Home Assignment # 4
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Question 1)
Approach:

- Substitute the unknown values of unknown genotypes in the equation to be gene1 and gene2. The equation looks like:
- dosage =[age+height+weight+race+enzyme+amiodorane+(gene_1+gene2)]^2
- Plug-in all the known parameters into the equation and find value for gene_1+gene_2
    - (dosage^0.5)-(age+height+weight+race+enzyme+amiodorane) = gene1+gene2
- The result should be as:-gene_sum= gene1 + gene 2
- Since Bob can only have one type of each gene, we can plug-in all different options of the two genes to get the closest match
- Now, plug-in all the different variations of the gene1 and gene2 in the above equation
- From all the options that could potentially match, the best match is selected based on the least absolute difference between (gene1+gene_2) and gene_sum
- The result will give us the pair of genotypes- (gene1,gene2) that is the closest fit to Bob

For the given set of input parameters the result is as follows:

VKORC1 gene- **VKORC1 genotype unknown**
CYP2C9 gene- **CYP2C9 * 3/* 3**

Question 2)

X	**Accuracy (when N = 3)**
3	91%
5	94%
7	96%
10	97%

N	**Accuracy (when N = 3)**
3	95%
5	97%
10	98%

Analysis:

- From observing the values for change in X, we can conclude that the value of accuracy increases with increase in number of nodes (X = 3,5,7,10)
- The reason behind this is the inclusion of increasing amounts of data
- As the number of nodes participating in the learning process increased, the integrated ML model was trained on different types of data contributed by different nodes. As the number of nodes increased, the type of data exposed to the ML model increased
- This would enable every model to test data that wasn't available with itself but it was able to test that data type due to the data contributed by another node to the ML model
- As the number of nodes increases, the time required for each epoch increases
- Additionally, the accuracy increases when the number of epochs increases
- This is because of the fact that the nodes find new information from the available train dataset in each epoch.
- Therefore, as the number of epochs increases, the testing accuracy increases. However, the computation cost increases. There is always a trade-off between increased accuracy and computation power.
- The continuously increasing testing accuracy also suggests that the model is not overfit

Question 3)

a) The survey aims to capture people's privacy concerns regarding smart-home voice assistants and the motivation behind buying them
b) Since the privacy concerns behind the use of IoT devices especially voice assistants have been escalating, the survey aims to understand the people's attitude towards the same. Additionally, are voice assistant's the only IoT devices that concern people or do other IoT devices affect privacy concerns as well. Finally, the survey intends to understand what are the factors that affect the purchase of a particular device and do people trust big-tech companies or not
c) *Sshh...They are listening!*- Do you use a smart-home assistant and think you are being listened to all the time?

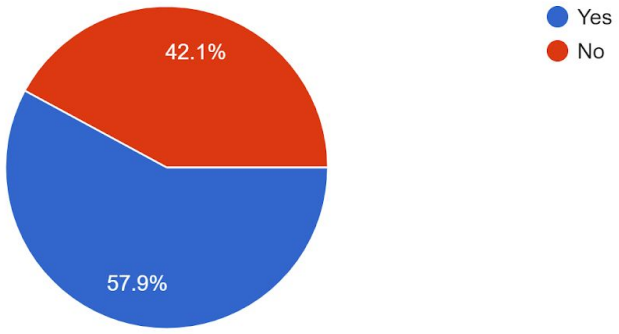
   Share your opinions in this two-minute survey and find out how many people share the same thoughts
d) I circulated the google form link on social media groups. There wasn't any screening criteria but I have asked in the form whether the participant has used a smart home assistant or not. Most of the participants have not taken a privacy class.
e) Google Form link- https://forms.gle/c1161sQhKr6Ujj1t7
f) The questions asked in the survey were:
   - Have you owned/ currently own a smart-home voice assistant?
     - Yes
     - No
   - If you answered No to the above question, please choose at least one of the following reasons
     - I do not trust the device manufacturer with my personal voice data

        - I think that the government would have access to my personal voice data
        - I think that my personal data would be shared with third-parties/ advertisers
        - I do not feel the value of the device justifies its utility
        - Other…
    - Which of the following devices do you use?
        - Google Home
        - Amazon Alexa
        - Other...
    - How often do you access your voice assistant in a day on a scale of 1-5?
    - Do you believe that your voice assistant stores all your conversations?
        - scale(1-4)-[strongly disagree- strongly agree]
    - Do you think you can access and delete your recorded voice data?
        - scale(1-4)-[strongly disagree- strongly agree]
    - Do you trust the device's manufacturer with your voice data that they have collected?
        - scale(1-4)-[strongly disagree- strongly agree]
    - Have you completely read your device's privacy policy?
        - Yes
        - No
    - Are you aware about any of the privacy laws that protect you from big-tech smart-home device manufacturers?
        - Yes
        - No
    - Do you believe that the government enforces enough laws to protect you from the device manufacturer?
        - scale(1-4)-[strongly disagree- strongly agree]
    - What was your reason(s) behind purchasing your smart-home voice assistant device?
        - To play songs, check schedule and weather forecasts
        - To control smart home-appliances
        - To shop for groceries online
        - Just out of curiosity
        - Other…

g) The findings from the survey are based on **19** responses out of which about 60% participants have used a smart-home device in the past :

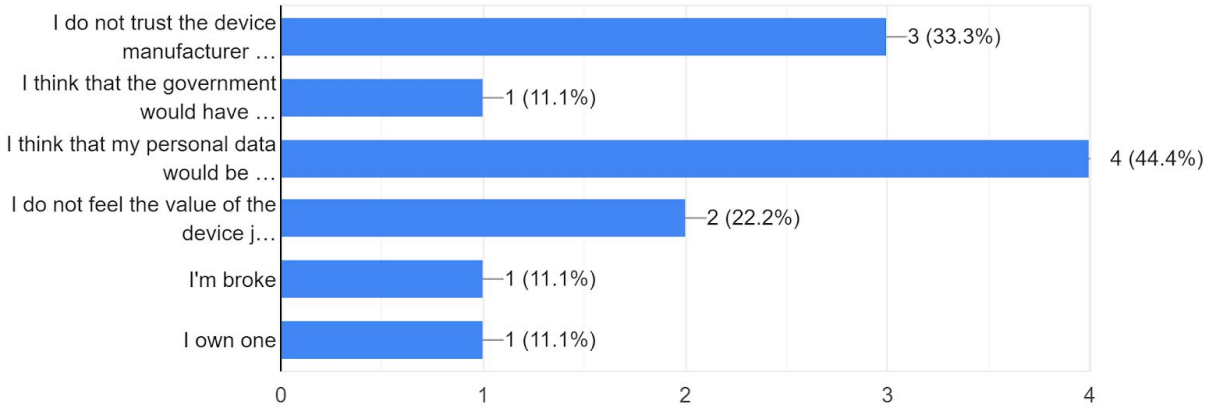
Have you owned/ currently own a smart-home voice assistant?

19 responses

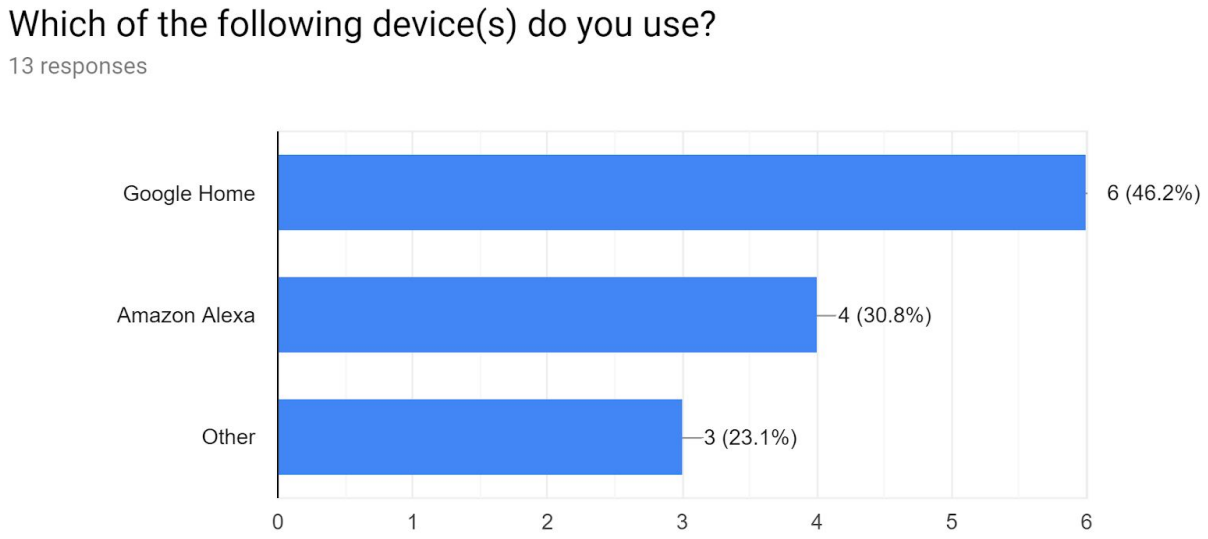


If you answered No to the above question, please choose at least one of the following reasons

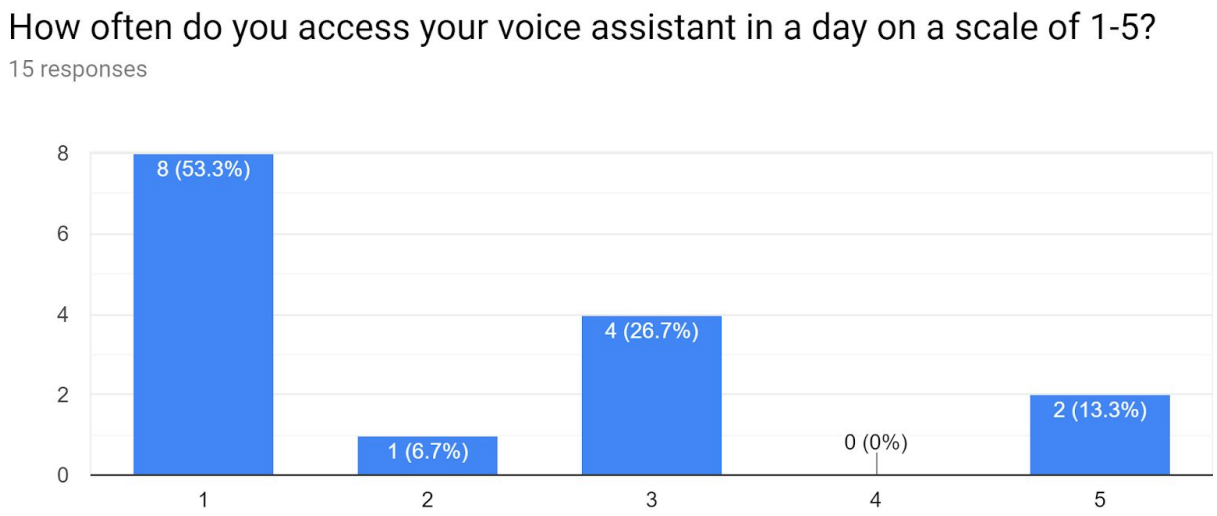
9 responses



This above question was based on Westin's second question. We can conclude that 77% of people **do not** trust the organization and think that they would sell personal data to third parties. We can conclude that most of the participants are fundamentalists since they do not believe the manufacturer. Additionally, the main concern behind people not purchasing smart-home voice assistant is the sharing of personal data with advertisers. The second concern being lack of trust in the device manufacturer



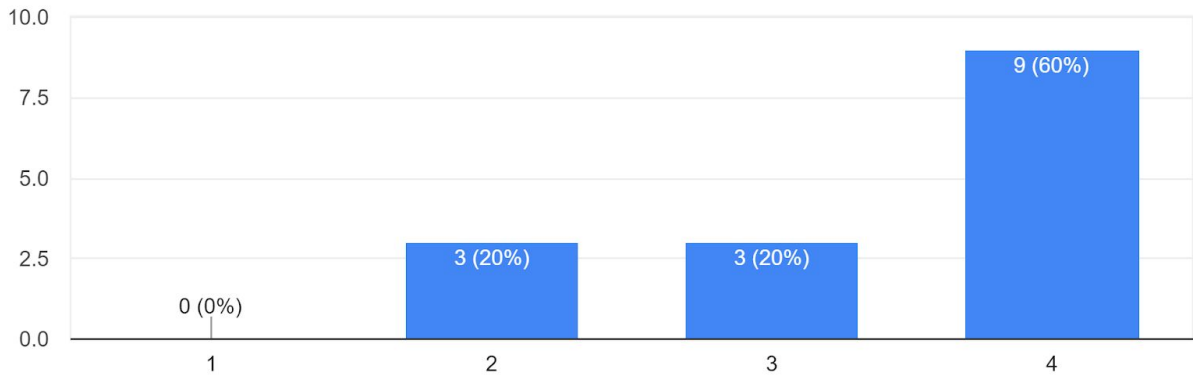
Almost 77% of people use the most common smart-home voice assistants manufactured by one of big-tech companies- Amazon and Google.



The distribution shows that most of the participants who use voice assistants use it only for a few times in a day. This shows that the interaction of the participants with their device is low. The reason behind the usage of such a low interaction rate can be answered by the last question of the survey.

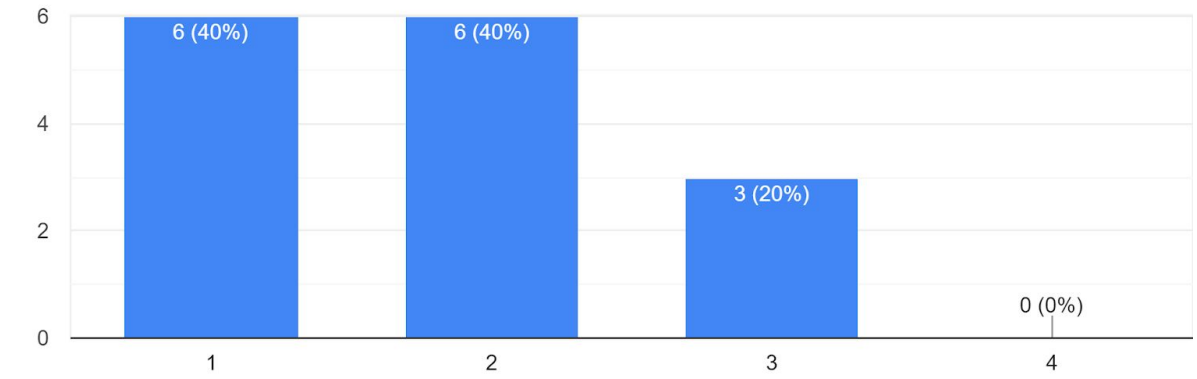
I believe that my voice assistant stores all my conversations

15 responses

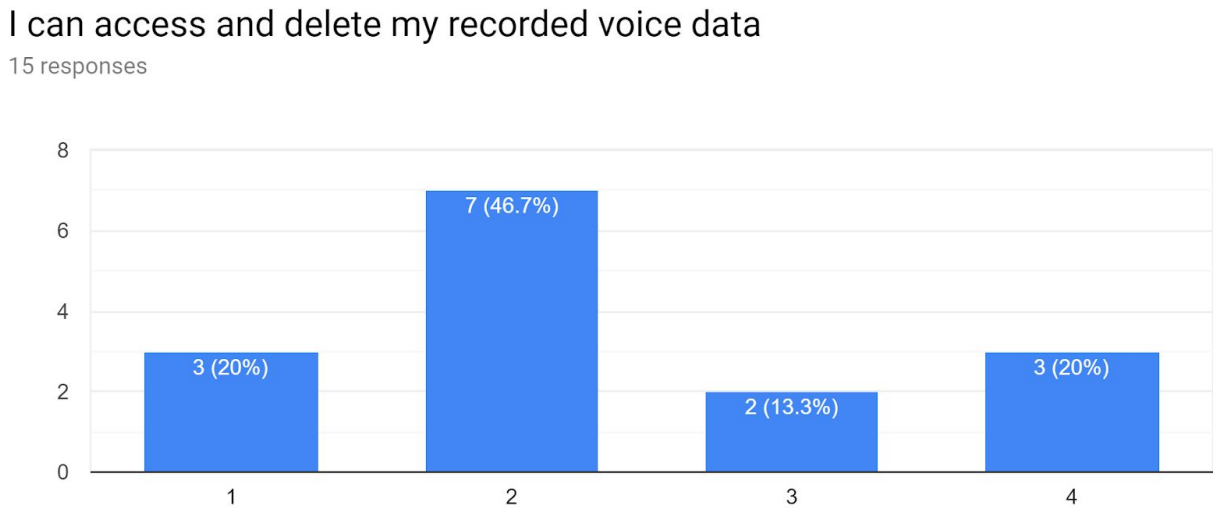


I trust the device's manufacturer with my voice data

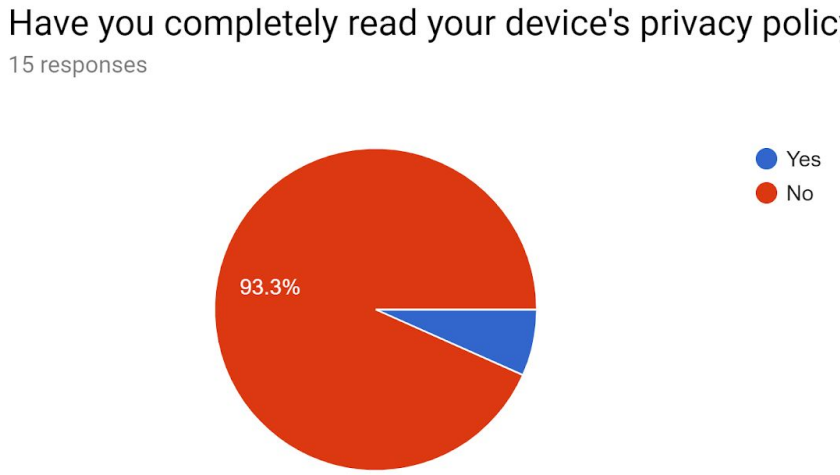
15 responses



80% of the participants strongly agree/ somewhat agree that their personal voice data is collected by the manufacturer. This displays a lack of trust of the users in the device manufacturer. The above two questions are in accordance with Westin's second question. The majority of the participants have issues trusting the manufacturer, making them fundamentalists. The major highlight is that none of the participants strongly trust the manufacturer with the data. We can conclude that the responses are legible since these questions were asked at different times in the survey, however the response trend stays the same.



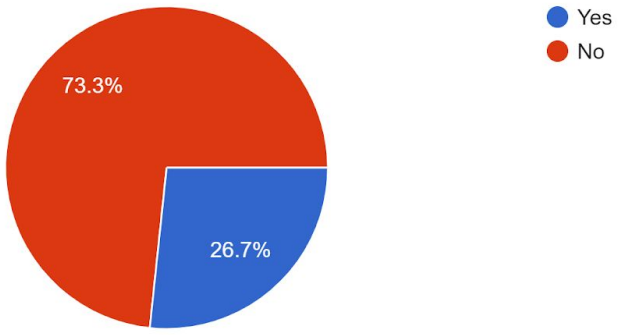
This question captures responses for Westin's first question. Most of the participant's have a mindset as the same of pragmatists.



Most of the participants have not taken a privacy class. We can conclude that most people do not read the privacy policy

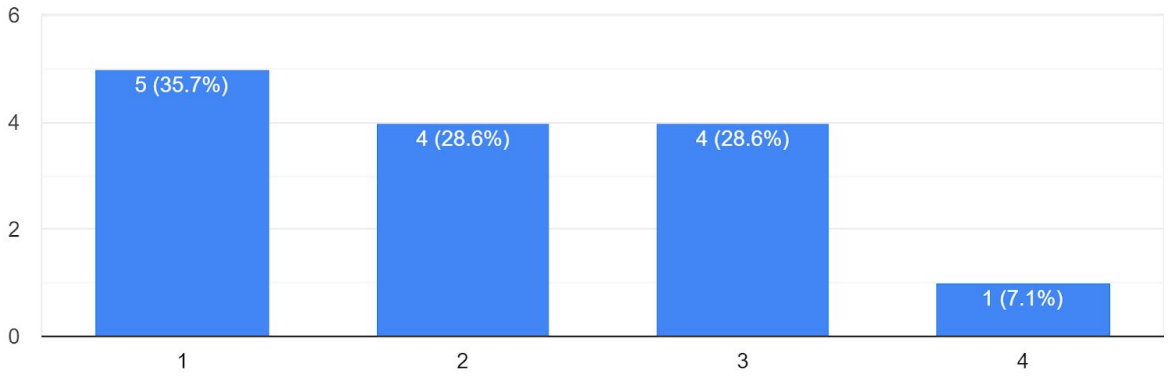
Are you aware about any of the privacy laws that protect you from big-tech smart-home device manufacturers?

15 responses

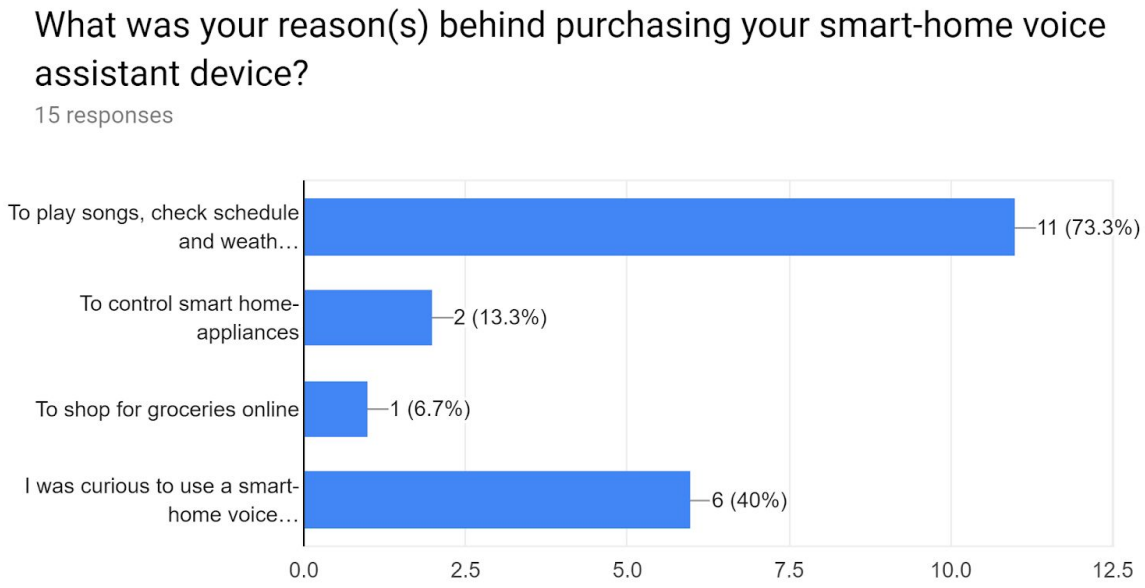


I believe that the government enforces enough laws to protect me from the device manufacturer?

14 responses



The above is Westin's third question. We can conclude that 57% of the participants have the same privacy attitude as that of pragmatists. However, there is a significant difference between *fundamentalists (35.7%)* and *unconcerned(7.1%).*



We can notice that almost 90% of the participants use smart-home assistants for basic daily activities like listening to music or check weather/schedules or just out of curiosity. Therefore we can conclude that most of the participants do not share information that would enable the manufacturer to build user-profiles for targeted marketing. However, we see that