

Master's in Computer Science

**MSDA3060- Data Visualization and Story Telling
PHASE-II
H-1B VISA ANALYSIS**



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ABSTRACT

The H-1B visa is a temporary work visa that allows US employers to hire foreign workers in specialty occupations that require theoretical or technical expertise in fields such as science, engineering, and information technology. The analysis of H-1B visa trends, examining the program's historical context, policy changes, and recent data on visa applications and approvals. It examines the economic impact of the H-1B program on the US labor market, considering both its benefits and criticisms. Overall, the analysis provides insights into the ongoing debates surrounding the H-1B program and its implications for US immigration policy and the economy[1][10].

I. INTRODUCTION

The H-1B visa program has been a significant part of the US labor market, providing temporary employment opportunities for foreign workers in specialized fields. It is useful for individuals who get a temporary employment position in the US from a US employer.

There is fluctuation in the visa application programs and there has been an existing issue in the US labor market and economy. Also, a natural disaster was affected in 2020 i.e., COVID-19 which affected a major part of the applications being filed. So, it is necessary to examine an analysis of the current problems. Based on the situation our analyses will aim to identify the key trends and patterns in H-1B visa usage, examine the characteristics of H-1B visa holders, and evaluate the program's impact on wages, job opportunities, and economic growth[1][10].

II. PROBLEM STATEMENT

Today's world is constantly bombarded with vast amounts of data, which can often be overwhelming and difficult to interpret. Raw data can be complex and unstructured, making it challenging to derive meaningful insights from it. Effective data analysis is therefore essential to make sense of this data and uncover useful information. This process of analysis can help us visualize data more clearly, identify trends, patterns, and correlations, and gain a deeper understanding of the data we are working with. Similarly, we have a large number of data for the H-1B Visa as this process started ages and records were stored. Such data must be interpreted and visualized to get a better understanding and future use.

The following are the problem statements of the analysis of the H-1B Visa from 2019 to 2021(Q1):

1. What is the trend of the visa application and visa status applied?
2. What are the trends of Visa status?

3. Which places are likely the hub for employers and sponsor the majority of H-1B?
4. How does the salary earned by H1b Visa compare to the average prevailing wages?
5. What is the trending job market in the United States?
6. What are the top 10 H1b employers?
7. Which state has the highest no of visa holders?
8. Who are the top agents filling the most H-1B applications?

III. METHODOLOGY

3.1. DATA SOURCE AND COLLECTION:

The data source for an H1-B visa analysis (Q1) 2019-2021 can be obtained from the U.S. Department of Labor's Foreign Labor Certification Data Center which provides information on job titles, employer information, job locations, wages offered, and visa status history. This data source is reliable as it is maintained by a government agency and provides comprehensive data on certified H1-B visa applications[1].

3.2. DESCRIPTION OF DATASET:

S.no	Field Name	Description
1	CASE_NUMBER	A unique case number is assigned by the (USCIS) to each H-1B visa application that is submitted by an employer on behalf of a foreign worker.
2	CASE_STATUS	Analyze the current status of the H-1B visa application, where the values can be certified, denied, withdrawn, or pending.
3	RECEIVED_DATE	H-1B visa application received date by USCIS.
4	DECISION_DATE	The decision date for the H1-B visa application.
6	JOB_TITLE	The title of the job offered by the U.S. employer to the foreign worker.
7	SOC_TITLE	Standard Occupational Code (SOC) is the occupational title given by foreign workers to the employees.
8	BEGIN_DATE	Requested start date of the employment period.
9	END_DATE	Requested end date of the employment period.
10	EMPLOYER_NAME	Organizational name of the employer who submits the application.
11	EMPLOYER_STATE	State where the employer is located.
12	WAGE_RATE_OF_PAY	Wage provided by the employer to the foreign workers.
13	PREVAILING_WAGE	The average wage paid to workers in similar occupations in the same geographical area.

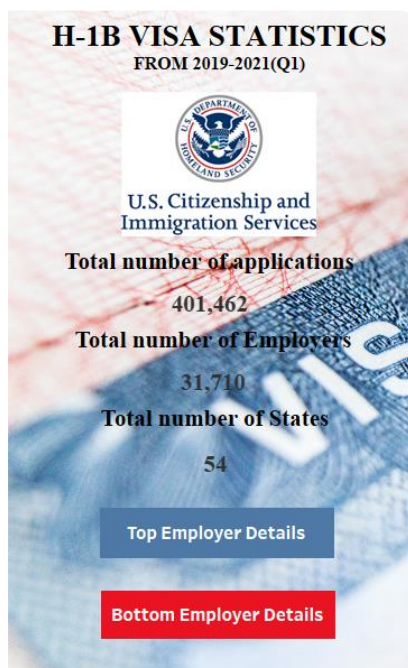
3.3. DATA CLEANING:

In Tableau, data cleaning is the process of preparing data for analysis by identifying and correcting errors, inconsistencies, and incomplete information. Tableau provides various tools and features to clean and shape data. For instance, Tableau's data interpreter feature can automatically detect and correct data anomalies, such as inconsistent date formats or misspelled data labels. Here we have also cleaned by removing duplicate records, resolving missing or incomplete data, standardizing data formats, and transforming data values into a consistent structure[2].

IV. DATA ANALYSIS AND VISUALISATION

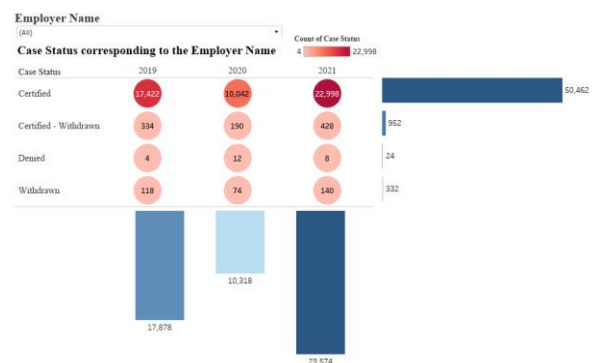
4.1. TOTAL NUMBER OF APPLICATIONS/ STATE/ EMPLOYERS:

Users can access detailed information on the top and bottom H-1B visa sponsors by clicking on the corresponding buttons, including the top 5 states and job titles associated with each sponsor. Additionally, the aggregation of the total number of applications filed, the total number of employers who file for H-1B Visa, and the corresponding state of the employers. Overall, this dashboard provides a valuable tool for policymakers, employers, and foreign workers seeking to understand the dynamics of the H-1B visa program in the United States[3][4].



4.2. CASE STATUS:

This dashboard provides visualizations of H-1B visa applications filed in the United States between 2019 and 2021, categorized by their case status. A text chart in the top left corner displays the number of applications filed yearly, differentiated by their case status (certified, withdrawn, certified-withdrawn, or denied). The color of each circle corresponds to the weightage of the number, providing a quick visual representation of the data. On the right-hand side, a horizontal bar chart aggregates the total number of H-1B visa applications received over the three-year period, categorized by case status. The dashboard also includes a vertical bar chart at the bottom, depicting the number of applications received each year for the same three-year period. This dashboard will be helpful for the intended audience like applicants where they can understand the trend and decide whether to apply or not. Similarly, employers also decide how many numbers of the case to be filed by their company[3][4][5] [10]..



4.3. EMPLOYERS AND JOB DETAILS:

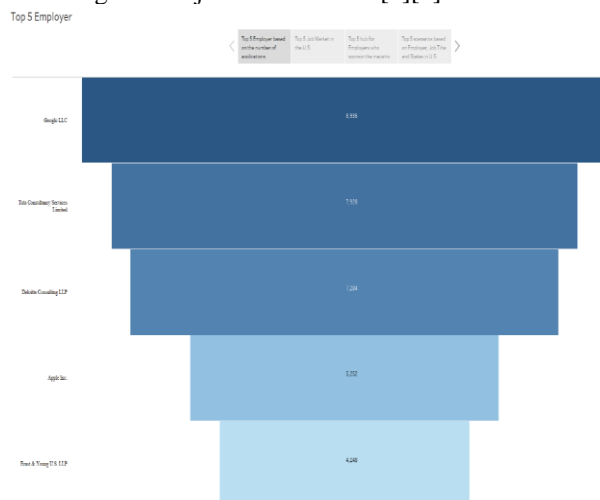
This analysis aims to examine employer and job details related to the salary earned by H-1B visa holders in comparison to the average prevailing wages. The data is visualized using a table chart that can be filtered by year, job title, and employer name. Additionally, the dataset used for this analysis includes fields such as employee name, job title, case status, and prevailing wages, which are aggregated to provide information on the minimum, maximum, and average prevailing wages, as well as the total number of applications. By aggregating these fields, we can gain a comprehensive understanding of H-1B visa application trends and prevailing wage rates across different job titles and employers[3][4][5].

Employer and Job Details							Year of the Decision Date
Employee Name	Job Title	Case Status	Max Permitted Wage	Min Permitted Wage	Avg Permitted Wage	Total Number of Applications	
WEB TOGA, INC.	Systems Analyst	Certified	\$0,850	\$0,850	\$0,850	2	2019
							Job Title
							Systems Analyst
							Employer Name
							WEB TOGA, INC.

4.4. TOP 5 EMPLOYERS DETAILS:

4.4.1. TOP 5 EMPLOYERS DETAIL BASED ON APPLICATION:

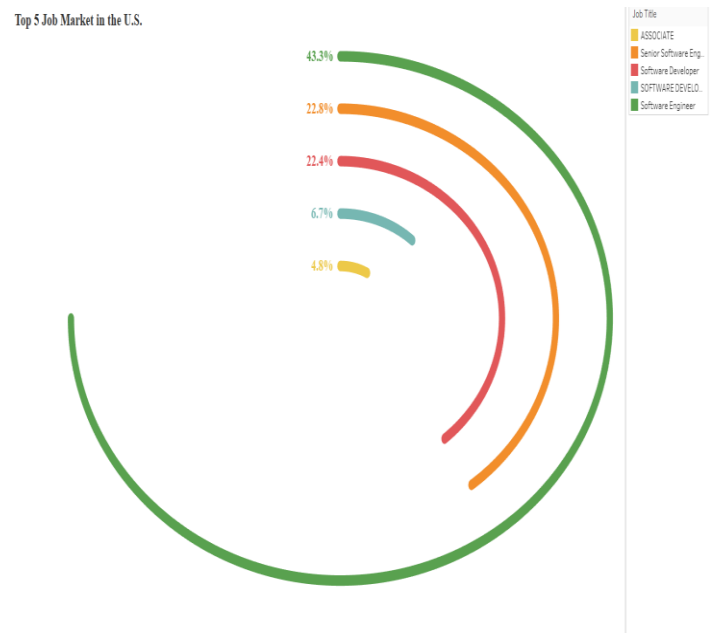
A funnel chart is used to analyze the top employers based on the number of H-1B visa applications submitted during 2019-2021. The chart displays a decreasing trend in applications received by companies. The analysis reveals that major IT companies like Google, Apple, and others offer more opportunities and sponsorship to immigrant workers reflecting current job market trends[6][7].



4.4.2. TOP 5 JOB MARKETS IN THE U.S:

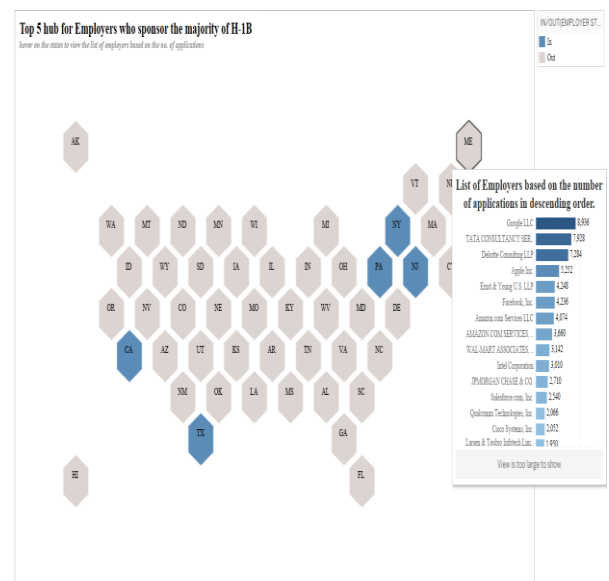
A radial bar chart can provide insights into the top 5 job markets in the USA based on H-1B visa applications. Each job market is represented as a segment of a circle, with the size of the segment reflecting the number of applications received. The chart can also display the percentage of applications for each job market by labeling each segment. The analysis reveals that major IT companies offer more opportunities and sponsorship to immigrant workers. [6][8].

Top 5 Job Market in the U.S.



4.4.3. TOP 5 HUBS FOR EMPLOYERS WHO SPONSOR THE MAJORITY OF H-1B:

A hex map identifies the top 5 hubs for H-1B visa sponsors. Each hexagon represents a geographic area, and the color indicates a high concentration of H-1B visa sponsors. Hovering over a state on the hex map displays the list of employers based on the number of H-1B visa applications they sponsor[3][4][6][9].



4.5. BOTTOM EMPLOYER DETAILS:

4.4.1 BOTTOM EMPLOYER DETAILS BASED ON EMPLOYERS AND JOB TITLE:

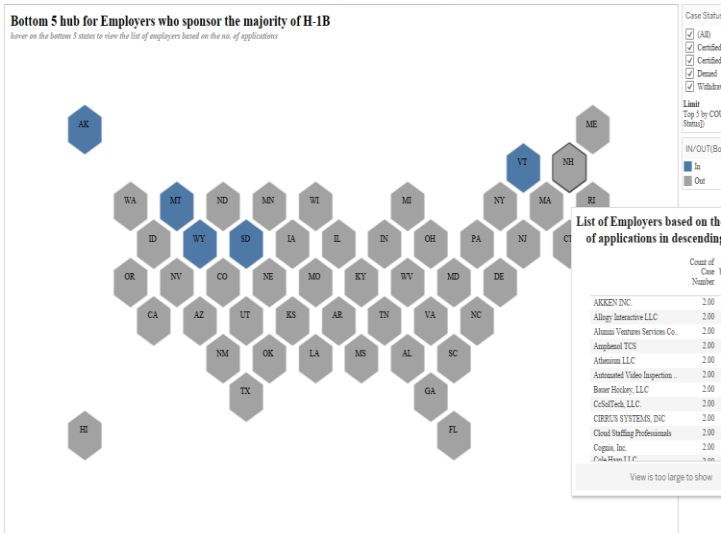
Using a table chart that lists the bottom 5 job markets and employers in the United States based on wages. The titles "Analyst" and "Business Analyst" are at the bottom of the list, and Ares Operation LLC has the lowest wages for these positions. The chart is helpful for those interested in low-paying jobs. Policymakers and employers can use the chart to improve compensation in these job markets[3][4][5][10].

Bottom 5 Job Market and Employers based on wages in the U.S.

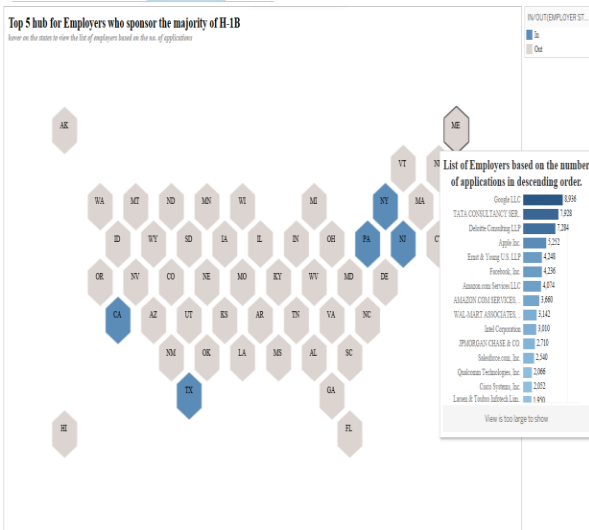
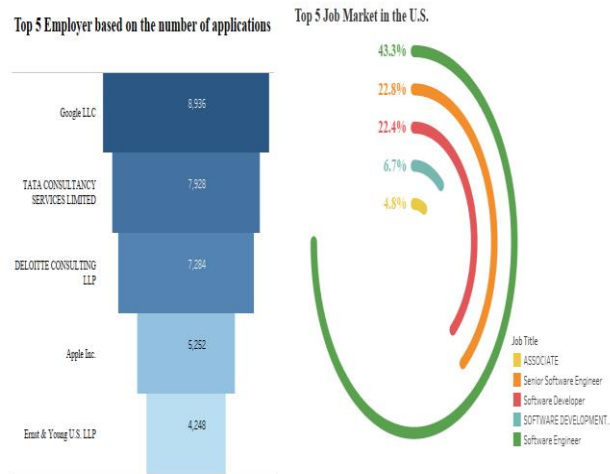
Employer Name	Job Title
ARES OPERATIONS LLC	ANALYST, BUSINESS ANALYTICS
BUCKNELL UNIVERSITY	ASSISTANT PROFESSOR OF CHINESE LANGUAGE
CHINA LUXURY ADVISORS, INC.	ASSISTANT ACCOUNT EXECUTIVE
COLLEGENET, INC.	APPLYWEB SOFTWARE ENGINEER
EXELON GENERATION COMPANY, LLC	ANALYST, MARKET FUNDAMENTALS

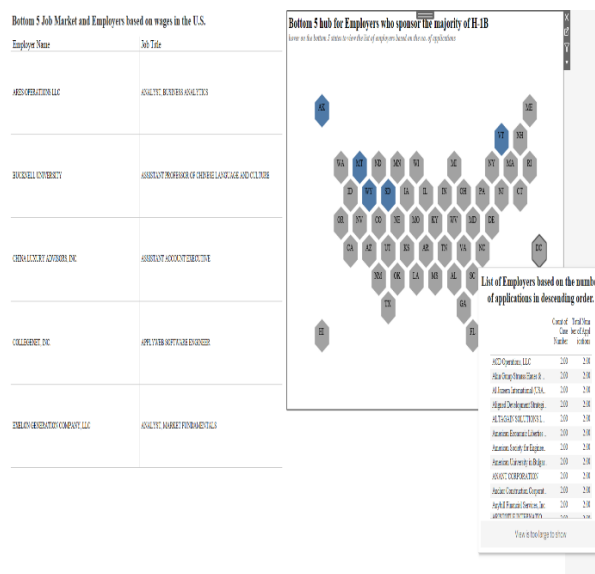
4.5.2. BOTTOM 5 HUB FOR EMPLOYERS WHO SPONSOR THE MAJORITY OF H-1B:

Using a similar data visualization technique, we can identify the lowest 5 states in the US with the certified approval rate for H-1B visas. By analyzing a map, it is evident that these states have a relatively low demand for H-1B visa workers, as the number of certified approvals is lower compared to other states. The tooltip provides further information, presenting a list of employers based on the number of applications[3][4][6][9].



4.5.3. OVERALL DASHBOARD FOR TOP AND BOTTOM RESULTS:





V. CONCLUSION

In conclusion, data analysis and visualization using Tableau can be a powerful tool for understanding the dynamics of the H-1B visa program. By examining data on H-1B visa applications and approvals, one can identify patterns and trends in the program, including the geographic and industry distribution of H-1B sponsors and the impact of the program on the US job market and wages. This information can be valuable for policymakers, employers, and foreign workers seeking to better understand the program and its implications. Tableau provides an intuitive and user-friendly platform for analyzing and visualizing complex data, allowing stakeholders to derive insights that can inform decision-making and drive positive outcomes for the US economy and workforce.

VI. RECOMMENDATION

The H-1B visa sponsorship dashboard offers valuable data and visualizations for employers, foreign workers, and policymakers. Employers can use it to identify potential areas for sponsorship, analyze competition, and ensure fair pay for employees. Foreign workers can find job opportunities, compare wages, and identify potential sponsors.

California seems to be the top state where the certified cases are high also, the Google company and associates role seems to be at the top. We recommend not going for Ares Operations LLC as an Analyst and Business Analyst and not opting for Alaska. People can calculate the wages according to the employer name corresponding to the job title yearly(2019-2021).

VII. FUTURE WORK

Our future work includes closely monitoring any significant changes in the prevailing wage calculation for H-1B visa applicants and investigating the trend of an increasing number of visa applicants holding master's degrees in the future, we plan to analyze the distribution of visa holders across different industries and nationalities and examine the impact of changes in visa policies on the program.

VIII. REFERENCE

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