

AI on Workforce - Project Report

Jade Custer
University of San Francisco
Data Visualization

Abstract—AI and automation have been making a steady rise in the last decade, and with it getting better and better, so has its takeover in the workforce. In different industries worldwide, there is a rising risk of AI and automation implementation. With this, certain skills and occupations in the matter are at risk of being replaced with an AI counterpart that is optimized to make efficient workflows. This report will detail AI and automation and their impacts on the workforce based on a dataset that uses worldwide data. As well as this, it will detail connections between salary, skills, occupations, industry, to AI and automation adoption

I. INTRODUCTION

The main goal of my project was to visualize AI and automation adoption in the workforce. I also aimed to see what the current workforce looked like in terms of industry and skills as AI and automation adoption became more popular. This becoming increasingly popular to know about as the workforce continues to evolve and change with the times, leading to major shifts in many industries and jobs.

Project Objectives

- 1) Which industries are at risk of being taken over by AI and automation
- 2) How does AI and automation risk differ in different cities
- 3) What skills are needed and cannot be done by AI or automation
- 4) What is the correlation between AI adoption/automation risk and salary
- 5) How does company size affect AI adoption

II. RELATED WORKS

Some works that were relating to the idea that I wanted to follow included the ones by [1], [2] and [4] which I thought were super interesting and with the data that I found I ultimately ended up on an idea similar to it. In this I ended up creating something based in AI, but many of the articles I was viewing had dived specifically into the issues with AI and automation and rather than focusing in different topics like I did there was less diversity. Although not directly related to how my overall design happened I did like the dashboard style look/article look that was present in many of these websites that I fell in love with and wanted to have as part of the project.

More on things that inspired the looks we have the articles [3] and [5] I liked how they looked and wanted to originally have the website look like, but with the beta release feedback they got overridden in favor for a different approach. If we

look back at my beta release I had some of the ideas they had and the scrollytelling element I later implemented ended up making my website seem much more similar, but how some of the elements stuck just didn't end up working well for me.

Several works were used to inspire the approach and look of my project, but there was a scrollama demo created by Russell Samora [6] that ultimately influenced how I designed my website and the scrolling aspect of it. I did end up switching what sides things were on, but arguably it was the template for the general aesthetics of the website. As well as this, it was the basis on how I decided to create my project best suited to display my information as best as possible

The tree map was arguably the hardest part of the project as I struggled a lot to get things right. An inspiration for how to develop a tree map was the [7] by Ben Schneideman, which led me to create a tree map that, although simple, had all the attributes of a tree map and how to make it easily in D3. It gave me the base lines to make a really good tree map that was done correctly and did my data justice.

In terms of my story [8], [10] and [9] were all crucial in terms of me meeting some of my goals in learning more about AI and automation risk. Super interesting to read and I highly recommend it as it was just something that I think is what I needed to make my website better since my data was minimal. I used points that I had read up and intertwined them into my story and with that my story without these stories would have been more than lackluster and would have not portrayed the same points I had in mind.

III. APPROACH

I tried a lot of approaches, and some worked better than others. Different approaches with aesthetics, visualizations, and story had varying results, but let's dive into things that didn't work well

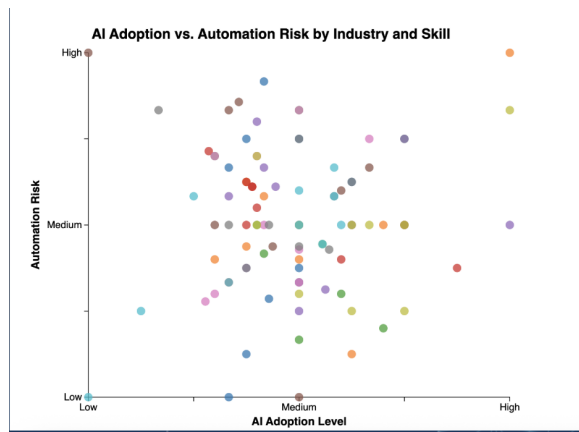


Fig. 1. This chart shows when I tried to take an approach to use industry and skill to plot data points for automation risk and AI adoption.

I had many issues with my scatter plots with the final approach, including just getting rid of the original aggregation it had and just changing it to be aggregated based on occupation and skill. It definitely worked, but this idea had to be ultimately scrapped because I feel like ?? didn't show anything of use and felt manufactured.

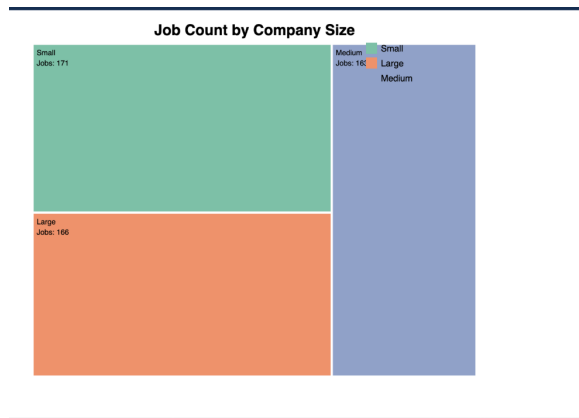


Fig. 2. This Tree map displays the original idea that I had for the Tree map regarding company size for an objective, but this caused me to realize that there would only be 3 boxes per risk level.

This approach didn't end up working because the data I had wasn't very good, and it wouldn't produce any results that made sense for what I wanted to show. Each color would have only 3 boxes, and I felt like a Tree map wouldn't correctly show that, but also felt like the information I got from the chart was unnecessary. Overall, I ended up switching to basing it off of occupation and adding the company size as a text add-on on which felt representative enough since I wasn't able to use the data I had to meet my objectives.

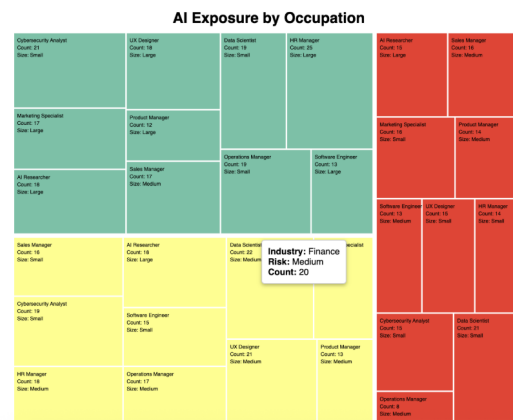


Fig. 3. An example of a tooltip idea I was using before it broke and left tooltips in places it shouldn't be. Tooltips don't exist on the tree map so this is an obvious defect.

This approach for my tooltips of all my charts sharing the same tooltips unfortunately didn't work as well as I hoped. Thus, unfortunately, creating the problem of charts that don't have tooltips, having random tooltips being there hovering. From there, I had to end up removing the tooltip upon drawing each chart which worked and allowed the original idea to work well.

IV. RESULTS

My visualizations definitely were able to meet my goals for the most part and I'm glad it worked out well especially with my struggles with a lack of data.

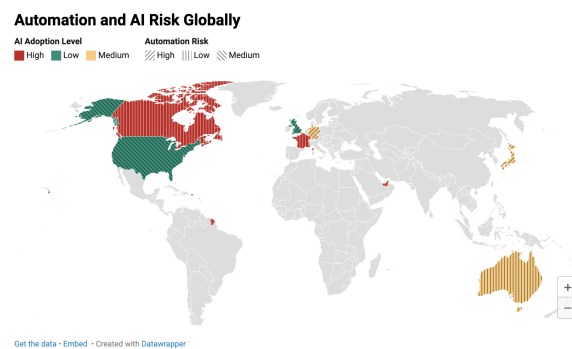


Fig. 4. This is a Choropleth Map made in DataWrapper based on AI and automation risk globally that shows that Canada and France have a high AI risk.

This chart was made to fulfill my objective relating to how does AI and automation risk differ in cities. DataWrapper, unfortunately, was not able to accept cities, so I ended up doing it based on countries, which still gave the same effects that I wanted. This met the objective because I was able to show how each country is affected easily with tooltips and a zoom functionality. Due to a lack of data, it doesn't have every country added, but it was at least good for the data I had.

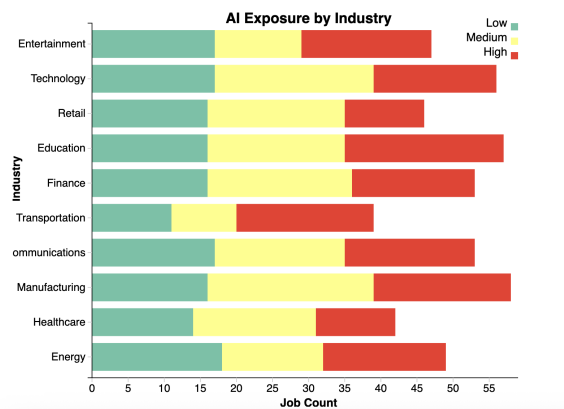


Fig. 5. This is a Stacked Bar Graph that showcase the AI risk based on industry where Transportation has the highest AI risk.

This bar graph was created to fulfill my objective regarding which industries are at risk of being taken over by AI. This chart definitely showed this as it showcases the industries that have the most job counts in the red section which is at high risk and I was able to see breakdowns because of the tooltips easily showing the job count and the fact that I could see just general trends at a quick glance.

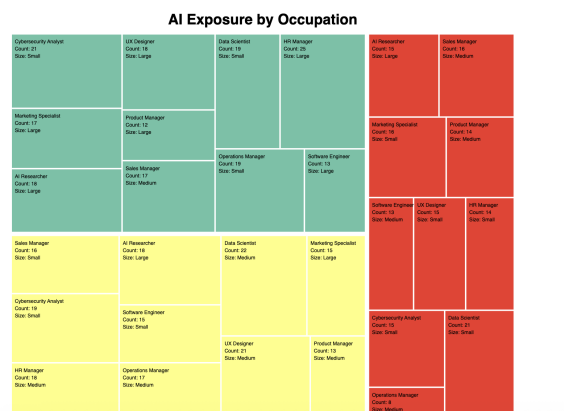


Fig. 6. This is a Tree Map showcasing the occupations most at risk of AI adoption where managerial positions seem to have the highest risk of AI exposure.

The Tree Map's purpose was to fulfill the objective of how company size affects AI adoption. This chart was unfortunately not able to fulfill this objective just because the data wasn't being showcased correctly and it didn't show what it needed to show and generally didn't give any trends, thus I ended up changing it to be based on Occupation, but still added the company size to somewhat fulfill the objective.

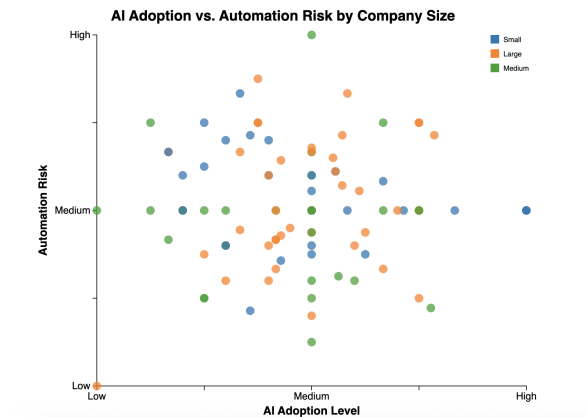


Fig. 7. This is a Scatter Plot showcasing AI/automation risk by plotting skill and occupation and colored by company size where large companies have the most medium risk.

This scatter plot was created to fulfill the objective of what skills are needed and cannot be done by AI or automation. The objective was met because after aggregating and some look into the data there is clear ideas of what skills are at a higher risk of AI and automation adoption.

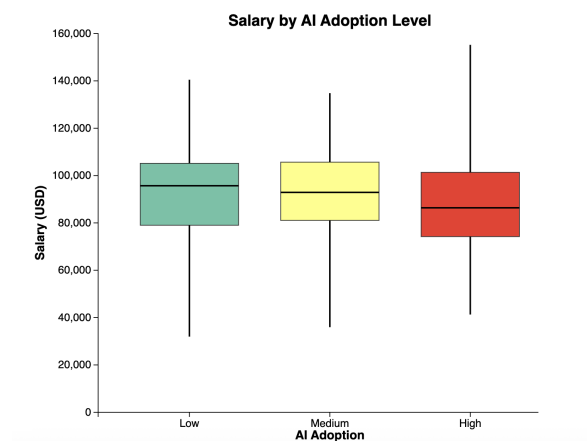


Fig. 8. This is a Box Plot to show AI adoption based on salary where the median wage goes down with higher risk.

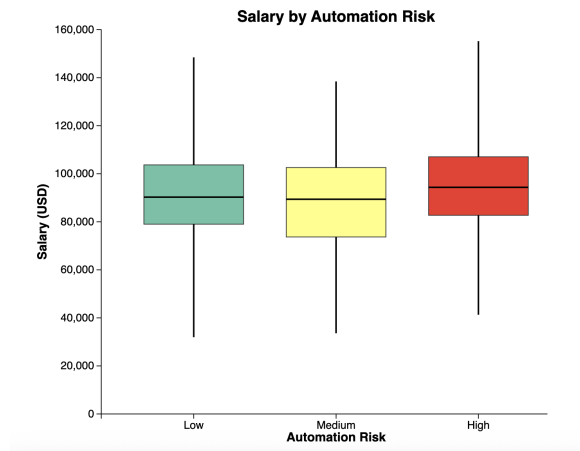


Fig. 9. This is a Box Plot to show AI adoption based on salary where the median wage goes up with higher risk.

These boxplots (Figures 8 and 9) were created to showcase what is the correlation between AI adoption/automation risk and salary. This clearly shows the objective as it shows the salary based on low, medium, and high risk for both AI and automation risks. There are some clear trends seen which is what I wanted out of this chart.

A. Measuring Success

I measured success based on whether or not I was able to create a visualization and if it met the objective that it was based on. As well as this, I based my success on whether or not the aesthetics were something I liked and were not bad or ugly charts. Finally, I measured my success in whether or not the data was showcased well and could actually give a look into the trends or risk/adoption levels

V. DISCUSSION

The approach I took was definitely promising in terms of how I tackled this project. I originally went from making things in Vizhub to then making it in a webpage, and slowly making progress from there. I made myself struggle a lot of the time because of this though. After my Beta Release additions, including scrollytelling I had to overhaul my website and start over then add back in SVG code, which meant between vizhub and the index.html, and the old look and scrollytelling I also had to change things, which was difficult and I kept making more work for myself. From this project though, I learned a lot more about editing visualizations and creating them from scratch with a certain vision in mind. As well as this, I learned how to create an actual website that was interactive, which was really fun. If I were to restart this project I'd start with scrollytelling from the get-go which would make everything so much easier.

VI. FUTURE WORKS

If I had more time, I definitely would have liked to try to turn my Chloropleth map into a D3 visualization, enhance my story, fix my scrollytelling transitions, and add filtering to my scatter plot.

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