**Must have skills:** Extensive Expert Data Science Knowledge and Experience, SQL, Python (or equivalent).

**About:** We are a staffing company/technology platform that places temporary professionals into short-term shifts/assignments. Our clients (companies) can request shifts through our platform, which our temporary contractors then fulfill.

**Objective:** We are looking to analyze our historical data to learn which factors (*most importantly bonuses*) affect whether a shift is filled by a contractor and build a predictive model that tells us the fill rate of a future shift or shift(s).

Using this model, we can then build a dynamic pricing model that suggests clients (companies) increase their pay rate when the chances of filling their shift are low.

### Deliverables:

* Insights report about our data explaining how each of these factors affect our fill rate.
  + Supply (available contractors, their distance to clients work site and driving radius preferences)
  + Demand (# of other shifts available in that area for that day/time, whether they have a bonus or not)
  + Location of clients work site
  + Bonus (whether there is a bonus or admin bonus)
  + Urgency (if its a last minute shift)
  + Client themselves
  + Time (hours of the shift)
  + Day of the week
  + Season
  + Software used by the clinic
* Predictive model

### Datasets (CSV Files)

* assignments.csv
  + see detail below
* contractor-availability-true.csv
  + days set available by each contractor
* contractor-geolocations-distance.csv
  + contractor geolocations and max travel distance setting
* office-alternative-locations.csv
  + some clients have multiple work site locations. This file contains different work site id’s for the same client
* office-geolocations.csv
  + client geolocations file
* office-softwares
  + client softwares

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### Assignments Dataset (~45k records)

| Columns | Meaning |
| --- | --- |
| assignment\_id, | the id of the assignment |
| assignment\_created\_at, | date/time the assignment was created |
| start\_date, | the start date/time of the assignment |
| end\_date, | the end date/time of the assignment |
| filled\_date | the date/time the assignment was filled |
| contractor\_id | id of the contractor assigned to that shift |
| office\_id | id of the client/company |
| alternate\_location\_id | alternate location of the office if they have multiple location associated with their account |
| deleted | whether the shift was canceled by the client |
| is\_finished | whether the shift was completed successfully by a contractor |
| hours\_worked | number of hours worked by the contractor |
| position\_id | the type of contractor |
| bonus\_percent | whether a bonus was added by the client |
| admin\_bonus\_percent | whether a bonus was added by our company |
| professional\_removed\_at | when a professional withdrew from the shift |
| cancellation\_notice | timeframe between professional\_removed\_at and start\_date of the shift. |

### Important Notes

1. The fill rate is calculated by taking all filled shifts (regardless of if they were canceled by the client) and dividing it by the number of shifts posted for that date range. Example:
   1. Fill rate = Shifts Filled/ All Shifts

Shifts Filled Query

SELECT \*

FROM assignment\_records

WHERE (start\_date between x and x)

AND contractor\_id IS NOT NULL

);

All Shifts Query

SELECT \*

FROM assignment\_records

WHERE (start\_date between x and x)

);

1. Bonuses were added in April 2022
2. Bonus\_added\_at field was added in August 2022. This field updates every time a client or admin adds a bonus or admin bonus to a shift
3. When analyzing the fill rate, be mindful that certain shifts are in the future (3-6 months+ away), so contractors do not always pick this up immediately.

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### How To Get Available Contractors?

* Filter contractors by **position\_id**
* Calculate distance between contractor and office (or alternative location if it present) and distance must be less then **maximum\_travel\_distance + 5**. If **maximum\_travel\_distance is** missing then use **75** miles.
* check if contractor available in certain day (**schedule\_days** table has only available dates of contractors, then connect them with shift **filled\_date** and/or **assignment\_created\_at**)
* skip contractor if they are assigned to some shift in the same day (check assignments table by **contractor\_id** and **start\_date**)