H-1B JOB MARKET EXPLORER

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BACKGROUND

- The H-1B is a visa in the United States under the Immigration and Nationality Act, section 101(a)(15)(H) which allows U.S. employers to employ foreign workers in specialty occupations

- Due to its accessibility and convenience, it is one of the most popular and widely sought specialty occupation visas

THE DATASET

Tabular dataset with details of employers' Labor Condition Applications
https://www.kaggle.com/jonamjar/h1b-data-set-2017

Categorical Attributes

CASE_NUMBER
CASE_STATUS
VISA_CLASS
EMPLOYER_NAME
EMPLOYER_CITY
EMPLOYER_STATE
EMPLOYER_POSTAL_CODE
JOB_TITLE
SOC_CODE
SOC_NAME
FULL_TIME_POSITION
PW_UNIT_OF_PAY

PW_WAGE_LEVEL
PW_SOURCE
PW_SOURCE_OTHER
WAGE_UNIT_OF_PAY
H1B_DEPENDENT
WILLFUL_VIOLATOR
SUPPORT_H1B
LABOR_CON_AGREE
WORKSITE_CITY
WORKSITE_COUNTY
WORKSITE_STATE
WORKSITE_POSTAL_CODE

Quantitative Attributes

CASE_SUBMITTED
DECISION_DATE
EMPLOYMENT_START_DATE
EMPLOYMENT_END_DATE
TOTAL_WORKERS
PREVAILING_WAGE
PW_SOURCE_YEAR
WAGE_RATE_OF_PAY_FROM

WAGE_RATE_OF_PAY_TO
ORIGINAL_CERT_DATE
NEW_EMPLOYMENT
CONTINUED_EMPLOYMENT
CHANGE_PREVIOUS_EMPLOYMENT
NEW_CONCURRENT_EMPLOYMENT
CHANGE_EMPLOYER
AMENDED_PETITION

DATA FILTERING AND CLEANING

- Subset of Records
  - Raw data: 624, 650 rows
  - Applied conditions detailed in table
  - Filtered data: 486, 755 rows
- Subset of Features
  - Raw data: 54 columns
  - Filtered data: 8 columns
- Data Reduction
  - Raw: 33,731,100 values
  - Filtered: 3,894,040 values
- Dataset reduced by ~89%

Filters	
Attribute	**Condition**
All	Not Null
CASE_STATUS	'Certified'
WAGE_UNIT_OF_PAY	'Year'
SOC_CODE	Is Valid*
VISA_CLASS	'H-1B'
WORKSITE_STATE	Is Valid

*SOC Code first 2 letters in https://www.bls.gov/oes/current/oes_nat.htm

THE STRUGGLE
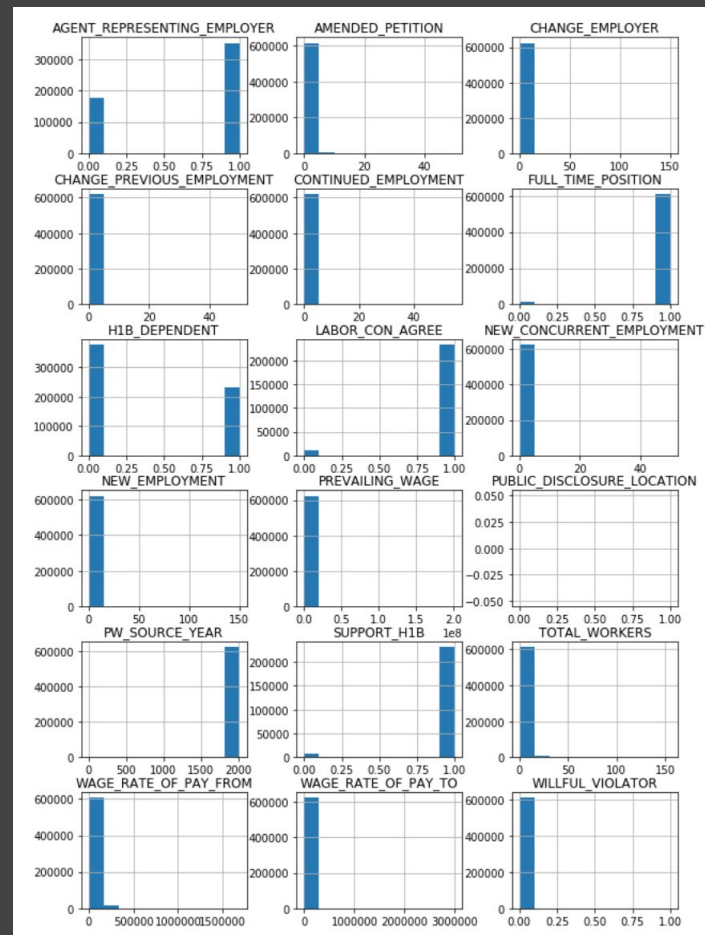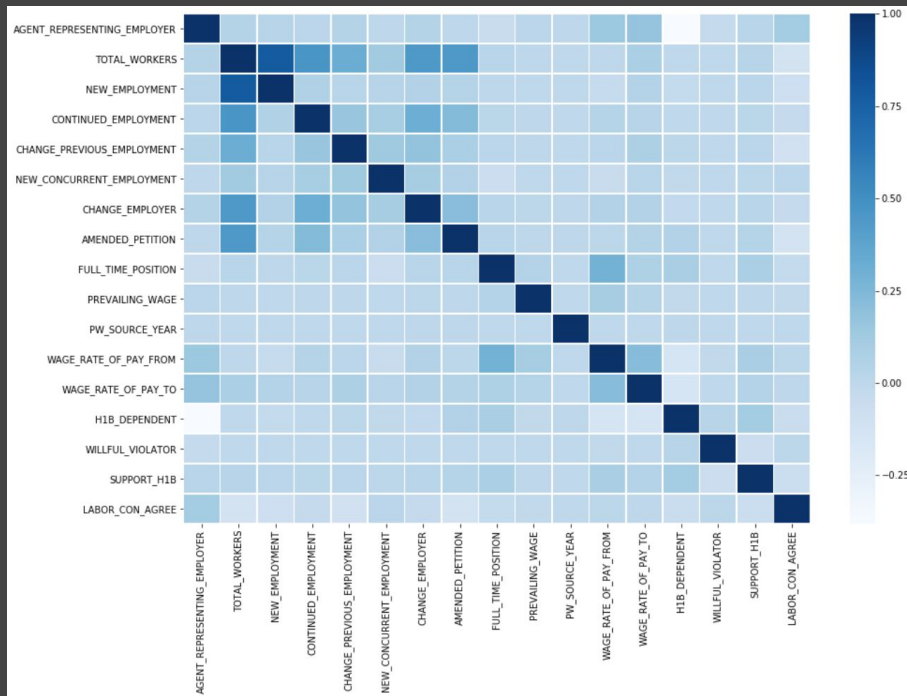
Correlation heatmap of raw features

Histogram of raw features

THE GOAL: BUILD AN H-1B JOB EXPLORATION TOOL

STAKEHOLDERS

- INDIVIDUALS SEEKING TO UNDERSTAND THE H-1B JOB MARKET

- SKILLED FOREIGN WORKERS
  - THOSE ALREADY LIVING IN THE U.S. SEEKING NEW EMPLOYMENT OR HOPING TO RELOCATE
  - THOSE SEEKING TO MOVE TO THE U.S.
  - MEMBERS OF OUR COHORT

- FOREIGN WORKERS
  - THOSE INVESTIGATING WHICH CAREER PATHS TO PURSUE

TASKS & TARGETS

Analyze	
Consume	
Discover	
Distributions	Outliers

Search		
Lookup	Locate	Browse

Query		
Identify	Compare	Summarize

H-1B Job Count Aggregations
Average Wages
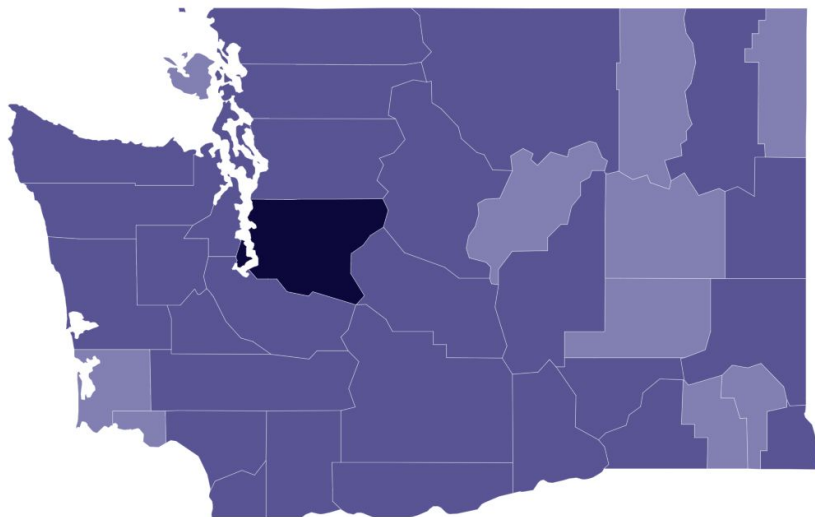
Job Type Comparisons
        By Region
        By Employer

Biggest Employer Comparisons
        By Job Type
        By Region

Region Comparisons
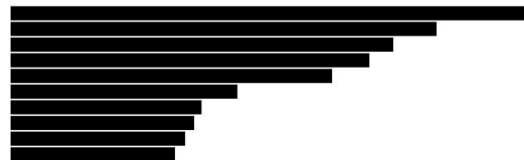   By Employer
        By Job Type

EARLY PROTOTYPE

Reworked Design
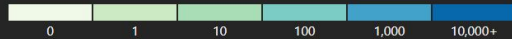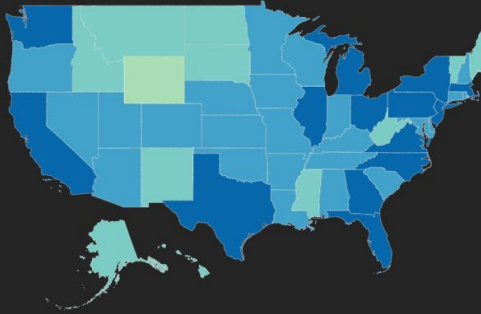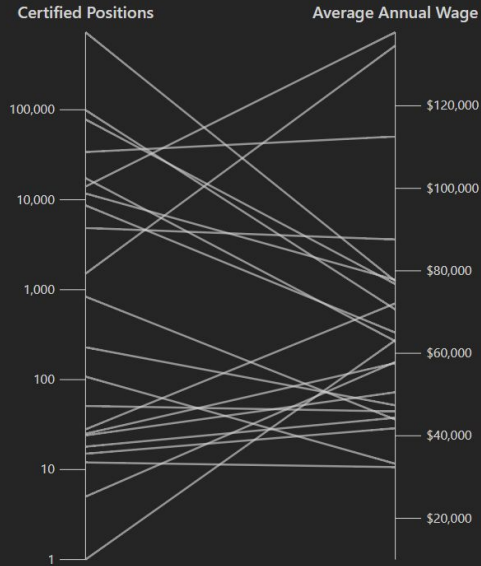
VISUALIZATION LAYOUT
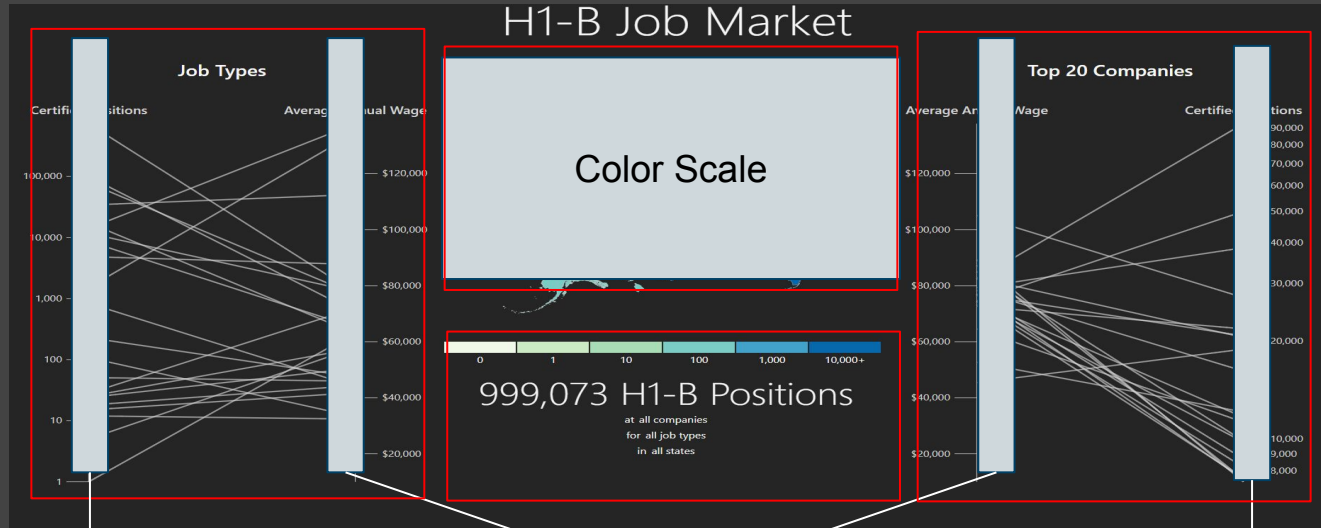
Dynamic Log Scale

Shared Scale

Dynamic Log Scale

HOW

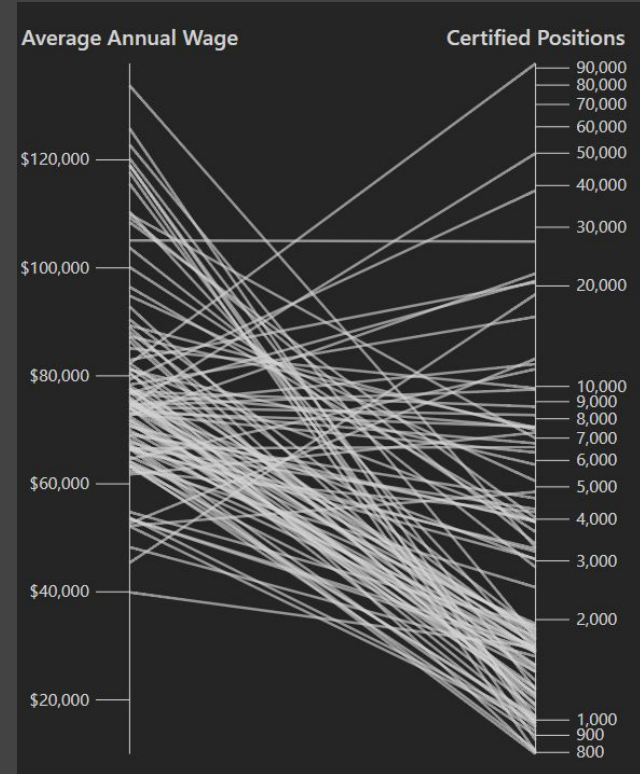| Interaction Capabilities					
Manipulate		**Facet**		Reduce	
Selecting	Navigating	Juxtapose	Filter	Aggregate	Embed
Employer Job Type Region	Region	Employer Job Type Region	Employer Job Type Region	Avg Wages Job Count	Hover Over for Attribute Details

Design Limitations

- Top 20 Companies by number of jobs. What about small businesses?

- Tick mark overlap

- Bivariate choropleth?

- Individual job listings

- Job Type subcategories
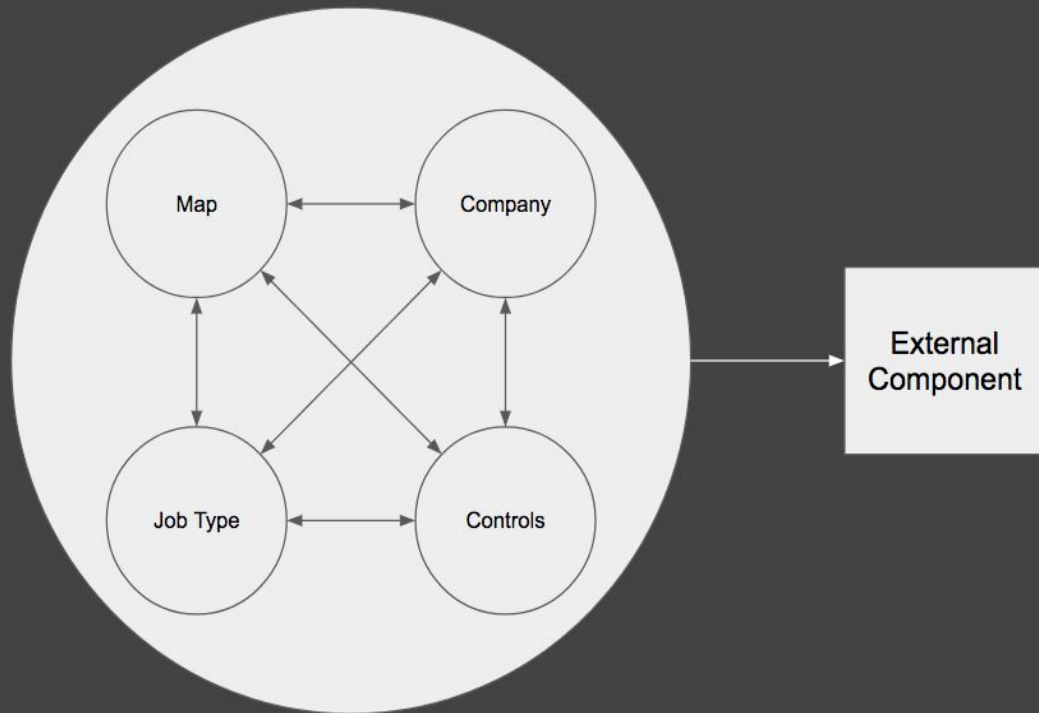
- Wage averaging on small samples.

IMPLEMENTATION

CSS Styling - Bootstrap
https://getbootstrap.com/

DOM Manipulation - D3 https://d3js.org/

Timestamps - Momentjs
https://momentjs.com/

Topojson Data -
https://github.com/deldersveld/topojson

Data Filtering - Underscore.js
http://underscorejs.org/

Event Pub/Sub

DEMO

FINDINGS

- Highest paying jobs tend to be in Management , Legal and Healthcare Practitioners and Technical Occupations

- The most plentiful jobs are in Computer and Mathematical Occupations and Architecture and Engineering Occupations

- In San Diego, for example, Qualcomm applies for the most H1Bs but Synopsis Inc, pays the highest wages (on average, of the Top 20 companies shown in the dashboard)

THANK YOU