Australia's National Science Agency





Is It a Trap? A Large-scale Empirical Study And Comprehensive Assessment of Online Automated {Privacy Policy Generators} for Mobile Apps

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CSIRO's Data61

Examples of privacy policies

🔿 Meta

Privacy Center

Manage your accounts Accounts Center

>

 \wedge

- 6 **Privacy Center home**
- Q Search
- ᠿ Privacy Policy
 - What is the Privacy Policy and what does it cover?
 - What information do we collect?
 - How do we use your information?
 - How is your information shared on Meta Products or with integrated partners?
 - How do we share information with third parties?
 - How do the Meta Companies work together?
 - How can you manage or delete your information and exercise your rights?
 - How long do we keep your information?



Facebook/Meta > 20,000 words

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Privacy Policy

This is the general privacy policy of my applications which is applicable to all the apps that I have on Google Play Store

Privacy Policy explains

- What information we collect and why we collect it
- How we use that information
- o The choice we offer, including how to access and update information

Important:

All the permissions mentioned below are made us optional, that is, it is NOT mandatory for users to give these permissions for the apps to work. However, in case if the user wants to customize the apps, then they need to give these permissions.

We do NOT collect any information about user account or user location or any such information. No personal information of User is obtained or stored anywhere.

Permissions

The permissions that the app requires are explained in each application. As mentioned above NONE of these permissions are mandatory

For any further queries, please do email me at developer contact email address

Easy Communication 1k installs, 156 words



The privacy policy is the **pivot** of current software privacy ecosystem



The privacy policy is the **pivot** of current software privacy ecosystem



Privacy Policies are commonly problematic!

POLIGRAPH: Automated Privacy Policy Analysis

Detection of Inconsistencies in Privacy Practices of Browser Extensions

https://w

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ar



Scrutinizing Privacy Policy Compliance of Virtual Personal Assistant Apps

Abstract—All major provide additional funct experience while the exte during their web browsi U

Fuman Xie University of Queensland Australia

Suwan Li Nanjing University China

Polisis: Automated Analysis and Presentation of Privacy Policies Using Deep Learning

Hamza Harkous, École Polytechnique Fédérale de Lausanne (EPFL); Kassem Fawaz, University of Wisconsin-Madison; Rémi Lebret, École Polytechnique Fédérale de Lausanne (EPFL); Florian Schaub and Kang G. Shin, University of Michigan; Karl Aberer, École Polytechnique Fédérale de Lausanne (EPFL)

https://www.usenix.org/conference/usenixsecurity18/presentation/harkous



Motivation (1/3)

Where did those problematic privacy policies come from?

		OR Metro Privacy Center Manage your accounts Accounts Center		y Policy and what does	
		Privacy Center home O Search is collected and used by as to support a range of different activity hould also be understood to include uses of your personal data the			d how we use and share it. bu use Meta Products in
	Purpose	The Personal Information We Collect	a ser reason reasoning represente a comp	and and on projects (see	d transfer information. We pful examples and simpler led links to resources
McDonald's coll • use our webs (Website); • use our mobi	lects personal information sites (including <u>www.mcd</u> ile and tablet Apps (Apps)		iternal websites or intranet	than purposes	ratso show you where you bu use. You can update
Collection Char Privacy PC	nnels).	nformation by any other means. Including	either physically or s, delivery you and other wring general	ere. Services, in order to fulfil basic the order status and shipping conspriate local website, language.	
	ЛСу		we collect lebsite or App, ed and your Apps, through	al, instant chat, and our customer It and the Services; e product advice and to allow you to	-
	Games Online SERVICES PRIVA dated: August 15, 2021	ICY NOTICE	operating ir corporate shining modules d, and other s and times,		
to as "w the pers	tice explains how Hamza Games e" in this notice) collects, stores, sonal data of end users of our Se d to as "you" in this notice), and	uses, or otherwise processes rvices as defined below			
	ressing your personal data.	and a point of the			



Motivation (2/3)

≡	Soogle Play Console	Q Search Play Console	c> (?)	Data Safety Report Generator	t.
e	Deep links	← App content			
Qua	lity	Privacy policy			
, 🗐	Ratings and reviews				
· 10	Android vitals	Add a privacy policy to your Store Listing to help provide transparency about how you treat sensitive use			
Mon	etise	You must add a privacy policy if your target audience includes children under the age of 13. Check the <u>u</u> violations.	i <u>ser data policy</u> to avoid common		
, Ĕ	Products	Privacy policy URL			
즈	Price experiments	Enter a URL, for example https://example.com/privacy			
四	Promo codes				
, (\$)	Financial reports				
()	Monetisation setup				
Polic	y and programmes				
\odot	Policy status				
0	App content				
	Teacher approved	© 2024 Google · Mobile app · Status Dashboard · Terms of Service	Privacy - Developer Distribution A	<u>sgreement</u>	

Developers publish and manage their apps in the Google Play Console.



Motivation (3/3)



 They may <u>copy-paste-modify</u> existing privacy policies, ad-hoc.

2. Ask ChatGPT to generate one.

3. Maybe something else?



Legal knowledge

and resource

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Online Automated Privacy Policy Generator (APPG) as the Solution

Privacy Policy Generator	
What kind of personal information de	o you collect from users?
Click all that apply	
Email address	
First name and last name	
Phone number	
Address, State, Province, ZIP/Postal co	de, City
Social Media Profile information (ie. from With Twitter)	n Connect with Facebook, Sign In
Others	
Others	
Select additional information you col (mobile/tablet)	llect from a device
Select additional information you col (mobile/tablet)	llect from a device
Select additional information you col (mobile/tablet)	llect from a device
Select additional information you col (mobile/tablet) Skip selecting an option if none apply to you	llect from a device
Select additional information you col (mobile/tablet) Skip selecting an option if none apply to you Location (GPS)	llect from a device
Select additional information you col (mobile/tablet) Skip selecting an option if none apply to you Location (GPS) Phonebook (Contacts list)	llect from a device



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Online Automated Privacy Policy Generator (APPG)



(c) #3 Termly, questionnaire-mode

(d) #10 Lawpath, document-mode



Methodology



Data Collection

Data Processing

Data Analysis



			Create custom service	Most frequent services
CATEGORIES	_			✓ Contact form
CATEGORIES		Q Type here to filter	1	Facebook acc
All	1901			Facebook Lik
Access to third-party acco	16	G fabulous-deals.com	Pro +	Google Analy
Advertising	1129	152 Media		Google Analy Google Fonts
	100	G 152 Media	Pro +	
Advertising serving infras	4	③ 1Agency	Pro +	Google Maps
Analytics	99	© 1plusX	Pro +	Google Tag M Mailing list
Backup saving and management	6	2Checkout	_	Twitter Twee
Beta Testing	5		Pro +	
Building and running @(thi	1	© 33Across	Pro +	Services added
Collection of privacy-rela	2	③ 360 E-Com	Pro +	✓ Contact form
Commercial affiliation	38	③ 3BMeteo widget	+	
Connecting Data	3	© 3Q	Pro +	
Contacting the User	7	42 Ads 4	m +	
Content commenting	6	③ 4Dem	+	
Content performance and fe	8	4Dem Landing Page Builde	er +	
Data transfer outside of t	4	③ 4Dem Marketing Automati	ion Pro +	
Data transfer outside the EU	4	4Dem Widget		

UI-mode

New Document * Favourites Popular New business Existing business Online business Personal math	ers Employment & HR Others	Privacy Policy	хq
Search results for "Privacy Policy" [84]		e App. Privacy Policy	ά×
12 GDPR Privacy Policy		Ite App Privacy Policy allows you to communicate to customers and users how your ation collected.	application collects and uses the
12 Employee Privacy Policy	B Dor	e in under 5 minutes 🔅 Last updated 17 Mar 2023 🖏 Suitable for all Australian	states and territories
12. Employee Privacy Policy	Docum	ent Summary	
☆ Mobile App Privacy Policy	+ App Pri increase	bile App Privacy Policy not only covers your application, but also user interaction w wavy Policy tells customers and users how your application collects and uses the link ingly custious about personal information being collected while using applications, i vacy Policy to give your customers and users confidence in your application.	ormation collected. As people are
🔆 Offline Privacy Policy		ry be required to have a Mobile App Privacy Policy to stay compliant with the Privacy ex. This compliance will not only ensure that you stay within the legal parameters bu	
1 NDIS Privacy Policy	+	splication rejected during the submission process. s Mobile App Privacy Policy If:	
2 Privacy Policy		developed an application and want to tell customers and users how their informatio loss the Mobile App Privacy Policy cover?	on is collected and used.
☆ Cookle Policy	+ Use	ection of personal information; of personal information; iosure of personal information;	
1 Information Security Policy	. Coo	utity of personal information; kies; d parties access to personal information;	
් Surveillance Policy		-location; and out right.	
Str Security Policy (Cybersecurity)	Priva	names for Mobile App Privacy Policy Include: acy Statement; and Privacy Statement.	
☆ Annual Leave Policy	+	er to include a Privery Policy for my another the second terms of te	

Document-mode



# and APPG Name	Excent of Data Life			<u>10 APPG</u>	ort	GDPR			Malifuegual Support	Readability
#1 Iubenda	•	O	•	•	•	•	•	•	•	0
#2 App Privacy Policy Generator	O	0	0	0	O	0	0	0	0	•
#3 Termly		O	•	•	•	•	•	0	0	•
#4 Privacy Policies	0	0	0	lacksquare	•	•	•	0	0	0
#5 App Privacy Policy	0	0	0	0	•	0	0	0	0	O
#6 Privacy Policy Online	0	0	0	0	•	0	0	0	0	O
#7 Terms Feed	0	O	0	\bullet	•	•	•	0	0	0
#8 Website Policies	•	•	O	•	•	•	•	0	0	0
#9 Free Privacy Policy	0	0	0	O	•	•	•	0	0	0
#10 Lawpath	0	0	•	0	0	0	0	0	0	O



# and APPG Name			rization of		ort	1		1	antimenal Support	Pesdability
#1 Iubenda		D	•	•	•		•	•	•	0
#2 App Privacy Policy Generator	0	0	0	0	O	0	0	0	0	•
#3 Termly	•	O	•	•	•	•	•	0	0	•
#4 Privacy Policies	0	0	0	O	•		•	0	0	0
#5 App Privacy Policy	0	0	0	0	•	0	0	0	0	O
#6 Privacy Policy Online	0	0	0	0	•	0	0	0	0	O
#7 Terms Feed	0	0	0	O	•	•	•	0	0	0
#8 Website Policies	•	•	O	•	•	•	•	0	0	0
#9 Free Privacy Policy	0	0	0	O	•		•	0	0	0
#10 Lawpath	0	0	•	0	0	0	0	0	0	O



	Table 2: T	he characte	rization of 1	0 APPGs	on 10 differe	ent din	nensio	ns.		
# and APPG Name					ort		cors		NUILINESON SUPPORT	Readability
#1 Iubenda		D	•	•	•	•	•	•	•	0
#2 App Privacy Policy Generator	0	0	0	0	O	0	0	0	0	•
#3 Termly	•	O	•	•	•		•	0	0	•
#4 Privacy Policies	0	0	0	O	•	•	•	0	0	0
#5 App Privacy Policy	0	0	0	0	•	0	0	0	0	O
#6 Privacy Policy Online	0	0	0	0	•	0	0	0	0	O
#7 Terms Feed	0	O	0	O	•	•	•	0	0	0
#8 Website Policies	•	•	O	•	•	•	•	0	0	0
#9 Free Privacy Policy	0	0	0	O	•	•	•	0	0	0
#10 Lawpath	0	0	•	0	O	0	0	0	0	O
(: low level / do	es not support	; () : intermedi	ate level / pa	artially support;	: high	level / f	ully suj	port	



App's basic information	1	2	3	4	5	6	7	8	9	10
Name of the app	•	•	•	٠	•	•	٠	•	•	٠
Name of the developer	•	•	٠	•	0	0	•	•	•	٠
State/Country of the developer	0	0	٠	•	•	•	٠	0	٠	٠
Physical address of the developer	•	٠	٠	٠	0	0	•	•	٠	٠
Email address of the developer	•	٠	٠	•	٠	•	٠	•	٠	٠
Phone number of the developer	0	٠	٠	٠	0	0	٠	0	٠	0
Customizable policy effective date	•	٠	٠	0	0	0	0	0	0	٠
Users' personal information	1	2	3	4	5	6	7	8	9	10
Users' general personal information										
Name	•	٠	٠	٠	0	0	٠	٠	٠	0
Age group* (adulthood or underage)	•	0	٠	0	0	0	0	٠	0	0
Phone numbers	•	٠	•	٠	0	0	٠	•	٠	0
Email address	•	٠	٠	•	0	0	٠	•	•	0
Residential addresses	•	٠	٠	٠	0	0	٠	0	•	0
Users' sensitive personal information										
Health data	•	0	٠	0	0	0	0	٠	0	0
Biometric data	•	0	٠	0	0	0	0	٠	0	0
Gender data	•	0	٠	0	0	0	0	0	0	0
Information revealing race or ethnic origin	0	0	٠	0	0	0	0	٠	0	0
Government identifiers (e.g., medical card number)	•	0	•	0	0	0	0	٠	0	0

Device permissions	1	2	3	4	5	6	7	8	9	10
Calendar permission	•	0	٠	0	0	0	0	0	0	0
Camera permission	•	0	٠	٠	0	0	٠	0	٠	0
Contacts permission	•	0	٠	٠	0	0	٠	•	٠	0
Location permission	•	0	٠	٠	0	0	٠	٠	•	0
Microphone permission	•	0	٠	0	0	0	0	0	0	0
Phone permission	•	0	٠	0	0	0	0	0	0	0
Sensor permission	•	0	•	0	0	0	0	0	0	0
SMS permission	•	0	٠	0	0	0	0	0	0	0
Storage permission	•	0	•	0	0	0	0	0	0	0
Selected third-party services	1	2	3	4	5	6	7	8	9	10
Facebook account access	•	٠	•	0	0	0	0	٠	0	0
Twitter account access	•	0	•	0	0	0	0	•	0	0
Google Analytics for Firebase	•	٠	٠	٠	0	0	٠	٠	•	0
Flurry Analytics	•	٠	٠	٠	0	•	٠	•	•	0
AdMob	•	٠	٠	٠	0	•	٠	٠	٠	0
Statistic summary	1	2	3	4	5	6	7	8	9	10
Minimum multiple-choice questions	/	4	58	7	2	5	7	38	7	/
Maximum multiple-choice questions	1	5	79	26	2	5	26	63	26	1
Minimum completion questions	1	4	11	2	2	3	2	2	2	1
Maximum completion questions	1	4	76	22	2	3	22	13	22	1

The breakdown of APPG's recognition of data use.



RQ2: The Prevalence of APPGs in Market

Method	Market Occupancy				
Fingerprint Keyword Searching	6.6% (3,066)				
Document Similarity Comparison	18.1% (8,425)				
Intersection	4.4% (2,042)				
Union (Total)	20.1% (9,332)				

The market occupancy ratio of 10 examined APPGs is around **20.1%!**

https://www.<mark>termsfeed</mark>.com/live/e4dcca9a-552d-4fb5-be2a-b4a37967d077

Fingerprint Keyword Searching

Contact Us

If you have any questions about this Privacy Policy, You can contact us:

• By email: 123

Generated using TermsFeed Privacy Policy Generator



1

RQ2: The Prevalence of APPGs in Market

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RQ3: The **Compliance** of APPGs against Regulations

Table 6: Tallies of the APPGs' compliance against legal requirements in privacy regulations. The individual requirements of LGPD are shown in Table 5. "N.R." stands for "no record". The enforcement date of LGPD is September 2020.

#	May'20	GDPR Jan'21	May'22	May'2	CCPA 0 Jan'21		LGPD May'22
1	8/8	8/8	8/8	14/18	14/18	14/18	8/8
2	N.R.	N.R.	3/8	N.R.	N.R.	3/18	3/8
3	8/8	8/8	8/8	3/18	15/18	15/18	6/8
4	8/8	8/8	8/8	5/18	16/18	16/18	6/8
5	N.R.	N.R.	0/8	N.R.	N.R.	2/18	1/8
6	N.R.	N.R.	0/8	N.R.	N.R.	2/18	1/8
7	8/8	8/8	8/8	5/18	16/18	16/18	6/8
8	N.R.	N.R.	8/8	N.R.	N.R.	11/18	5/8
9	8/8	8/8	8/8	5/18	16/18	16/18	6/8
10	N.R.	N.R.	2/8	N.R.	N.R.	2/18	4/8

Table 7: The disclosure existence of seven fundamental data rights. Numbers in the first row indicate APPGs as per Table 1, and "Apps" denotes the tallies of disclosure for 12 leading onne

apps.								
Data Right	2	3	4	5 6	7	8	9	10 Apps
Right to Know	×	r	1	x x	1	1	1	✔ 12/12
Right to Access	×	r	1	x x	1	1	1	✔ 12/12
Right to Processing	×	r	1	x x	1	1	1	✗ 12/12
Right to Restrict of Processing	×	r	1	x x	1	1	1	✗ ∥ 12/12
Right to be Forgotten	×	r	1	x x	1	1	1	✔ 12/12
Right to Data Transfer	×	r	1	x x	1	1	1	✗ 12/12
Right to Lodge a Complaint	×	r	1	x x	1	1	1	✔ 12/12

Table 8: The disclosure existence of five highly concerning privacy practices. Numbers in the first row indicate APPGs as per Table 1, and "Apps" denotes the tallies of disclosure

for 12 leading apps.

Privacy Practice 1	2	4 5 6 7
Data Encryption	1	<pre></pre>
Government Requests	×	<
Data Breach Notification	×	< x x x x
Changes Notification	×	<pre></pre>
	_	

aung apps.									
actice	1	2		4	5 6	7	8	9	10 Apps
ption	~	1	r	1	XX	1	1	1	✔ 8/12
t Requests	~	x	ſ	1	XX	1	1	1	X 11/12
h Notification	X	x	ſ	×	XX	x	1	x	X 1/12
otification	~	x	ſ	1	x x	1	1	1	✗ ∥ 12/12



The #2 App Privacy Policy Generator is the most popular one, boasting a 72.7% adoption rate. Users tend to select easy-to-use APPGs even though at the cost of a potentially-higher risk to breach privacy regulations.



Conclusions – Automated Privacy Policy Generators (APPG)

- **1. [Usability]** APPGs are a handy solution for developers to draft privacy policies for their apps. They have various features and characterizations.
- 2. [Market Penetration] The market occupancy ratio of 10 examined APPGs is around 20.1%. Users tend to select easy-to-use APPGs even though at the cost of a potentially-higher risk to breach privacy regulations.
- **3. [Noncompliance]** Noncompliance with privacy laws and under-claiming issues indicate potential need for a more stringent evaluation of APPGs' capabilities.
- 4. [APPG Mode] Questionnaire mode can better guide users to include claimed device permissions compared to UI mode.
- 5. [Privacy Policy Contradiction] More privacy policy contradiction issues exist in APPG-based privacy policies.



Implications and Findings to Stakeholders

• App developers/APPG users: While app developers may benefit from using APPGs to create privacy policies more efficiently, they should be aware of APPGs' latent limitations.



• APPG providers: Our analysis suggests APPG providers should work on improving recognised data use, since the majority of APPGs on the market only provide a very limited scope of personal information and device permissions.



 Privacy regulators: Regulators should recognize the importance of this issue and be engage with this emerging market trend.





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Thanks for your listening!



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