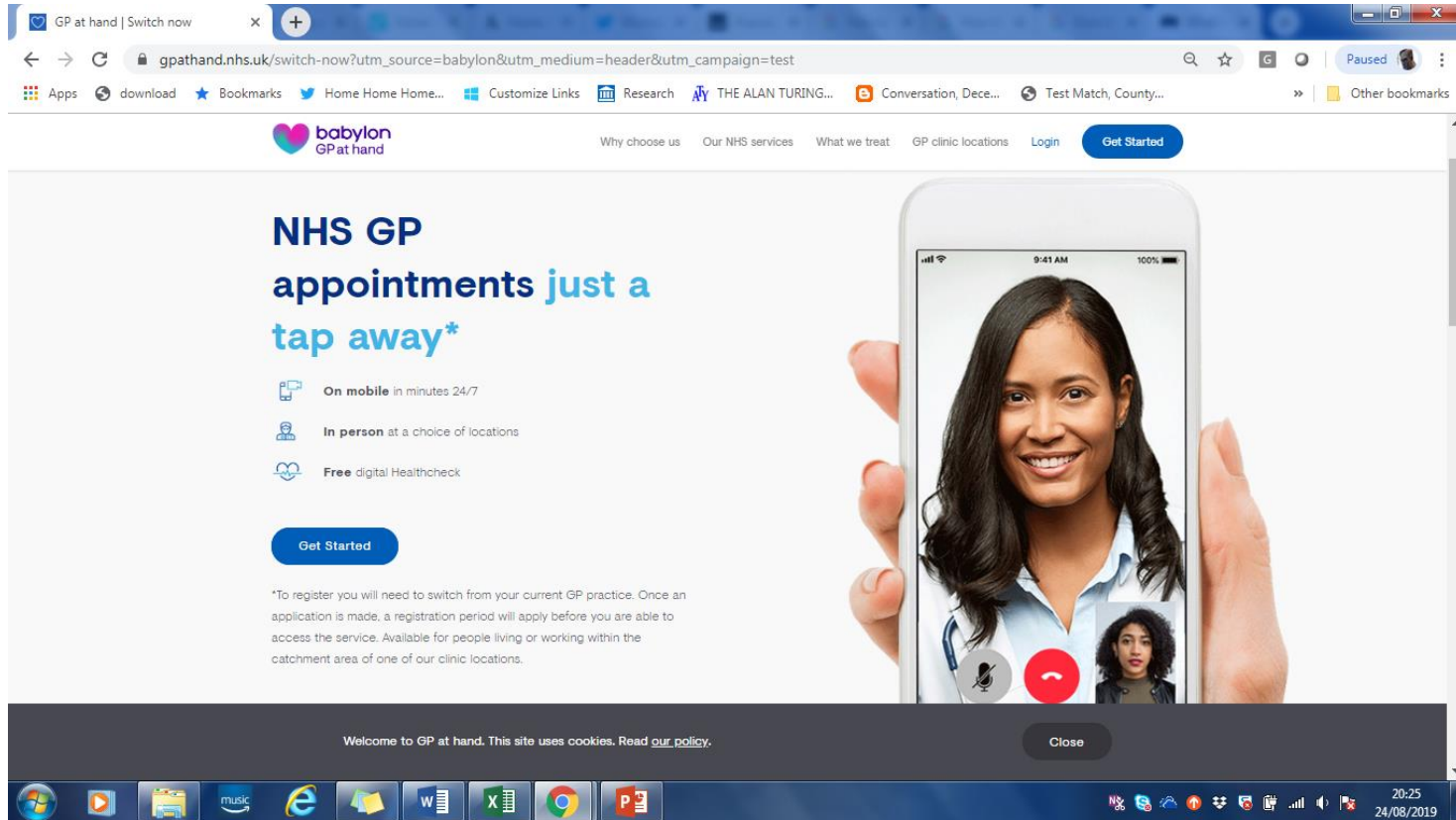
GDPR & *Informed Consent*

- Case study I give to my students:
 - Royal Free Hampstead NHS Trust collaboration with Google's DeepMind
- Powles and Hodson (2017) investigated first healthcare deals of Google's British-based artificial intelligence subsidiary, DeepMind Technologies Limited,¹ in the period between July 2015 and October 2016.
 - **“Google, the world's largest advertising company, that has long coveted the health market”**

Data Protection Officers and Data Protection

- Powles and Hodson (2017)
 - “... amount of **data transferred** [**millions of identifiable personal sensitive medical records**] is **far in excess of the requirements of those publicly stated needs..**”
 - “**None of the millions [the NHS Trust’s patients] in the dataset were either informed of the impending transfer to DeepMind, nor asked for their consent**”
 - “We do not know—and have no power to find out—**what Google and DeepMind are really doing with NHS patient data**, nor the extent of Royal Free’s meaningful control over what Google and DeepMind are doing”

Privacy and Smart Phone Apps

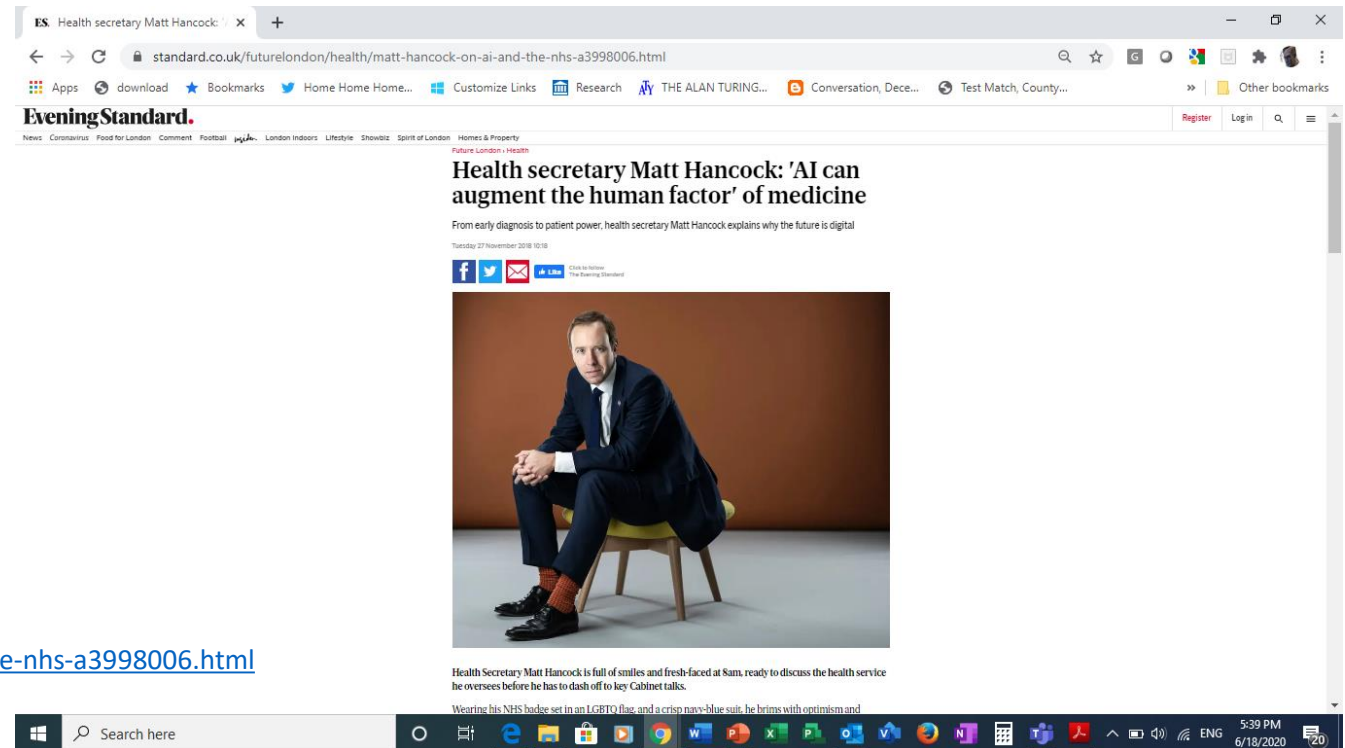


Babylon's “mission is to put an accessible and affordable health service in the hands of every person on earth”.

Babylon health app:
<https://www.babylonhealth.com/>

Babylon app and the UK Health Secretary

- Matt Hancock, current UK Secretary of State for Health:
 - Endorsed Babylon “private healthcare company in a sponsored newspaper supplement” (Syal, 2018).



<https://www.standard.co.uk/futurelondon/health/matt-hancock-on-ai-and-the-nhs-a3998006.html>

Babylon app data breach

- “... one of its [Babylon app] users discovered he had been given access to dozens of video recordings of other patients' consultations.” (Leo Kelion, BBC: 2020)
- “A follow-up check by Babylon revealed a small number of further UK users could also see others' sessions.” (Leo Kelion, BBC: 2020)

Effect of Babylon app data breach

- **“Babylon allows its members to speak to a doctor, therapist or other health specialist via a smartphone video call and, when appropriate, sends an electronic prescription to a nearby pharmacy. It has more than 2.3 million registered users in the UK.”**
- **“Leeds-based Rory Glover had access to the service via his membership of a private health insurance plan with Bupa, one of Babylon's partners.”**

Leo Kelion, 2020: <https://www.bbc.co.uk/news/technology-52986629>

Effect of Babylon app data breach contd.

- "... when he [Rory Glover] went to check a prescription, he **noticed** he **had about 50 videos in the Consultation Replays section of the app that did not belong to him.**"
- **"Clicking on one revealed that the file contained footage of another person's appointment."**
- "I was shocked," he told the BBC. "**You don't expect to see anything like that when you're using a trusted app.** It's shocking to see such a monumental error has been made."

[Leo Kelion, 2020: https://www.bbc.co.uk/news/technology-52986629](https://www.bbc.co.uk/news/technology-52986629)

Embedded Trackers in Smart Phone Apps

The screenshot shows the Exodus Privacy v1.2 interface. At the top, there are tabs for 'Exodus Privacy', 'Reports', 'Trackers', and 'Analysis'. The main header displays '5 trackers' and '26 permissions' for the app 'Babylon: online doctors & NHS GP at hand'. The app's version is 3.22.1.11049-armeabi-v7a, created by Babylon Health, with over 100,000 downloads. A 'Signed by' section shows the fingerprint, issuer, subject, and serial of the APK. Below this, the report is dated August 18, 2018. The 'Trackers' section lists five trackers: AppsFlyer, Facebook Login, Google Crashlytics, Google Firebase Analytics, and MixPanel. The 'Permissions' section lists 26 permissions, including ACCESS_COARSE_LOCATION, ACCESS_FINE_LOCATION, ACCESS_NETWORK_STATE, AUTHENTICATE_ACCOUNTS, BLUETOOTH, BROADCAST_STICKY, CAMERA, FLASHLIGHT, and GET_ACCOUNTS, each with a risk level (Dangerous or Normal).

5 trackers

26 permissions

Babylon: online doctors & NHS GP at hand

Version: 3.22.1.11049-armeabi-v7a
Creator: Babylon Health
Downloads: 100,000+ downloads

Other versions On Google Play APK fingerprint

Signed by:
Fingerprint: 39d94af68f7620a9ed4533201e8b1bb5539408e8
Issuer: countryName=UA, stateOrProvinceName=Odessa, localityName=Ukraine, organizationName=Ciklum, organizationalUnitName=Android, commonName=Eugene Dudnik
Subject: countryName=UA, stateOrProvinceName=Odessa, localityName=Ukraine, organizationName=Ciklum, organizationalUnitName=Android, commonName=Eugene Dudnik
Serial: 1389021976

This report was automatically issued on Aug. 18, 2018, 8:31 p.m..
This report was automatically updated on Aug. 18, 2018, 8:31 p.m..

5 Trackers

We have found **code signature** of the following trackers in the application:

- AppsFlyer
- Facebook Login
- Google Crashlytics
- Google Firebase Analytics
- MixPanel

A tracker is a piece of software meant to collect data about you or your usages. We do not guarantee the exhaustiveness of this list.

Here is the list of trackers signatures found by static analysis in this APK. This is not a proof of activity of these trackers. The application could contain tracker(s) we do not know yet. If you have doubts about this report, contact us at contact@exodus-privacy.eu.org.

26 Permissions

We have found the following permissions in the application:

Permission	Risk Level
ACCESS_COARSE_LOCATION (android.permission) <i>Access Approximate Location (Network-Based)</i>	Dangerous
ACCESS_FINE_LOCATION (android.permission) <i>Access Precise Location (GPS And Network-Based)</i>	Dangerous
ACCESS_NETWORK_STATE (android.permission) <i>View Network Connections</i>	Normal
AUTHENTICATE_ACCOUNTS (android.permission)	Normal
BLUETOOTH (android.permission) <i>Pair With Bluetooth Devices</i>	Normal
BROADCAST_STICKY (android.permission) <i>Send Sticky Broadcast</i>	Normal
CAMERA (android.permission) <i>Take Pictures And Videos</i>	Dangerous
FLASHLIGHT (android.permission)	Normal
GET_ACCOUNTS (android.permission) <i>Find Accounts On The Device</i>	Dangerous

Babylon health app has these **embedded trackers**:

Facebook Login
AppsFyer
Mixpanel
Google Firebase
Google Crashlytics

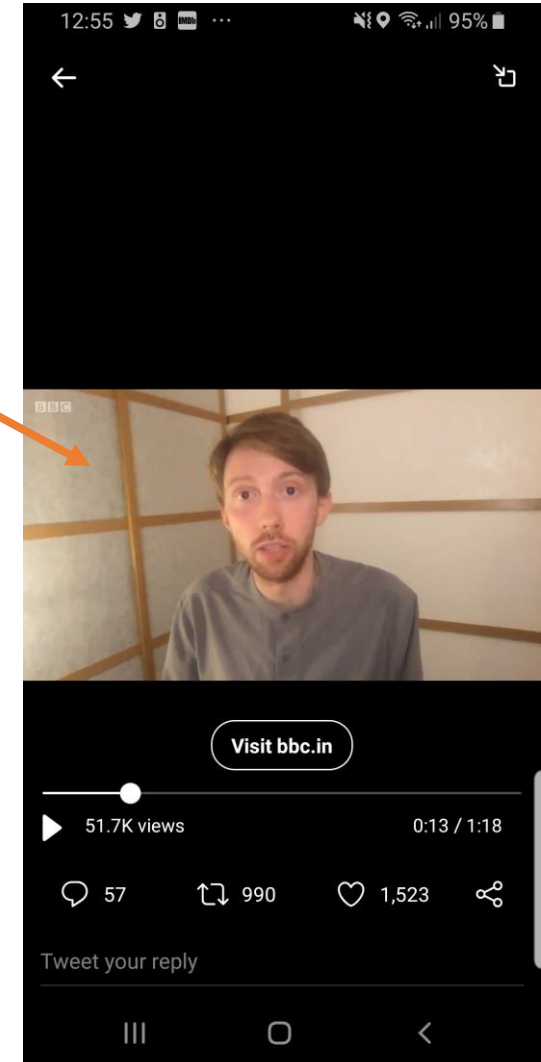
UK Daily Briefing Thursday 18 June

- Matt Hancock makes a comment about Apple re the **UK government contact tracing app**:
 - ‘...a "technical barrier" was hit when testing the NHS app on the Isle of Wight... **Android phones** (Google platform) **were far more compatible with it than Apple products.**’
<https://www.lbc.co.uk/news/watch-live-the-governments-coronavirus-press-conference/>
 - Isle of Wight trial used a **centralised app**: picked up only 4% of Apple iPhone users (Channel 4 news, 18 June 2020- Andy Davies’ item) !Apple’s architecture philosophy is privacy-preserving (**Michael Veale** UCL & Turing Institute).

Privacy & contact tracing apps

- Veale's team developed the technology that Google and Apple adapted into the decentralised approach to their joint contact tracing app.
- Veale's findings "already made it into university syllabi" (@mikarv 19/06.20)

<https://www.ucl.ac.uk/laws/people/dr-michael-veale>



**UCL's Dr Michael Veale on
BBC Newsnight: 18 June 2020**

Sensitive Personal Information and Privacy

- Menstruation data is being monetised:
 - “Out of 36 apps tested by *Privacy International **61% automatically transfer data to Facebook the moment a user opens the app.**”
 - “This happens whether the user has a Facebook account or not, and whether they are logged into Facebook or not”
 - “Menstruation apps are not just concerned with menstruation cycles”
 - [“Menstruapps – How to Turn Your Period Into Money \(For Others\)”](#), they collect information about your health, your sexual life, your mood and more ..”

* <https://www.privacyinternational.org/long-read/3196/no-bodys-business-mine-how-menstruation-apps-are-sharing-your-data>

Internet for tracking?

- Dr. Arvind Narayanan leads *Princeton's Web Transparency & Accountability Project* :

“The web is a cesspit of surveillance”

<https://www.cs.princeton.edu/~arvindn/>

<https://webtap.princeton.edu/>



Relation to CSI-COP project?

- EU H2020 (SwafS) programme funded research and innovation idea on an essentially AI ethics project
- 30-month 11-partner project: CU, UPAT, NaTE, TIL, UOULU, BIL, TDL, CTU, Stelar, IB, UAB:
<https://cordis.europa.eu/project/id/873169>
- Leverage citizen science methodology to co-investigate tracking on websites and in smart phone apps to create taxonomy of trackers

Citizen Scientists in CSI-COP

- Citizen scientists are volunteer enthusiasts who collaborate on real-world projects supporting research of professional scientists
- Citizen science contributes new knowledge through a variety of projects across many disciplines: space science, earth science, etc., see SciStarter: <https://scistarter.org/>

Informal Education in Online Privacy

- Free-to access and attend informal education in online privacy and informed consent:
 - MOOC
 - Workshops
- Outcome:
 - Cohort of CSI-COP citizen scientists engaged as a grass-roots movement motivated to investigate cookies in websites and on apps

Research -> Innovation

- **Trained CSI-COP citizen scientists** will record cookies they find in websites they visit, and apps they use
- **Co-develop taxonomy of different types of cookies** and embedded trackers (session, functional, necessary, performance, advertising, tracking, etc.)
- **Co-innovate** online knowledge resource – an accessible **repository of trackers** (think *Panama Papers*, or *UCL's Legacies of British slave-ownership online database*)

CSI-COP work completed

- Research:
 - Completed: produced/submitted open-access report (D2.1 M04 30 April 2020) on **best practices** in engaging, sustaining motivation, and **citizens' science** legacy. DOI: [10.5281/zenodo.3899478](https://doi.org/10.5281/zenodo.3899478)
 - Completed: submitted initial data management plan (DMP) (D1.7 M06 18 June 2020)

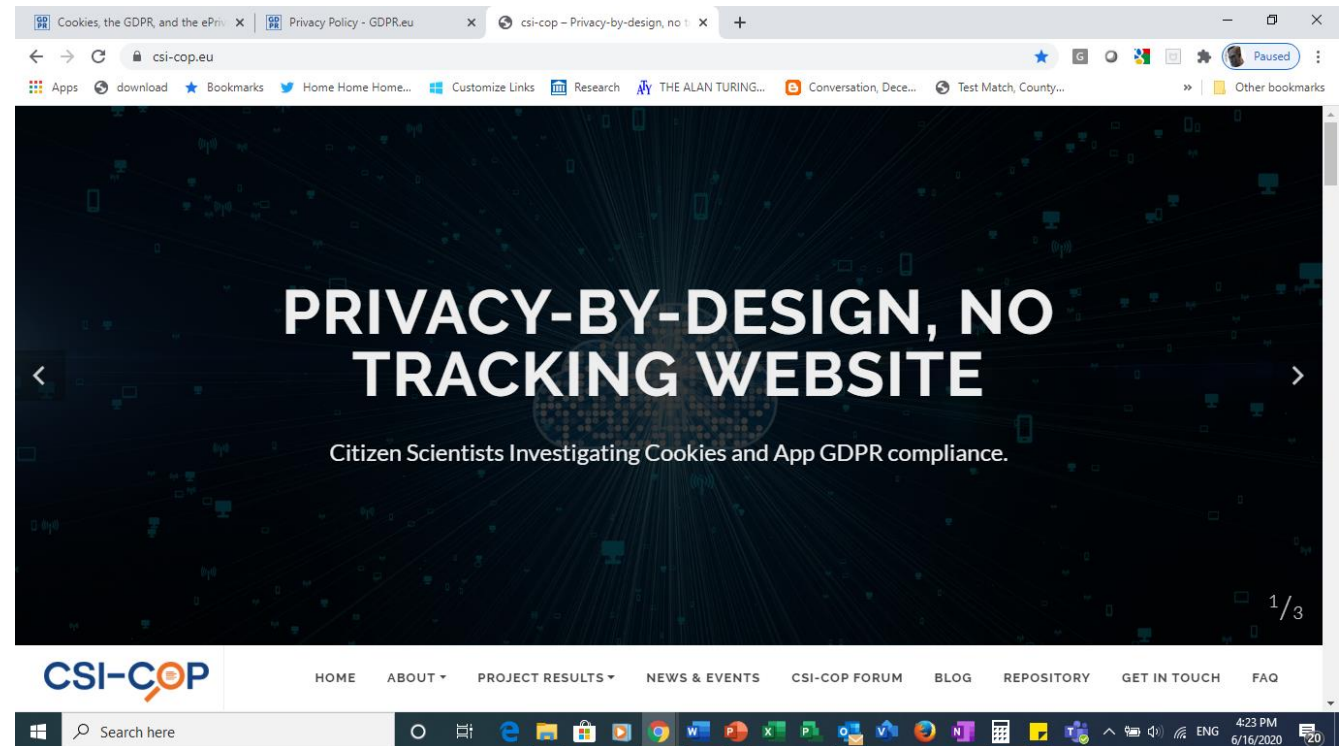
CSI-COP current research tasks

- Completed: exhaustive research to learn how previous citizen science projects have addressed **challenge of inclusivity**: balanced participation from gender, digital divide, socio-economic, geographical, immigrants/refugees (D2.2 due M06 30 June 2020)
- Underway: creating framework for inclusive CSI-COP citizen science engagement – due M09 (September 2020)

CSI-COP innovation work so far

- Innovation:

- Completed: project website: <https://www.csi-cop.eu>



CSI-COP website

- Philosophy:
 - Privacy-by-design
 - No-tracking website
- How:
 - Reverse engineer WordPress to extract embedded cookies that track visitors
 - Intention: trust between citizen scientists and other visitors to CSI-COP site


GDPR Cookies, the GDPR, and the ePriv x | Privacy Policy - GDPR.eu x | csi-cop - Privacy-by-design, no tr x +

csi-cop.eu

Apps download Bookmarks Home Home Home... Customize Links Research THE ALAN TURING... Conversation, Dece... Test Match, County... Other bookmarks

CSI-COP HOME ABOUT PROJECT RESULTS NEWS & EVENTS CSI-COP FORUM BLOG REPOSITORY GET IN TOUCH FAQ

Citizen Scientists Investigating Cookies and App GDPR compliance.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 873169

SITEMAP

- Home
- Our Team
- Consortium Partners
- Project Results
- News & Events
- Discussion Forum
- Repository
- Get In Touch

RECENT POSTS

REINFORCE citizen science project webinar on the 1st of June at 11AM CEST
13 May 2020

COVID-19 Contact Tracing and Privacy: Studying Opinion and Preference
13 May 2020

Analysis of the NHSX Contact Tracing App 'Isle of Wight' Data Protection Impact
13 May 2020

CSI-COP does not use any cookies that analyse traffic. CSI-COP applies privacy-by-design, no tracking across its website. Please select [here](#) to read CSI-COP 'Privacy statement' and addressing GDPR-compliance.

Search here

Windows taskbar: Search here, icons for various applications, system tray showing ENG, 4:23 PM, 6/16/2020, and a notification icon with 20.



CSI-COP Privacy notice

The philosophy of design for the CSI-COP website has been to develop each section (Home, About, etc.) and its sub-pages as privacy-by-default. We encourage our visitors to check the website below to learn that the CSI-COP website is GDPR compliant: <https://2gdpr.com/178757653>

The development has involved ensuring the website is free of tracking visitors' movement and navigation around CSI-COP pages. This means the CSI-COP website does not track from which website a visitor arrived on to a CSI-COP web page, nor does CSI-COP website monitor or record the 'session' of each visitor. To this end the CSI-COP website has no visitor tracking on its web pages.

<https://csi-cop.eu/privacy-policy/>

Does this mean the CSI-COP website carries no cookies (small text files, please see [FAQ](#) page and further information below) ? The site is forced to include a small number of cookies to function, although these do not result in a visitor being tracked.

Home Page

For example, on the Home page, there are 'third-party' requests from Google for use of its fonts. CSI-COP is the 'first-party' for the CSI-COP website. A 'third-party' means a party that is not related in any way with the first party, in this case, CSI-COP. The third-party requests relate to the fonts used on each of the pages on CSI-COP's website.

Why does CSI-COP use Google fonts? These were embedded in the WordPress template CSI-COP adopted to create its web

Scan results for csi-cop.eu

securityheaders.com/?q=csi-cop.eu&followRedirects=on

Apps download Bookmarks Home Home Home... Customize Links Research THE ALAN TURING... Conversation, Dece... Test Match, County... Other bookmarks

Security Headers Home About Donate


Sponsored by Report URI

Scan your site now

csi-cop.eu Scan

☐ Hide results ☒ Follow redirects

Security Report Summary



Site:	https://csi-cop.eu/
IP Address:	194.66.38.12
Report Time:	18 Jun 2020 19:41:45 UTC
Headers:	<div><div>✓ Strict-Transport-Security</div><div>✓ Content-Security-Policy</div><div>✓ Feature-Policy</div><div>✓ X-Frame-Options</div><div>✓ Referrer-Policy</div><div>✓ X-Content-Type-Options</div></div>

Supported By

Windows Search here


8:42 PM 6/18/2020

Scan results for bbc.co.uk

securityheaders.com/?q=bbc.co.uk&followRedirects=on

Apps download Bookmarks Home Home Home... Customize Links Research THE ALAN TURING... Conversation, Dece... Test Match, County... Other bookmarks

Security Headers

Sponsored by  Report URI


Home About Donate

Scan your site now

bbc.co.uk **Scan**

☐ Hide results ☒ Follow redirects

Security Report Summary



Site:	https://www.bbc.co.uk/
IP Address:	212.58.233.252
Report Time:	18 Jun 2020 19:52:53 UTC
Headers:	<div><div>✓ X-Frame-Options</div><div>✗ Strict-Transport-Security</div><div>✗ Content-Security-Policy</div><div>✗ X-Content-Type-Options</div><div>✗ Referrer-Policy</div><div>✗ Feature-Policy</div></div>

Supported By

Windows Search here

8:53 PM 6/18/2020

<https://www.bbc.co.uk/>

ONS website: <https://www.ons.gov.uk/>

The screenshot shows a web browser window with the URL `securityheaders.com/?q=https%3A%2F%2Fwww.ons.gov.uk%2F&followRedirects=on`. The page has an orange header with the "Security Headers" logo, "Sponsored by Report URI", and navigation links "Home", "About", and "Donate". The main content area is orange and features the text "Scan your site now" above a search bar containing `https://www.ons.gov.uk/` and a "Scan" button. Below the search bar are checkboxes for "Hide results" (unchecked) and "Follow redirects" (checked). The "Security Report Summary" section is in a light blue box and includes a large orange "D" icon, the site URL, IP address, report time, and a list of headers with their status (green for good, red for bad).

Security Headers
Sponsored by **Report URI**

Home About Donate

Scan your site now

`https://www.ons.gov.uk/` **Scan**

☐ Hide results ☒ Follow redirects

Security Report Summary

D

Site: <https://www.ons.gov.uk/>

IP Address: 2606:4700:10::ac43:22a8

Report Time: 22 Jun 2020 16:30:54 UTC

Headers:

- ✓ Strict-Transport-Security
- ✓ X-Frame-Options
- ✗ Content-Security-Policy
- ✗ X-Content-Type-Options
- ✗ Referrer-Policy
- ✗ Feature-Policy

Supported By

Windows taskbar: Search here, icons for Edge, File Explorer, Store, Photos, Chrome, Word, PowerPoint, Excel, Outlook, Teams, OneDrive, Calculator, and system tray showing 5:30 PM on 6/22/2020.

Other main CSI-COP activities

- **Citizen science- Stakeholder cafés:** platform to discuss data protection and privacy issues in digital technologies
- **Parent-Teacher Round-tables** with invited CSI-COP citizen scientists explaining their experiences on discovering trackers embedded in website cookies and apps.
- **Pro-privacy champions** arising from the citizen scientists in CSI-COP connected to the university partners and engaged for Outreach events promoting data protection (project legacy)
- **Working group** created from the partners to maintain and update the repository for maximum use to better inform the public on digital tracking and reduce the problem of tracking-by-default through advocating pro-privacy software development

Indicators to Measure CSI-COP Impact

- Impact measures from MoRRI & UNSDG indicators include:
 - **Gender equality** (GE): Balanced recruitment of male, female and other gender citizen scientists
 - **Science Literacy and education** (SLSE): Responsible Research and Innovation (RRI) Training ; Science communication through informal education into GDPR
 - **Ethics** (E) Ethics at the level of the University and other partners in CSI-COP consortium
 - **Public Engagement** (PE): various
 - **Open Access** (OA): Open Access to research and to CSI-COP's Innovation
 - **Partnership for Goals**: Encourage and promote effective public, public-private and civil society partnerships

Expected Impacts

- Impact on Responsible Research and Innovation (RRI)
- Development of new knowledge and innovations by citizen scientists
- Impact on the science: GDPR compliance
- Other impacts include:
 - Screen time
 - Staying safer online
 - Upskilling the public and educators

References

- CSI-COP EU Cordis page: <https://cordis.europa.eu/project/id/873169>
- CSI-COP website: <https://www.csi-cop.eu>
- Manjoo, F. (2020). 'I Visited 47 Sites. Hundreds of Trackers Followed Me'. *New York Times*. Accessed June 1, 2020 from here: <https://www.nytimes.com/interactive/2019/08/23/opinion/data-internet-privacy-tracking.html>
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Thank you listening

Any questions?