In this paper, we perform a survey of n = 34 Amazon skill developers, finding that many have limited understandings the policy requirements.

Recruitment

8 developers developed 1-2 skills and 10 developed over 10 skills. 8 developers also have the experience developing Google actions. 29 developers are male. Most of developers are in age of 26-45. For developing language, 15 developers use javascript and 9 use the python. For question where to host skills, 21 developers use alexa-hosted amd 11 use their own endpoint.

8 Are you aware that there are some platform required policies? (content guidelines and privacy requirements, e.g., not selling any products to kids, not publishing skills containing profanity or sexually explicit content.)

22 complete aware

11 somewhat aware

1 somewhat unaware

9 Do you read the Alexa required policies (prohibited content and behaviors) before developing skills?

8 always

9 most

3 half

11 sometimes

3 never

10 Do you think any of these policies are clear or ambiguous for you? (Skills are not allowed to:) - For kids skills, it is a custom skill and you are not an Amazon-approved developer.

60 77 81 75 69

11 No violation 95% right ignore

12 Collect kids data 80% right

Violate 19

Notsure 1

No 8

13 Ask for positive rating 50% right

Violate 12

No 10

14 No violation 50% right 10 think recommend other skills

15 No violation 90% right ignore

16 Call emergency responder 30% right

7 clearly mention the emergency

5 No

Others no medical advice

17 Predict gender 40% right

Only 1 mentions

15 no

18 One word invocation name 10% right

5 mention

16 no

19 Do you think the Amazon Alexa platform should provide a policy compliance training for developers before they develop skills?

10 definitely yes

16 probably yes

6 probably not

2 don’t matter

20 Are you aware that there are also some requirements from “HIPAA” (Health Insurance Portability and Accountability Act) and “COPPA” (Children's Online Privacy Protection Rule) about specific types (health and children) of data collection?

8 aware

16 somewhat aware

1 neural

5 somewhat unaware

4 unaware

21 Do you think the Amazon Alexa platform should check the skill code to determine whether it violates any policies? (Now the platform only checks skill outputs and doesn't check the code)

7

17

6

2

2

22 When do you think a skill should have a privacy policy?

6 mention all skills should have one

13 mention sensitive data/data collection

23 Do you think it is important for users to clearly know how their data is used? - Importance

90

24 When you need the user’s personal data (such as username), would you ask the user through conversation (ask “What is your name?” in skill response) or request for permission API?

15 permission

4 question

13 both

(but in fact, most are from output and 1/3 are permissions)

25 Why do you prefer to that particular way to ask for user data? (ask through conversation or request for permission API)

1. some data such as user names are difficult to capture accurately via verbal conversation 2. for sensitive data it is better to have an explicit permission

26 How do you write the privacy policy for a skill?

5 write

8 copy

4 never

4 other

13 both

27 Do you think it is easy to write a privacy policy?

8 difficult

18

5

3

0

28 Do you share privacy policies for all skills or write for each individual skill?

3 never write

7 share for all

15 share for some

6 write for each

29 Do you check whether your privacy policy and code are consistent?

9

9

1

11

4

(but in fact, maybe not good)

30 Do you think a tool for generating a privacy policy can be helpful for developers?

22

11

0

0

1

31 Which way do you think is better for presenting privacy policies to users?

3 website

10 read out

21 webpage

32 Do any of your skills get content from web (such as getting knowledge from Wikipedia)?

3 2 3 11 15

(how to use this resut?)

33 Do you worry about any inappropriate content you get from the web appearing in your skill?

1. 3 2 5 5

34 Do you add images or audio files (such as prerecorded audios) in your skills for better functionality?

6 6 2 6 14

35 Have you updated any skill code after that skill has been published?

12 5 2 12 3

36 Do you fully inspect your code and remove any inconsistent code (such as unused intent or permission) before submission?

13 10 3 6 2

37 Do you think a static analysis tool for checking skill code can be useful for developers?

11 15 3 5 0