



Indeed.com Job Posting Patterns and Predictions Over Time

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Outline: 1. Motivation/Research Question, 2. Modeling Approach/Goal, 3. Data Acquisition/Explanation, 4. Analysis Plan/Justification, 5. Tricky Analysis Decision, 6. Bias/Uncertainty Validation, 7. Results/Conclusions, 8. Next Steps, 9. References, 10. Closing

Motivation, Research Question, & Hypothesis

01

Context

Indeed.com (world's most popular job search site) optimizes the job application process with tailored recommendations for users to match them with employers.

02

Motivation

Make informative predictions about the *Indeed* U.S. job market and optimal job search times/categories that are relevant to job seekers and college students.

03

Research Question

Which job categories on Indeed are the most employable in the next five years, which metro cities will have the most opportunity, and which time(s) of year could yield the most success for job seekers?

indeed

“

Hypothesis

- Most optimal time of year for employment: early Fall/Spring
- Most employable categories in the next 5 years (based on current data): Physicians and Surgeons, Construction, and Sports Jobs

Goal & Modeling Approach

GOAL STATEMENT:

We will...

- Analyze Indeed job posting patterns from Feb 1, 2020 – Present using FRED data
- Identify optimal times and locations to seek jobs
- Track fastest growing & declining job categories over time
- Examine COVID-19's impact on job postings and search trends
- Assess labor market power shifts and their alignment with findings



MODELING APPROACH:

▪ SARIMAX

- Resample to monthly frequency and fit SARIMAX model to produce forecast for the next five years
- Captures and effectively handles seasonal trends in job postings

▪ Key Insights for Job Seekers

- Forecasts best times & places to apply for jobs
- Identifies high-demand & declining job sectors
- Evaluates labor market trends to inform job-seeking strategies

Data Explanation & Acquisition



With a 7-day trailing average, **Indeed** regularly produces the percentage-based adjustment in daily job post totals, adjusted seasonally (SA), since February 1, 2020 to present.



Our Data

Our four time-series datasets (downloaded from publicly-accessible **Indeed Hiring Lab** Github repository) include overall job postings, postings organized by job sector, postings organized by U.S. metro cities, and postings organized by states.

Key Features for Analysis

- **indeed_job_postings_index (_SA/_NSA):** "100.36"
- **display_name** (renamed to sector): "Accounting"
- **date:** "2020-02-06"
- **metro:** "Abilene, TX"

Analysis Plan & Justification



CHALLENGES AND DIAGNOSTIC/VALIDATION



CHALLENGE:

Differentiating between pre- and post-pandemic job trends to ensure accurate forecasting



DIAGNOSTIC/VALIDATION:

Used time-series comparisons from 2020-2025 to examine shifts in job posting trends

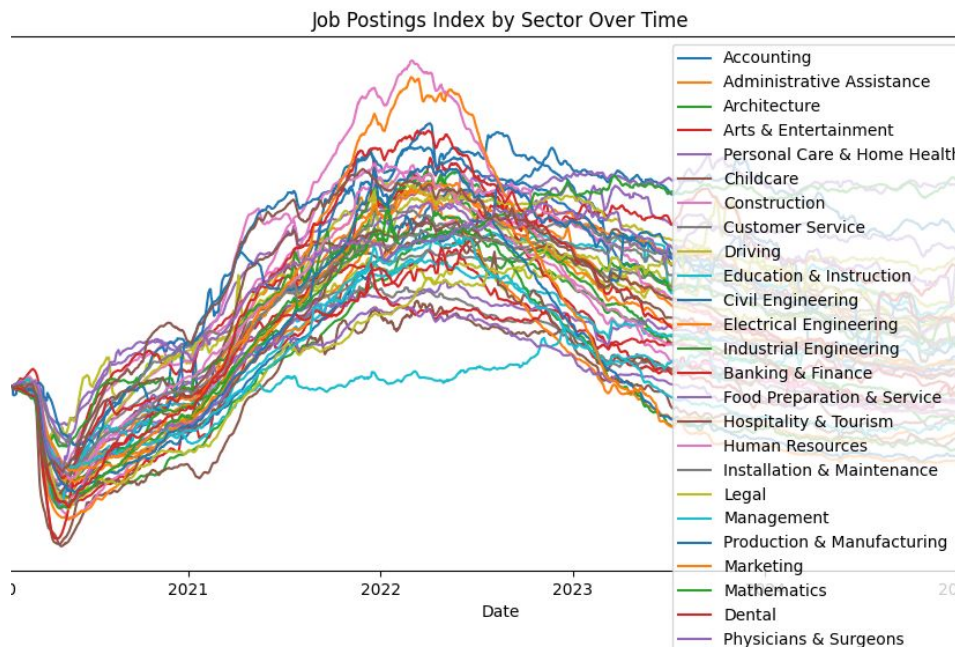
Tricky Analysis Decision



Determining at which point to cut off our forecasting...

With the power of the SARIMAX model, we had the ability to forecast aggregate, sector, and metro-based posting data for the next 5, 10, or 20+ years.

We decided to give the model a 60 month limit for forecasting in order to obtain the most accurate, relevant prediction for the job market, particularly for college students.



Bias & Uncertainty Validation

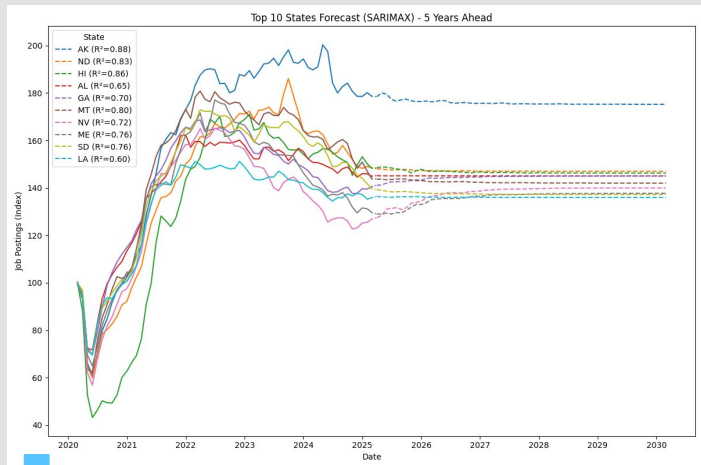


Seasonality bias and trends in this job posting data, particularly data that is not seasonally-adjusted (_NSA)



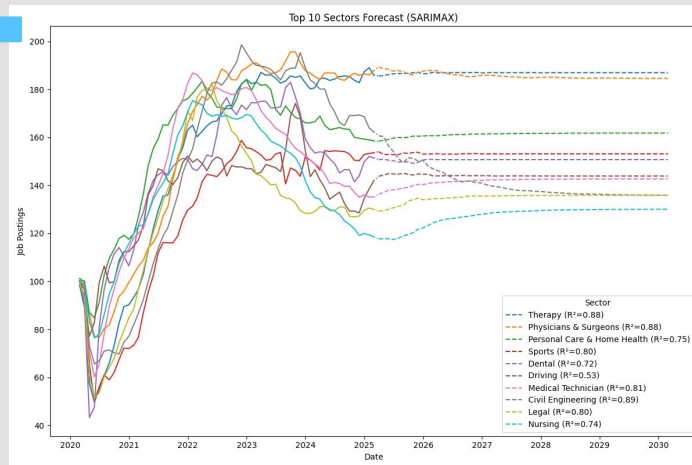
Mitigated with **SARIMAX** package that addresses these seasonal influences on the data and allows for accurate, informative forecasting

Results & Conclusions



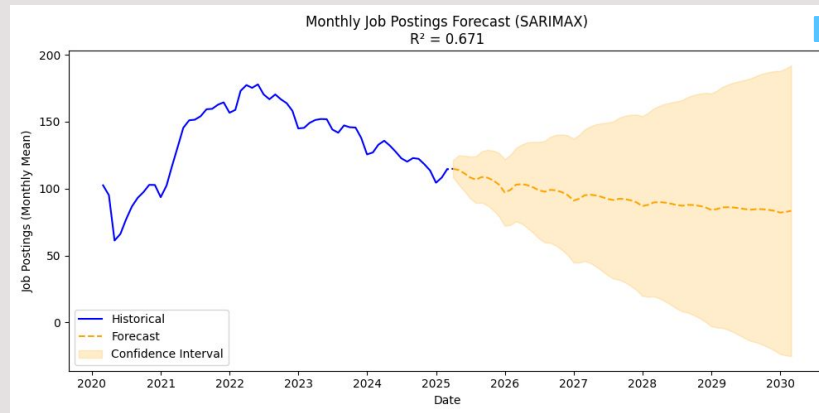
5-Year Top Ten Sectors Forecast:

- Therapy/Physicians & Surgeons highest
- Steep decline expected for Civil Engineering
- Growth in nursing
- R^2 ranging from 0.53-0.89



5-Year Top Ten States Forecast:

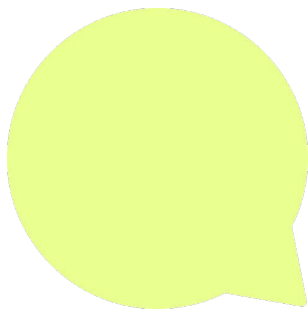
- AK remains highest
- ND, HI, AL remain steady
- NV with a noticeable climb, overtaking SD, LA, and ME
- R^2 ranging from 0.60-0.88



5-Year Aggregate Job Postings Forecast:

- Steady/stable decline expected for all job postings
- R^2 of 0.671
- Wider confidence interval as years progress, demonstrating less assurance in model's predictive power over time

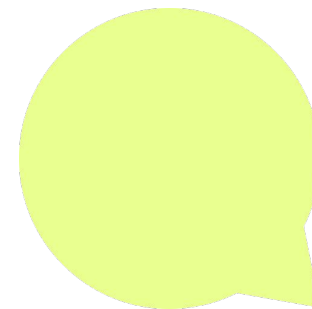
Next Steps



Improve assurance in our model's predictive power by including more autoregressive terms to lessen wideness of confidence interval



Conduct further analysis into COVID-19 impacts: influence on particular sectors' growth/decline?



Compare and contrast results with *Indeed Hiring Lab* data from other countries

References

Our Github: <https://github.com/cpowell229/DS-Project2>



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Thank You!

