

Navigating ageism in the tech sector

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Final Project Website

<https://ecahill31.github.io>

Project goals

In our project, we aim to demonstrate the prevalence of ageism in job seeking and in the workplace by employing a narrative structure to our visualizations. We want our final visualization to lead others who may not believe ageism is important or pervasive to more readily understand that this is a huge issue. We also want our viewers to understand that older workers deserve fair chances and quality treatment in all stages of working, including searching, interviewing, and excelling. This work is part of a MIMS Capstone Project goal of helping older individuals better navigate job search when dealing with ageism.

The website is meant to be understandable by any adult or teenager of any age group, without the need for a strong technical and data science understanding while still including impressive, useful, and aesthetically pleasing visuals. However, our target audience are those under the age of ~50, to promote their awareness and compassion toward this issue. The way our narrative is phrased is geared toward a younger target audience.

Visualization task goals

Ageism word cloud: The goal of this visualization is to show a comparison between age unfriendly and age neutral words commonly used in job listings. The word cloud is used to display these words and how they are categorized in a visually engaging way.

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Tech vs. non-tech roles line chart: The goal of this visualization is to show the decline in manager positions for baby boomers and the difference in the proportion of managers in the tech industry versus non-tech. The chart is used to display this information in a clear and easy-to-understand way.

Interview questions: The goal of this visualization is to encourage the user to use their own decision-making skills to determine whether a question is discriminatory or not. This places the onus on the viewer to think about how they could ask questions that might seem innocuous, but actually be harmful.

Coding tool bar chart, dot plot, and radar chart: The goal of these visualizations is to show that there aren't substantial differences between those who are 50+ and under 50 in terms of the numbers of tools they know.

Ageism slideshow: The goal of this visualization is to showcase multiple images related to ageism in the tech industry, with each image sliding in from the right of the screen. The slideshow format is used to display these images in an engaging and dynamic way.

Each of our visualizations serves a different purpose, but all are designed to help raise awareness about the issue of ageism in the tech industry and promote understanding and change.

Related work

As a starting point for our discussions, we largely relied on publicly available data from the US Bureau of Labor and Statistics (BLS). As part of our Exploratory Data Analysis, we deeply studied macroeconomic indexes such as the unemployment rate to understand how ageism impacted the chances of employment. The following figure illustrates one of the charts obtained from the [BLS about unemployment](#).

Labor Force Statistics from the Current Population Survey

Series Id: LNS1400000
Seasonally Adjusted
Series title: (Seas) Unemployment Rate
Labor force status: Unemployment rate
Type of data: Percent or rate
Age: 16 years and over

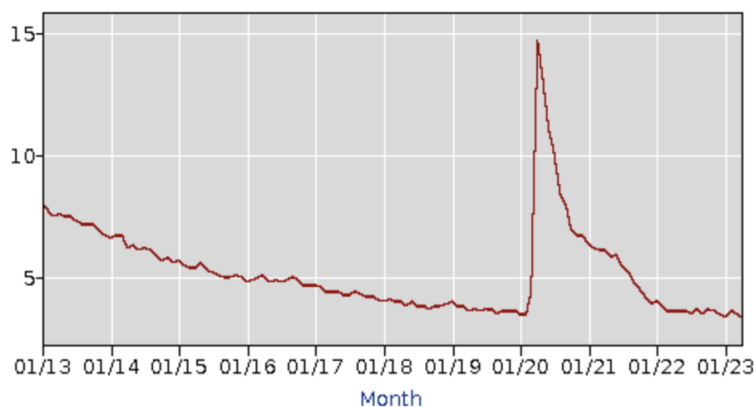


Figure 1: Unemployment rate in the United States over the years according to the BLS

Moreover, one of our initial intentions as a project team was to incorporate the impacts of intersectionality into our analysis. For instance, how would ageism respond within particular social groups at the bottom of the Matrix of Domination ([Constanza-Chock, 2018](#))? Our goal was to understand if such age discrimination could affect those groups even more following some sort of snowball effect with the other existing intolerances. Therefore, we investigated specific reports with breakdowns not only in terms of age groups but also based on race, gender, and nationality, among others. During that exploration phase, we primarily relied on the reports generated by the United States Equal Employment Opportunity Commission. Mainly, we looked into the charge statistics filed each year per type of discrimination from 1997 through 2021, available on the [EEOC website](#). The following figure illustrates the dataset obtained from the EEOC for the discrimination charges.

Charge Statistics (Charges filed with EEOC) FY 1997 Through FY 2021

	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Total Charges	80,680	79,591	77,444	79,896	80,840	84,442	81,293	79,432	75,428	75,768	82,792	95,402	93,277	99,922	99,947	99,412
Race	29,199	28,820	28,819	28,945	28,912	29,910	28,526	27,696	26,740	27,238	30,510	33,937	33,579	35,890	35,395	33,512
	36.2%	36.2%	37.3%	36.2%	35.8%	35.4%	35.1%	34.9%	35.5%	35.9%	37.0%	35.6%	36.0%	35.9%	35.4%	33.7%
Sex	24,728	24,454	23,907	25,194	25,140	25,536	24,362	24,249	23,094	23,247	24,826	28,372	28,028	29,029	28,534	30,356
	30.7%	30.7%	30.9%	31.5%	31.1%	30.2%	30.0%	30.5%	30.6%	30.7%	30.1%	29.7%	30.0%	29.1%	28.5%	30.5%
National Origin	6,712	6,778	7,108	7,792	8,025	9,046	8,450	8,361	8,035	8,327	9,396	10,601	11,134	11,304	11,833	10,883
	8.3%	8.5%	9.2%	9.8%	9.9%	10.7%	10.4%	10.5%	10.7%	11.0%	11.4%	11.1%	11.9%	11.3%	11.8%	10.9%
Religion	1,709	1,786	1,811	1,939	2,127	2,572	2,532	2,466	2,340	2,541	2,880	3,273	3,386	3,790	4,151	3,811
	2.1%	2.2%	2.3%	2.4%	2.6%	3.0%	3.1%	3.1%	3.1%	3.4%	3.5%	3.4%	3.6%	3.8%	4.2%	3.8%
Color	762	965	1,303	1,290	1,135	1,381	1,550	930	1,069	1,241	1,735	2,698	2,943	2,780	2,832	2,662
	0.9%	1.2%	1.7%	1.6%	1.4%	1.6%	1.9%	1.2%	1.4%	1.6%	2.1%	2.8%	3.2%	2.8%	2.8%	2.7%
Retaliation - All Statutes	18,198	19,114	19,694	21,613	22,257	22,768	22,690	22,740	22,278	22,555	26,663	32,690	33,613	36,258	37,334	37,836
	22.6%	24.0%	25.4%	27.1%	27.5%	27.0%	27.9%	28.6%	29.5%	29.8%	32.3%	34.3%	36.0%	36.3%	37.4%	38.1%
Retaliation - Title VII only	16,394	17,246	17,883	19,753	20,407	20,814	20,615	20,240	19,429	19,560	23,371	28,698	28,948	30,948	31,429	31,208
	20.3%	21.7%	23.1%	24.7%	25.2%	24.6%	25.4%	25.5%	25.8%	25.8%	28.3%	30.1%	31.0%	31.0%	31.4%	31.4%
Age	15,785	15,191	14,141	16,008	17,405	19,921	19,124	17,837	16,585	16,548	19,103	24,582	22,778	23,264	23,465	22,857
	19.6%	19.1%	18.3%	20.0%	21.5%	23.6%	23.5%	22.5%	22.0%	21.8%	23.2%	25.8%	24.4%	23.3%	23.5%	23.0%
Disability	18,108	17,806	17,007	15,864	16,470	15,964	15,377	15,376	14,893	15,575	17,734	19,453	21,451	25,165	25,742	26,379
	22.4%	22.4%	22.0%	19.9%	20.4%	18.9%	18.9%	19.4%	19.7%	20.6%	21.4%	20.4%	23.0%	25.2%	25.8%	26.5%
Equal Pay Act	1,134	1,071	1,044	1,270	1,251	1,256	1,167	1,011	970	861	818	954	942	1,044	919	1,082
	1.4%	1.3%	1.3%	1.6%	1.5%	1.5%	1.4%	1.3%	1.3%	1.1%	1.0%	1.0%	1.0%	1.0%	0.9%	1.1%
GINA														201	245	280
														0.2%	0.2%	0.3%

Figure 2: Number of discrimination charges filed per year according to the EEOC

However, as we continued to structure our storyline, we had to make important decisions regarding scope definition. Based on the feedback received during the intermediary presentation, instead of providing a general macroeconomic analysis, we focused on one specific industry in more detail: technology. As a result, accessing intersectional data solely from the tech industry was much more complicated, considering our project premise of using only publicly available data. Therefore, we shifted our analysis to focus solely on ageism within the tech industry. However, as suggestions for continuing projects, incorporating this type of analysis would be profoundly informative and should enlighten even more the discussions about such a relevant subject.

Table 1.1. A catalogue of stereotypes identified in different institutional settings and countries

INSTITUTION OR SECTOR	STEREOTYPES	
	YOUNGER PEOPLE ARE...	OLDER PEOPLE ARE...
Health and social care^a		
POSITIVE	Healthy Physically active Strong and energetic	Warm Likeable
NEGATIVE	Risk-takers Drug-users Stressed and anxious	Rigid Irritable and frustrating Lonely and isolated Frail and weak Asexual Easily confused Depressed and depressing Needy Disabled
Work^b		
POSITIVE	Energetic Ambitious Tech-savvy Hard-working (middle-aged)	Reliable Committed Experienced Hard-working Socially skilled Good mentors and leaders Able to deal with change
NEGATIVE	Narcissistic Disloyal Entitled Lazy Unmotivated Easily distracted	Incompetent and unproductive Unmotivated Resistant to change Harder to train and unable to learn Not flexible Not technologically competent
Media^c		
POSITIVE	Attractive	Healthy Engaged Productive Self-reliant
NEGATIVE	Troublesome Violent criminals	Unattractive Unhappy Senile Badly dressed Inactive Dependent Unhealthy Disempowered and poor Vulnerable Diabolical

^a For additional information, see references 16 and 33-40.

^b For additional information, see references 16 and 41-48.

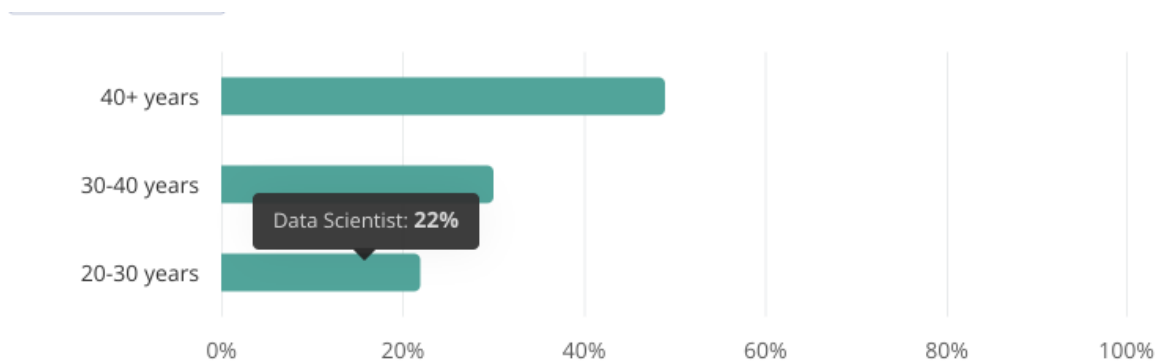
^c For additional information, see references 32 and 49-51.

Figure 3. Table of stereotypes about older and younger people from the WHO Global Report on Ageism 2021

The terms found in this report helped us determine which terms to use in our ageist/non-ageist word visualization.

[WHO Global Report on Ageism 2021](#)

The report highlights ageism as a significant challenge that needs to be addressed. The report emphasizes the importance of combating ageism to ensure that older people are valued and respected, and that they can fully participate in society. It also identifies key areas where action is needed to address ageism, such as improving access to healthcare and social services, promoting intergenerational dialogue and understanding, and creating age-friendly environments.



Data Scientist Age

Data Scientist Years	Percentages
40+ years	49%
30-40 years	30%
20-30 years	22%

Figure 4. Age group representation in data science

This original bar chart showed the difference between different age groups and the proportion of tech workers they make up.

[Ageism in Tech and Data Science](#)

This resource gave us an idea for one visualization we ended up changing into a waffle chart. Additionally, this resource offered information about ageism in the

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tech sector specifically, and had a really nice storytelling structure that inspired our “imaging your parent or legal guardian is looking for a job” structure.

Silicon Valley is the top destination for all generations, but boomers cast their net wider

Faced with these results, we were interested to see if there were any differences in where tech workers search for jobs, or the kinds of roles they are interested in.

For instance, could the the startup culture of the Bay Area — where workers often clock long hours for low pay in the hope of cashing out later — be dissuading baby boomers from applying?

Where the generations are searching for tech jobs

Metros ranked by share of interest from jobseekers

	Millennials	Gen X	Baby Boomers
1.	San Jose, CA	San Jose, CA	San Jose, CA
2.	San Francisco, CA	San Francisco, CA	San Francisco, CA
3.	Seattle, WA	Seattle, WA	Huntsville, AL

Figure 5. Indeed.com Ageism Report discussing different generational tech job searching

The focus on generations and tech job hunting inspired our idea for the Tableau chart on how different generations are represented in management and non-management positions in tech and non-tech roles.

[Indeed.com Tech Ageism Report](#)

This resource provided useful statistics highlighting the importance of addressing ageism and the strength of anxiety felt toward being an older worker. The article also highlights the importance of diversity in the workplace, with age as a key factor to consider in diversity.

Myth #2: Older tech workers experience a drop in salary

Older tech workers as a group do not experience a reduction in average salary that is any different from non-tech industries. Rather, workers in tech experience the same salary lifecycle as their counterparts in non-tech.

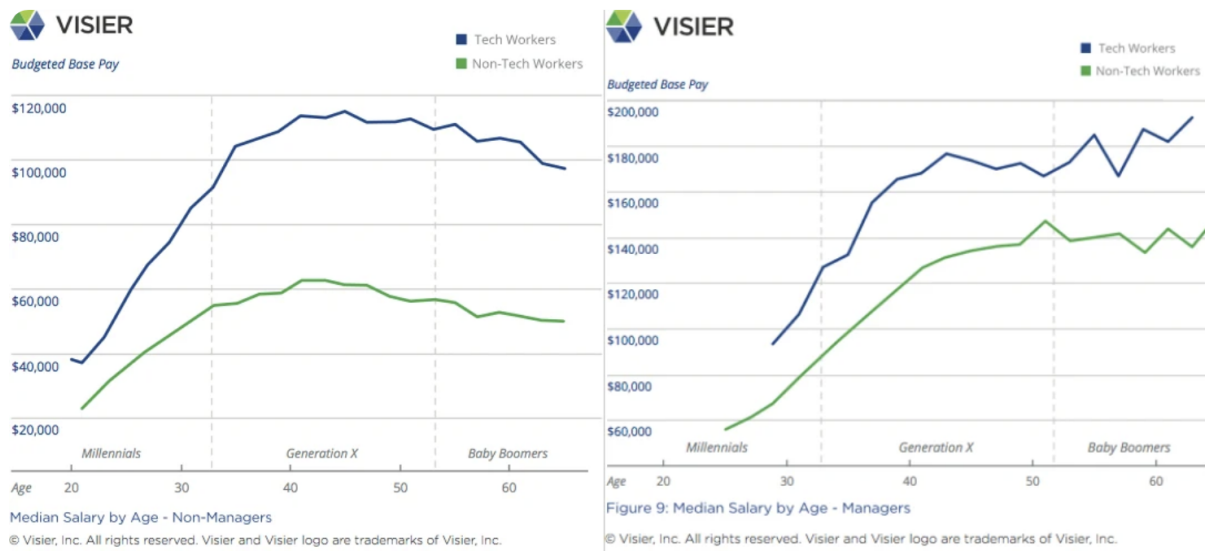
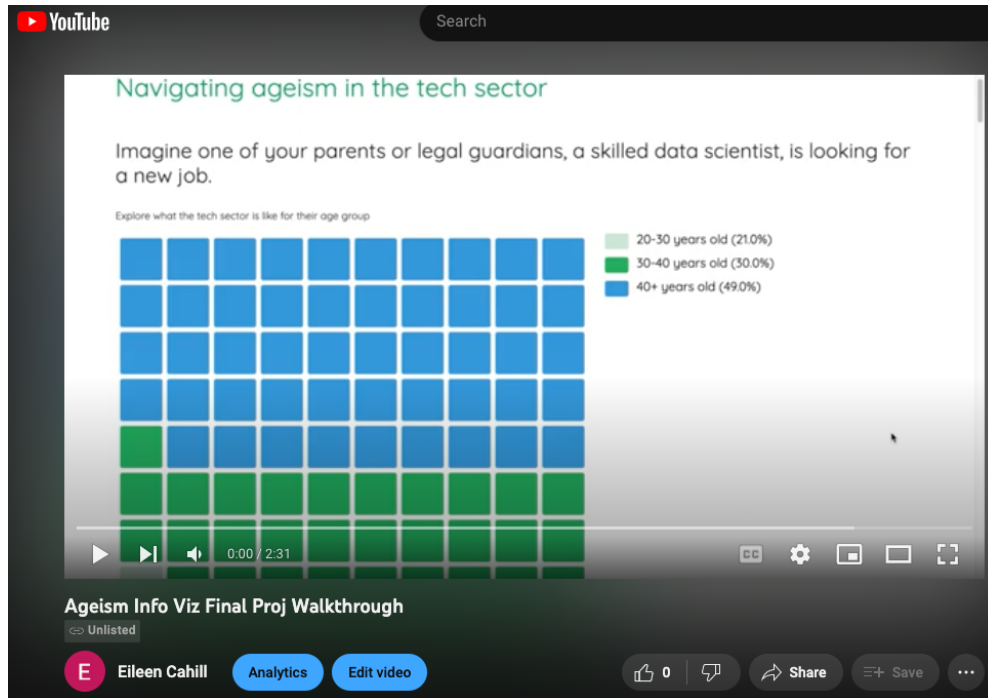


Figure 6. Visier Insights analysis of workers' salaries of different ages in Tech in comparison with Non-Tech

The Visier Insights report is a comprehensive study on ageism in the tech industry. It explores how ageism affects hiring, retention, and promotion practices and offers solutions to mitigate the impact of ageism in the workplace. The report uses data from Visier's database, which includes many employees across multiple industries, to analyze the experiences of older workers in tech. Through the report, the authors can identify several alleged myths regarding ageism, as illustrated in the following figure; However, they also provide multiple important conclusions emphasizing its prevalence within the Tech Industry. The paper helped us understand the importance of plotting the Tech Industry with the Non-Tech industry to properly and understand the differences among those two subgroups.

Product walkthrough



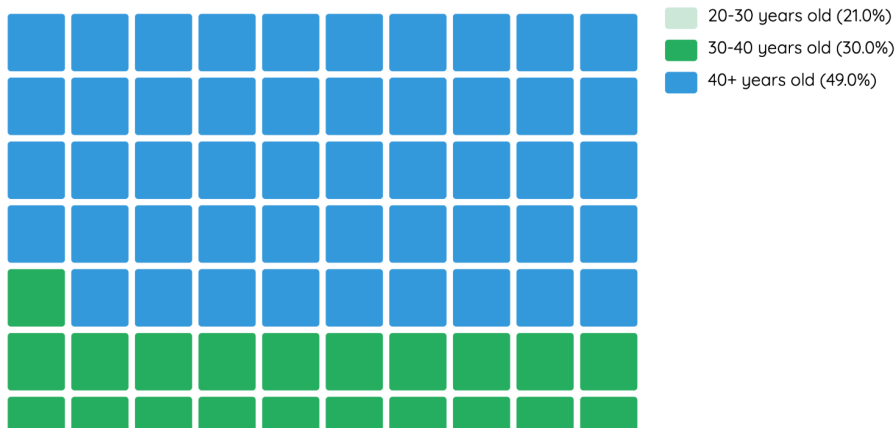
Video of website walkthrough: <https://youtu.be/-ScCH48vh8A>

Visualization description (Screenshots)

Navigating ageism in the tech sector

Imagine one of your parents or legal guardians, a skilled data scientist, is looking for a new job.

Explore what the tech sector is like for their age group



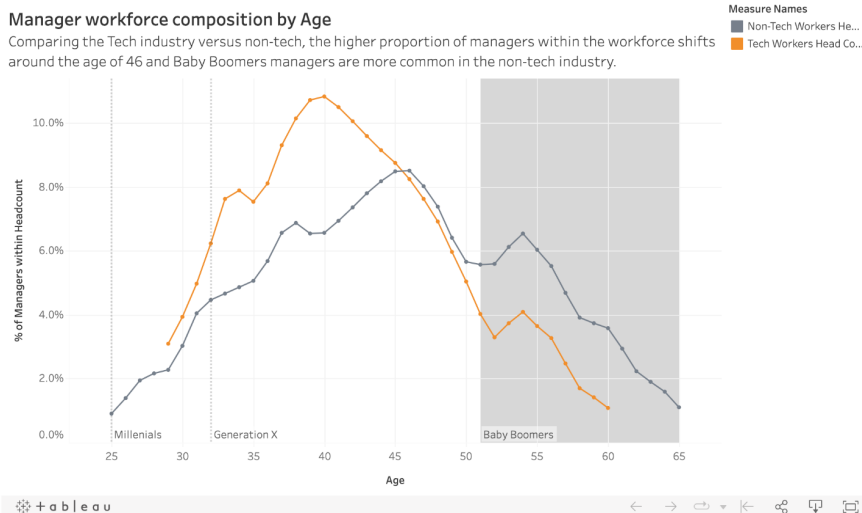
Waffle Chart: Drawing from Kay et al (2016), as discussed during lecture 24 slide

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26, discrete representations have been proven as more accurately interpreted by the users. Therefore, we adopted a Waffle chart with individual squares to help present the percentage breakdown of data scientists. Furthermore, based on Xiong et al (2022) from lecture 24 slides 20-21, we adopted a top-filling approach, which has proven to be the coloring with the lowest estimation error. The chart utilizes an initial animation of falling into place to draw attention to the boxes, preventing them from being static.

Baby boomers show a steep decline in number of manager positions with increasing age. This decline in the number of manager positions held by baby boomers as they age is a clear sign of ageism in the workplace. It's not just limited to the tech sector; studies have shown that older workers in general, regardless of industry, face challenges when it comes to advancing in their careers.

What statistics can you find from these charts about your parent/legal guardian?



Manager workforce composition line graph: Utilizing the Gestalt principle of continuity, the line graph showcases the difference in percentage of managers in both tech and non-tech sectors of various ages. The graph is broken into 3 generations, millennials, generation X, and baby boomers, with baby boomers emphasized with a gray background that distinguishes it from the other generations. This supports our goal of focusing on older workers. The baby boomers show a decline in both tech and non-tech manager headcounts with fewer tech workers than non-tech workers. Using the principle of highlighting we were taught in class, the tech workers line is in orange while the non-tech workers line is in gray. Additionally, this color differentiation aims to be easy to digest using the preattentive attributes of curvature and orientation mentioned in class Lecture 5, slide 9. Our storyline focuses on tech workers, so we wanted our visualizations to embody that focus.

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Now imagine, on LinkedIn, they find 221,450 Data Scientist jobs.

There can be age bias in what's considered the "ideal" candidate. Ageism can show up in job descriptions when they use certain terms or phrasing that signal a preference for younger candidates. For example, words like "digital native," "recent graduate," or "entry-level" can imply a preference for candidates who are just starting their career, even if they have equivalent skills and experience to more seasoned candidates. Similarly, job ads that emphasize "fast-paced environments," "high-energy," or "ability to work long hours" may discourage older candidates who may have caregiving responsibilities or value work-life balance differently.

Let's look at some the terms found in job descriptions.

Do you think these are age-unfriendly or age-neutral terms?

Age Unfriendly Terms	Age Neutral Terms
Active	Enthusiastic
Energetic	Dedicated
High-Performer	Dependable
Fun	Careful
Tech-savvy	Friendly
Fast learner	Benevolent
Recent college graduate	Work ethic
Youthful	Hard-working
GPA	Communication

Animated Word Cloud: As we learned in the lecture 21 slide 5, visualizing text has its own challenges. In order to address the intrinsic difficulties and still provide impactful insights, we leveraged two strategies. First, we established a direct association with the existing storyline, where the animation plays a very important role. Once the user lands in that part of the page, all the words are gray and randomly placed within the canva. However, once the movement begins, it becomes clear how some words that might have not been seen as age unfriendly terms, end up being labeled as so. Second, since this was a limited and structured dataset, we leveraged color and the positioning of the words to provide more information to the user, by creating an organized and properly grouped version of the word cloud, as we've seen on lecture 21 slide 41 example A. By doing so we hoped to provide engagement but also ensure high informativeness from the visualization.

Imagine they made it to the interview stage! They start telling you some of the questions they were asked.

Ageism can also manifest itself in the interviewing stage, where older candidates may face discrimination based on assumptions about their technological proficiency or their ability to adapt to new work environments. For example, an interviewer may ask a question like "How comfortable are you using new technologies?" assuming that older candidates may not be as familiar with the latest tools and software. This assumption is not only unfair, but it can also prevent qualified candidates from getting hired, regardless of their skills and experience. In addition, older candidates may also face bias in terms of cultural fit, as some companies may prioritize younger candidates who they believe fit better with the company's culture or values. It is important for interviewers to be aware of these biases and to evaluate candidates based on their skills and qualifications, rather than their age.

Do you think they are being discriminated against with these questions?

What is your energy level?

Discriminatory

Not discriminatory

Are you okay with working for someone younger?

Discriminatory

Not discriminatory

Have you kept your technology skills up to date?

Discriminatory

Not discriminatory

When did you graduate college?

Discriminatory

Not discriminatory

User input on potentially discriminatory interview questions: One way we wanted to bring interactivity into our product was by giving our viewers questions to answer. Since it is easy to read without thinking, we wanted a list of questions that the viewer could decide whether or not they felt like they were discriminatory. It is different for an individual to agree that ageism is harmful versus to know what it can look like. The questions aim to bridge the gap between agreement and understanding one's impact.

You start to wonder if there are substantial differences between those 50+ and under 50 in the workplace.

The tech industry has been particularly criticized for its youth-centric culture, which often prizes the qualities of younger workers such as creativity and adaptability over the experience and institutional knowledge that older workers can bring. This is particularly striking when you consider that the tech industry is often touted as a meritocracy that values skills and experience above all else.

Let's look at the most commonly used tools in data science and machine learning.

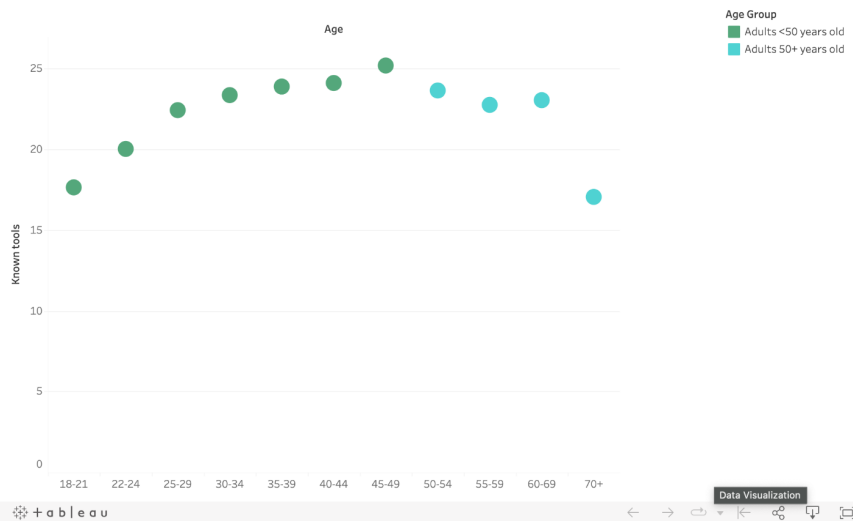
The top 10 coding tools used by all data scientists and machine learning engineers



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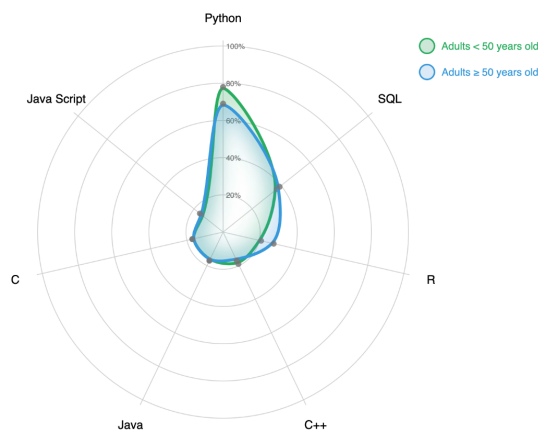
Vertical Bar Chart (Top 10 Coding Tools): One of the main questions we received during our usability testing was related to what are the most important and common tools used by data scientists today. To support the visualization of the next spider chart, we display the information regardless of age group using a bar chart. We adopted the bar format based on Knafflic's suggestion of leveraging the high familiarity users tend to have with them (2015, p. 50). Additionally, to provide better guidance towards which is the most popular tool, we used color to highlight as a visual affordance (Knafflic, 2015, p. 122). Finally, the user also has the option to hover over each bar and see the actual numbers through a tooltip functionality implemented in Observable. That way, we offer some kind of interactivity in case the user wants to obtain more specific information about a certain skill.

The average number of known data science and machine learning tools doesn't vary much by age group



Average number of known tools by age group: This chart aims to show that the number of known tools does not vary much by age group. We use color to distinguish between the two main groups (50+ and under 50). Comparing these values is possible with this chart as the dots generally fall around the same place on the y-axis outside of the upper and lower extremes.

Do you see a substantial difference between the age groups?
Percentage of people in each age group that use the top 7 tools



Radar Chart: As discussed in *class 13 slide 32*, we adopted the radar/spider charts to convey the message regarding a multi-dimensional analysis of the programming language skills among our two different age groups. The chart presents each of the seven most popular programming languages according to the Kaggle survey and provides the percentage of respondents who claimed to have experience within each age group. Instead of generating two multiples, we decided to keep the interactivity to allow the user to visualize each group individually, by hovering over each one of them in the chart. The radar chart also respects the color coding previously defined to promote a better navigation flow and understanding of the data to the user.

Data

The list of datasets used in this project was constrained to publicly available data. In order to ensure that the website could be published with no data privacy issues, including through Tableau Public, we defined the utilization of public information as a basic project premise.

The datasets that we used for the project are described below:

Kaggle Dataset: The dataset "kaggle_survey_2020_responses.csv" contains 20,036 responses to 39 or more questions. The survey included both single-choice questions, where respondents could select only one option, and multiple-choice

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questions, where respondents could choose more than one option. The responses were recorded in separate columns for multiple-choice questions, with one column for each possible answer choice.

Accessed via: <https://www.kaggle.com/c/kaggle-survey-2020/data>

Visier Insights Report: The Visier Insights report combines anonymous and standardized workforce data to investigate the impact of age on the workforce. The dataset used for the report includes 330,000 employees from 43 large US enterprises, all of which were customers of Visier. Additionally, Visier combined its primary data with existing resources from the US Bureau of Labor and Statistics (BLS) and other external resources.

This dataset was particularly more challenging because although the generated report is public, it only provides the final visualizations and not the actual raw data. Therefore, to obtain approximations of the data and re-design certain visualizations according to the best practices learned in class, we used a solution called: [PlotDigitizer](#), that infers the individual data point based on existing charts.

Accessed via:

<https://www.visier.com/blog/four-common-tech-ageism-myths-debunked/>

NLP Primary Data: As part of a Capstone project, we had access to a primary data source generated by the Capstone project team regarding Age Unfriendly and Age Neutral terms. This data source contained a list of words found in common job postings, obtained through web crawling, and properly labeled as either Unfriendly or Age Neutral. Although it was a primary data source, the results of the capstone project are expected to be published along with the final deliverable. Therefore, there is no conflict with the data availability premise of our website.

As expected, all the datasets listed above require some sort of data cleaning and processing. Most of the calculations were executed in Tableau or, in a few cases, in Excel. The final numbers were then used as input in the final Observable notebooks.

Tools



Tableau: Tableau was used as the Exploratory Data Analysis solution to ensure that the project team had enough familiarity with the data. Moreover, for some specific charts, as presented in section 3, we leveraged the Tableau Public feature to host and embed specific charts, including i) Manager workforce composition by Age; ii) The average number of known data science and machine learning tools don't vary much by age group. Finally, since we also used a very extensive dataset obtained from Kaggle, using Tableau allowed us to develop insights rapidly and create interactive visuals.



Observable (JavaScript): The largest number of our charts required interactivity and animation for engagement and proper utilization in addition to a certain degree of customization, considering the profile of our users. Therefore, we created most visualizations in Observable, using JavaScript and applying libraries such as D3 and specific packages to incorporate the animations and interactivity. Finally, we used Observable embed functionality to include the individual charts in our HTML file.



Figma: For our usability test, we used Figma to design our mid-fi prototype. It also helped us to establish the proper narrative and storyline of the solution as a whole. Similarly to an infographic, we created a story and validated it using Figma.



Visual Studio Code: We used VSCODE as our code editor for the HTML coding. Additionally, we installed specific extensions to facilitate the writing and debugging process, including, for example, CSS-in-JS, D3.js code snippets, HTML boilerplate and HTML Preview.



GitHub: For hosting our website we used GitHub, under the repository ecahill31. As students with git accounts, it facilitated the visualization across the team and helped us with version control.

Results

Storyline

Refining our narrative was a huge goal of ours since the usability testing portion of the project. Some of the feedback we heard made us question whether our original idea of starting with a persona and having the viewer “role play” them throughout the narrative was not successful. Our testers forgot their role and found that to be confusing. Marti also gave us feedback about removing the persona and instead asking users to picture someone they care about like a parent looking for a job. We ultimately **got rid of the persona and instead used language** to convey the same goal of increasing compassion from younger viewers.

What we decided to keep and remove in terms of visualizations was heavily influenced by our user testing.

- Firstly, the users claimed a lack of guiding language in the information visualization structure. We implemented a clearer navigation path to address such an issue, leveraging the Gestalt principle of continuity.

- Secondly, the users generally claimed that they found the Word Cloud helpful, although confusing. We worked quite a bit on making the word cloud require little action from the user while still using animation to engage them. We also made sure to categorize the words into two main categories, keeping them organized, and ensuring they aligned with the abilities of the NLP model used in the corresponding capstone project.
- Finally, another common trait among our testers was the challenge of continuous engagement with the initial narrative. At a certain point, they all lost track of the general idea and started focusing on individual tasks. We utilized information hierarchy by bolding and making header text much larger than supporting text. All of the main narrative elements are a large font size to emphasize that they are the main points and what tie the whole story together.

Visuals

Our testers defined the tech vs. non-tech manager chart as an easy-to-interpret visualization that quickly conveyed an important message regarding how the tech world behaves compared to the non-tech regarding management positions percentage across different age groups. However, they also claimed some opportunities for improvement within this chart. For instance, they claimed that filtering of different age groups provides little more insight than the regular visualization of the graph. By filtering, as currently implemented, the user loses the comparative aspect of the analysis and does not gain anything in return. Moreover, the Y-axis units needed to be clarified and better aligned with the axis title. To sum up, a minor chart redesign will be required to address those relevant concerns

Initially, we had an unemployment visual that had linked information about gender and race and age. Although we initially thought this might provide a substantial amount of interesting insights, it seems to be the wrong choice for our product vision and goals. First, it does not align with the rest of the speech that we are trying to convey through our visualization, which is mostly focused on the tech industry. Second, chart #2 largely relies on a lot of interactivity, which might not be the best strategy to convey a simple and direct message to our users. With that in mind, we decided that this chart will no longer be part of our product. We decided

to remove this from the final product as it was an overwhelming amount of information and did not further our product goals.

Number of known tool charts were among the clearest and easiest to understand in usability tests, so we ended up using this information and adding a couple of additional charts to further this point. According to our testers, the tool chart provided good insights regarding the difference in known tools based on age group and allowed them to quickly visualize that older adults in tech have an extensive belt of tools and techniques. One interesting comment we received suggested allowing the user to drill down further into this chart and obtain even more insights from the data. We ultimately gave more detail about which programming tools were most commonly used and insight into whether there were differences between percentages of people who used these tools in 50+ and under 50 age groups as shown by our radar plot.

Lastly, we heard in our usability testing that the whole product felt a bit bleak because it focused on the problem with ageism with no methods on how to deal with it. We decided to end our website on a more positive note by including some resources for tackling ageism to make it clear that there are things that can be done to improve ageism.

Division of labor

Overall breakdown: ~50/50. List of specific tasks below.

Task	Who worked on it
Narrative structure of information flow	Eileen
Figma prototype for usability testing	Eileen
Write-up for usability testing	Split
Create HTML file and fill in with graphics, animations, words	Eileen
Troubleshoot HTML issues, figure out	Filipe

additional animation issues	
Create animated Word Cloud	Filipe
Create animated Waffle chart	Filipe
Create interactive Radar Chart	Filipe
Create tech vs. non tech manager chart	Filipe
Create tool knowledge dot plot	Eileen
Lead 2 usability tests	Eileen
Lead 1 usability test	Filipe
Create bar chart for tool knowledge	Filipe
Create GitHub site, put files into GitHub	Eileen
Writing usability testing task questions	Filipe
Writing usability testing questionnaire	Eileen
Creating thumbnail image	Eileen
Background research and lit review for project proposal	Eileen
Managing project notion for all resources	Eileen
Gathering tech sector stats	Eileen
Product proposal	Split
Final project writeup	Split

Thumbnail image



(SVG file attached to final submission)

This project is a part of the MIMS '23 Capstone, Sage: [Enabling Aging Workers to Excel in the Modern Job Market](#)

Github

<https://github.com/ecahill31/ecahill31.github.io>

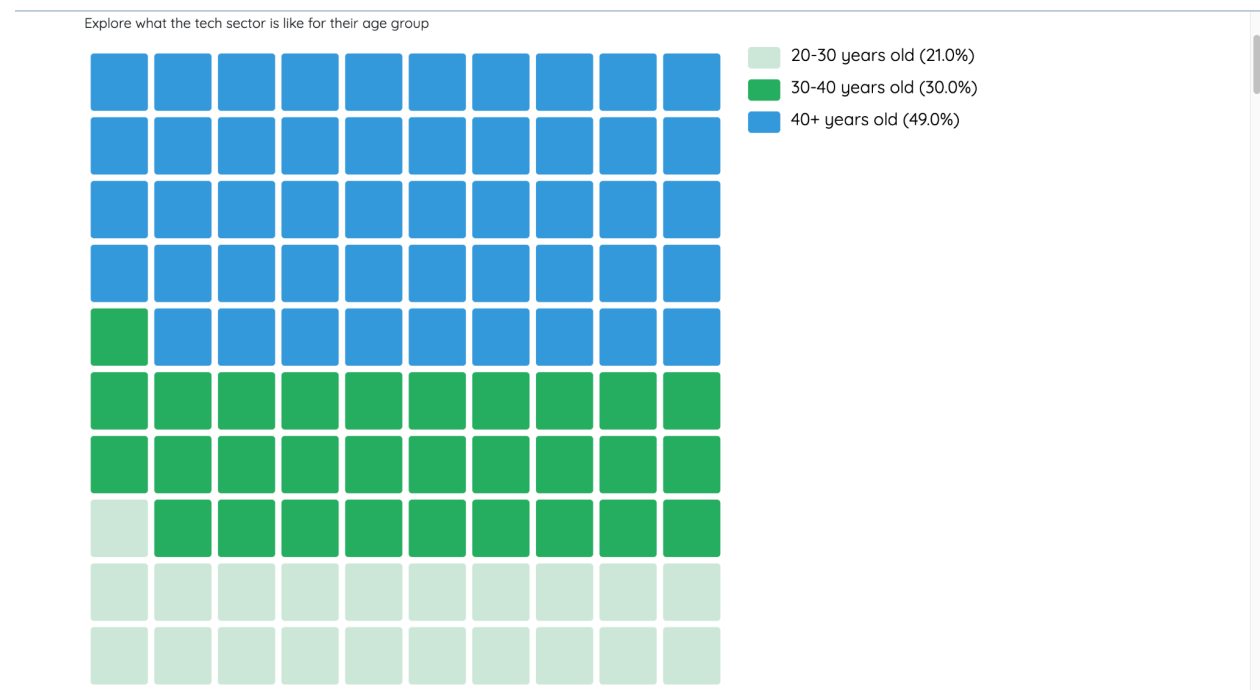
Additional Resources

Observable References

- <https://observablehq.com/@rayraegah/radar-chart>
- <https://www.visualcinnamon.com/2015/10/different-look-d3-radar-chart/>
- <https://observablehq.com/@analyzer2004/waffle-chart>
- <https://observablehq.com/@fil/waffle-chart>
- <https://observablehq.com/@fil/plot-animate-a-bar-chart>
- <https://observablehq.com/@jarrettmeyer/animated-bar-chart>
- <https://observablehq.com/@ahmedhammeda/how-to-create-a-zoomable-and-animated-bar-chart-with-d3-js>

Appendix

Other screenshots:



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Ageism can also lead to challenges in career advancement and job security for older workers, as they may be perceived as less valuable to the company compared to younger employees. They make up a significant portion of the workforce!



Ageism is a problem that needs to be tackled.

Ultimately, the goal is to create a tech industry that values workers of all ages and backgrounds, and that recognizes the contributions that older workers can make to the field. By breaking down stereotypes and fostering a more inclusive culture, we can help to ensure that the tech sector is a place where everyone can thrive, regardless of their age.

