

Impact of Voice-Activated Artificial Intelligence Devices



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Introduction

- Technology is rapidly transforming society
 - Sort of like Skynet in Terminator
- Big Research Question:
 - How has the adoption of voice activated devices affected the lives of the average U.S. consumer?



How we got the data

- Machine learning is still a relatively new concept
- Used published reports to reverse engineer data in the form of a csv file
- Our source: <https://voicebot.ai/>
 - [Voice Report: From answers to action: customer adoption of voice technology and digital assistants - 2019](#)
 - [U.S. Smart Speaker Consumer Adoption Report 2019](#)
 - [Voicebot: Voice Assist Consumer Adoption in Healthcare - October 2019](#)
 - [Voice Shopping Consumer Adoption Report 2018](#)

[illegible]

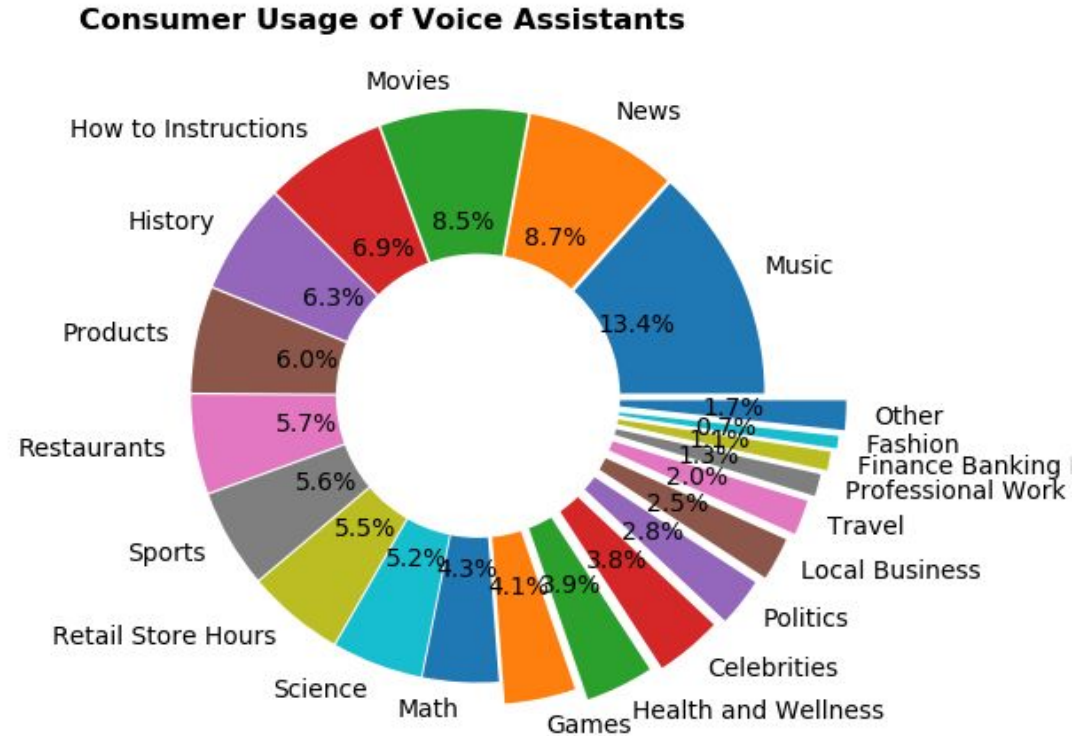
Questions

- To answer our big picture question, we picked a series of questions based on the interest of each group member.
- Topics brought upon by voice assisted AI include:
 - Income
 - Healthcare
 - Market share
 - Popularity
 - Privacy concerns



Consumer Usage

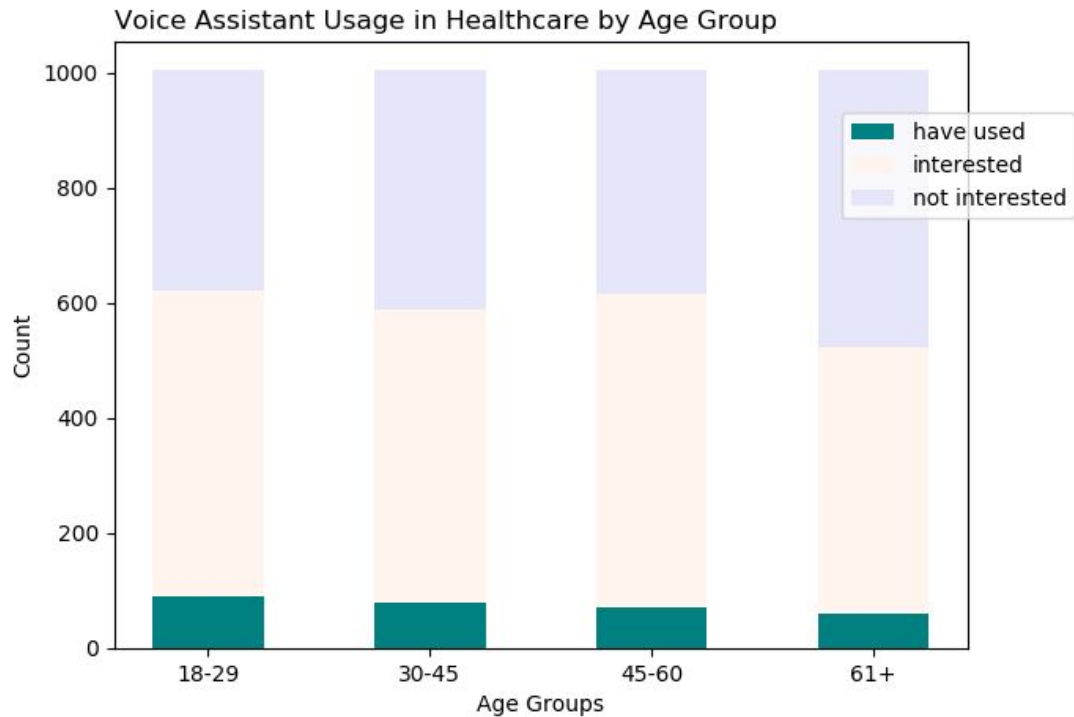
- The consumer report of 2019
 - 1203 participants surveyed
 - Most searched: music



Data Source: Smart Speaker Consumer Adoption Report 2019

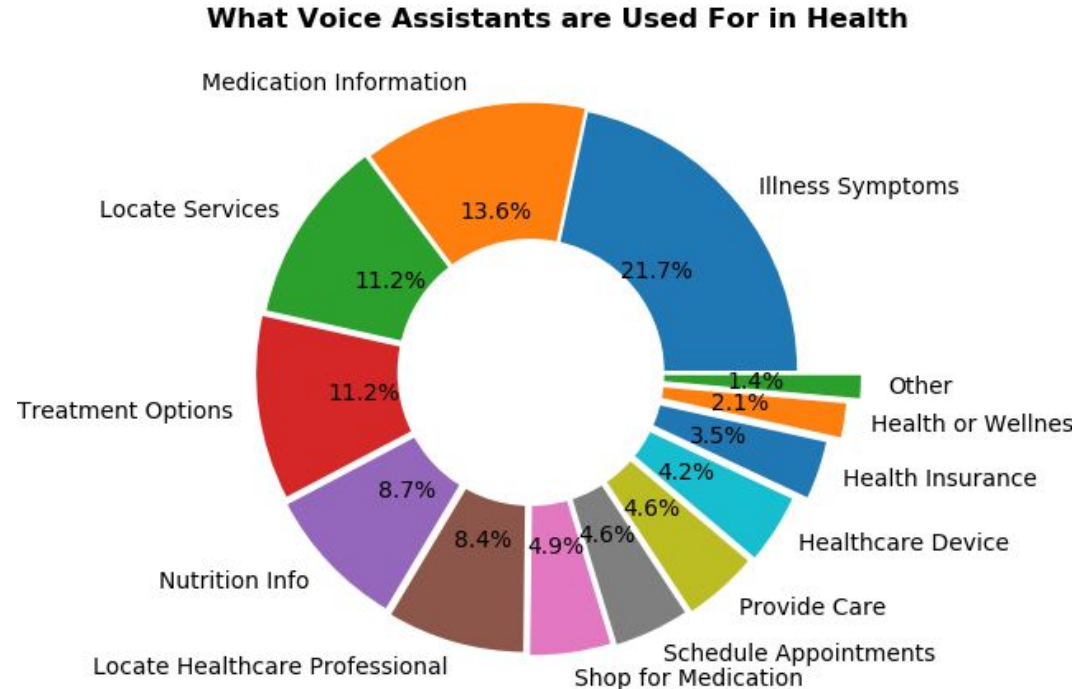
Age Distribution

- 1004 participants
- Have used:
 - 9% - 18-29
 - 8% - 30-45
 - 7% - 45-60
 - 6% - 61+
- Interested:
 - ~50% throughout all age groups



Consumer usage in healthcare

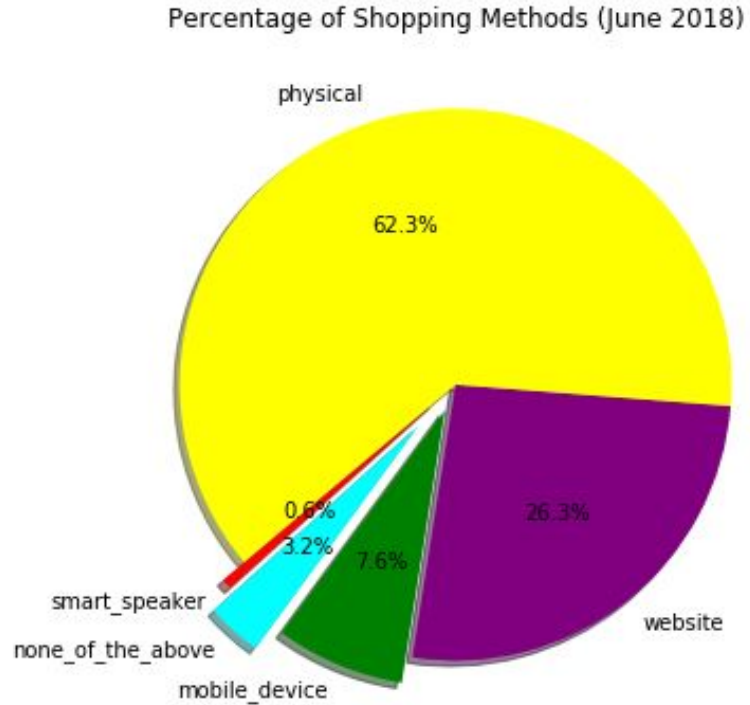
- The healthcare report of 2019
 - 1004 participants surveyed
 - Most searched: illness symptoms



Data Source: Voice Assistant Consumer Adoption in Healthcare - October 2019

Shopping Method

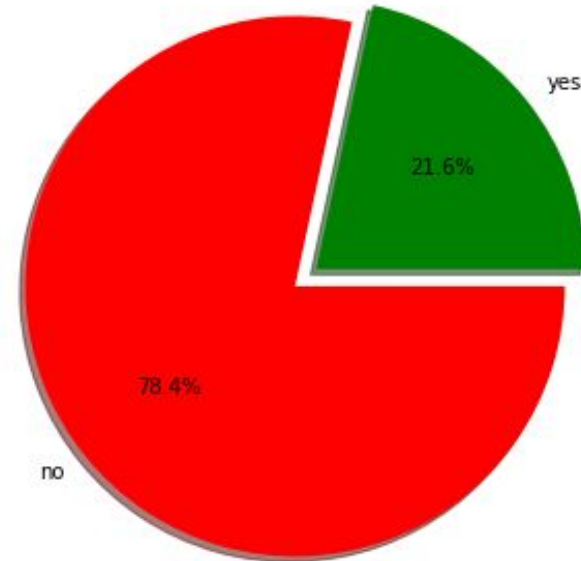
- Data is out of 1203 participants
- More than half still prefer to shop in person
- Smart speaker percentage a measly 0.6%



U.S. Households Percentage

- Data is as of June 2018
- U.S households still getting accustomed to smart speakers at this time

Percentage of Households That Own a Smart Speaker (June 2018)



Coding

- Changed column name to give cleaner formatting
- Find the number of respondents (`len`)
- Find the answers for the new columns (`.unique().str[0]`)
- Create new Data Frame to reference this
- All set up for the pie chart

```
In [89]: #only looking for the 'own_a smart speaker' column
#clean it up, give the column a nicer name
answers_df = pd.DataFrame({'Owns a Smart Speaker': voice_df['own_a_smart_speaker']})
answers_df.head()
```

Out[89]:

Owns a Smart Speaker	
0	no
1	no
2	no
3	no
4	no

```
In [93]: #get the number of respondents
#data from June 2018 Data
total_survey = len(answers_df['Owns a Smart Speaker'])
total_survey
```

Out[93]: 1203

```
In [96]: #create a groupby for Smart Speaker column
shop_df = answers_df.groupby(['Owns a Smart Speaker'])
shop_df
```

Out[96]: <pandas.core.groupby.generic.DataFrameGroupBy object at 0x11a2dc710>

```
In [97]: #get the respondents answers to the questions/columns
results = shop_df['Owns a Smart Speaker'].unique().str[0]
#show results
results
```

Out[97]: Owns a Smart Speaker
no no
yes yes
Name: Owns a Smart Speaker, dtype: object

```
In [99]: #get a count of actual number of responses
results_df = shop_df['Owns a Smart Speaker'].count()
#display count
results_df
```

Out[99]: Owns a Smart Speaker
no 943
yes 260
Name: Owns a Smart Speaker, dtype: int64

```
In [102]: #Create a new Data Frame of the reponses
final_answers_df = pd.DataFrame({'Do You Own a Smart Speaker?' : results,
                                'Total': results_df})
#style.hide_index() hides sets the order of columns
#Display new Data Frame
final_answers_df.style.hide_index()
```

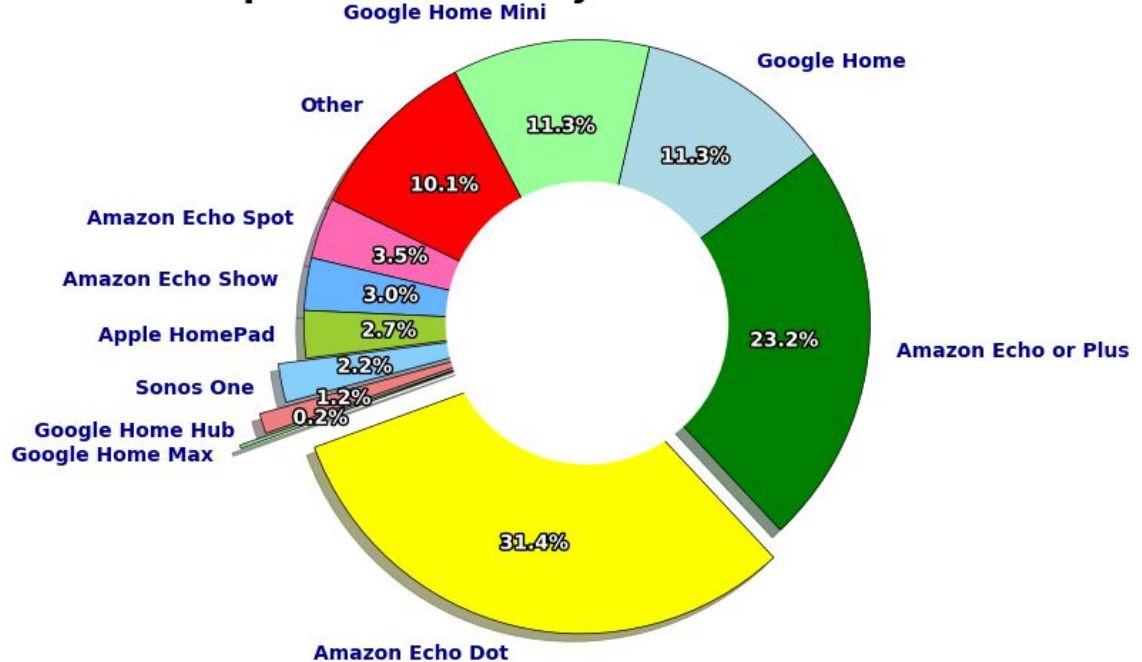
Out[102]:

Do You Own a Smart Speaker? Total	
	no 943
	yes 260

What shares do different smart speakers own in the market?

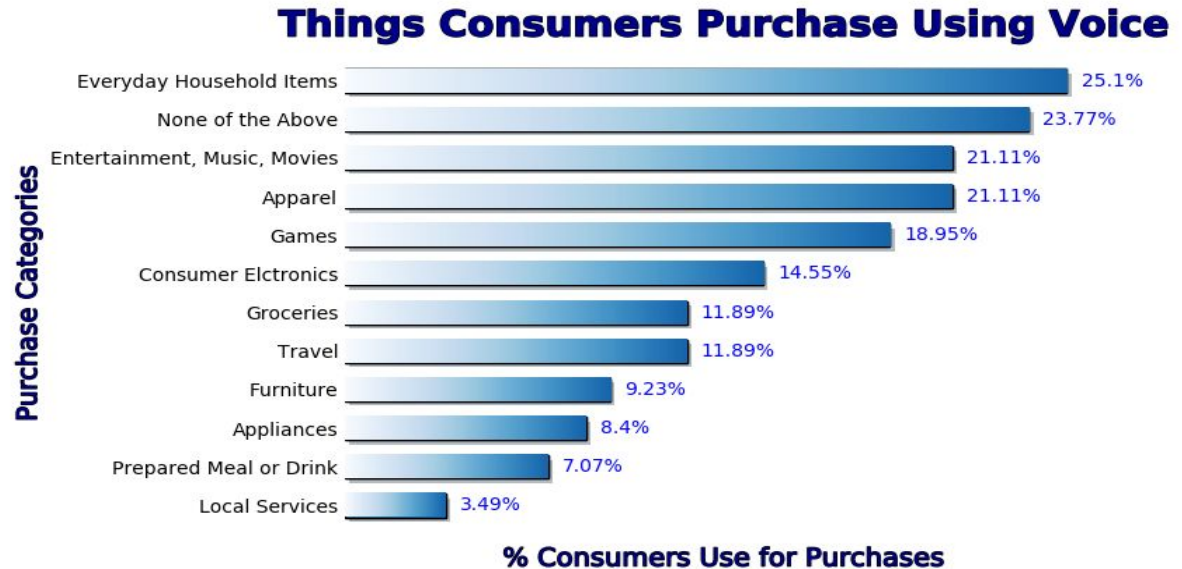
- Amazon leads the market
- Google in second place
- Sorry Apple fans
- Amazon was an early mover
- Amazon consumer market dominance

US Smart Speakers Share by Device as of March 2019



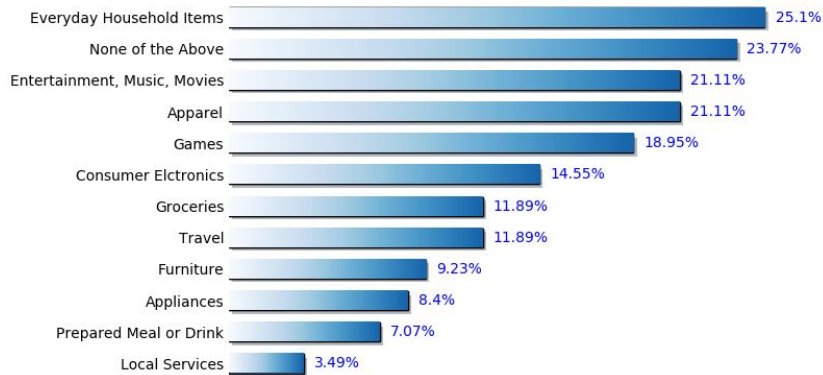
What do consumers buy using voice activated AI devices?

- Everyday household items leads
- Top categories are similar to online purchases
- Generally diverse
- ¼ chose none of the above
- Still low use percentage



Fun w/ coding

- Horizontal bar chart formatting
- `import seaborn as sns`
- Add % values to bars
- Gradient bars



```

54 # Remove all borders from the diagram
55 sns.despine(left = True, top = True, right = True, bottom = True)
56
57 # Add value amounts next to each bar in percentages
58 for index, value in enumerate(x_axis):
59     plt.text(value + 0.005,
60             index,
61             str(round((value) * 100, 2)) + '%',
62             va = "center",
63             color = "blue",
64             fontweight = "medium")
65
66 # Create a color gradient for the bars
67 bar = ax
68
69 def gradientbars(bars):
70     grad = np.atleast_2d(np.linspace(0, 0.8, 256))
71     ax = bars[0].axes
72     lim = ax.get_xlim() + ax.get_ylim()
73     for bar in bars:
74         x,y = bar.get_xy()
75         w, h = bar.get_width(), bar.get_height()
76         ax.imshow(grad,
77                 extent = [x, x+w, y, y+h],
78                 aspect = "auto",
79                 zorder = 3,
80                 norm = mpl.colors.NoNorm(vmin = 0, vmax = 1),
81                 cmap = plt.get_cmap("Blues"))
82     ax.axis(lim)
83
84 gradientbars(bar)
85

```



Questions

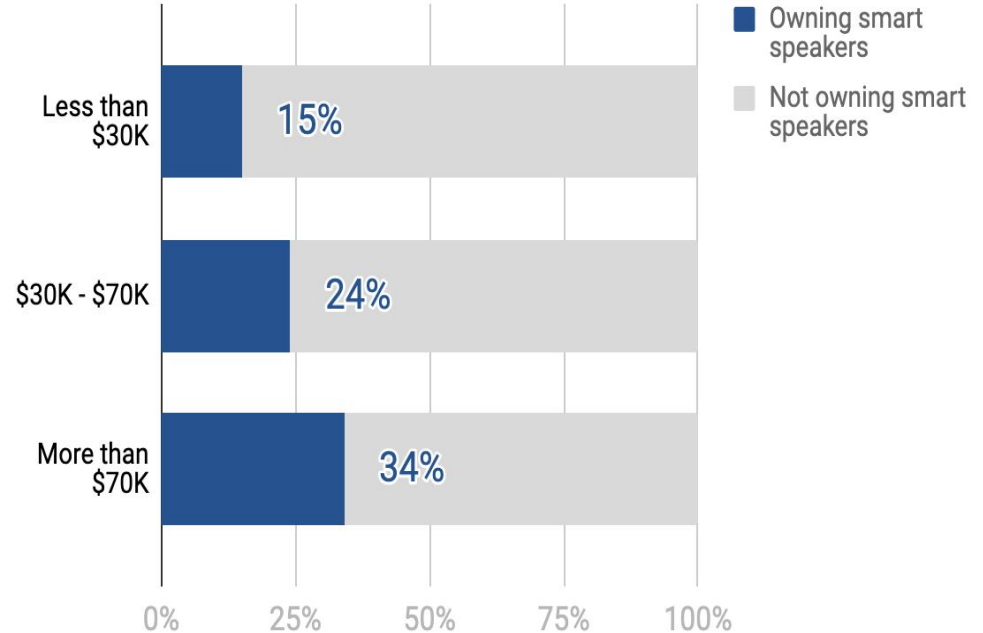
- Income breakdown of smart speaker owners
- Privacy concerns



Income Breakdown

Findings:

- Smart speaker ownership percentage variances between different income groups
- Relationships between income level and smart speaker ownership

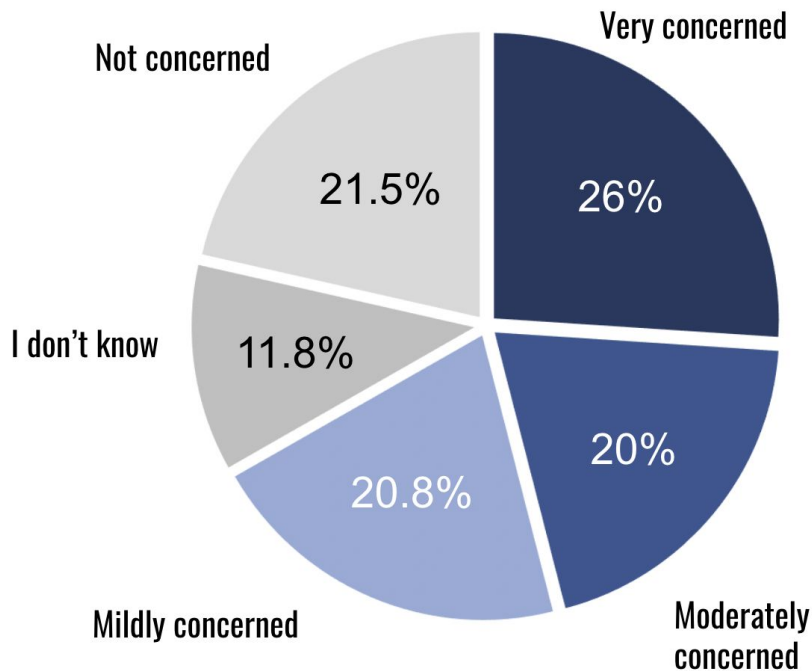


Data source: Pew Research Center Survey of US Adults 2019

Privacy Concerns

Findings:

- Different levels of privacy concerns
- Percentage of each levels
- People still keep buying



Data source: Voicebot Smart Speaker Consumer Adoption Report 2019

General Summary

- The market for smart speakers is still fairly limited with small percentage of population actually owning the device.
- Amazon dominates the current market of smart speakers and this trend should continue to show with the market expanding in popularity.
- The use of voice activated AI affects the lives of average US consumers by new devices entering essentially a new market, it is safe to say that the trend is going to have more of an affect on many consumers at some point.

Conclusions

- Adoption rate has skyrocketed in the past 2 years
 - Promise of further adoption as research goes on
- High demand for skilled employees
 - May also lead to termination of current jobs
- Many rules and regulations have not been created yet
 - Privacy concerns and blackmail
- Balance between regulation and innovation



QUESTIONS?