Environment Preparation

- We Started with loading necessary Libraries
- Then the datasets have been loaded

Data Exploration

We started to explore data using (`info(), describe(), shape(), head(), unique()`), we noticed that:

- `PerformanceRating` Data Frame has more than one Rate for the same Employee but in different dates.
- `EducationLevel, RatingLevel, SatisfiedLevel` data frames contains encoding of the Categorical information
- `Education` Column in `employees` data frame has different name in `EducationLevel` data frame `>>> EducationLevelID`
- `EducationField` Column contains `Marketing` twice but one of them with extra Space `>>> "Marketing "`

Data Cleaning

- We renamed `EducationLevelID` Column in `EducationLevel` data into `Education.`
- We used `Education` column to merge `employees` data frame with `EducationLevel` data frame into a new data frame named `emp_merge`.
- Again, we merged `emp_merge` data frame with `PerformanceLevel` data frame into a new data frame named `HR_ratings`.
- We Created 2 dynamic dictionaries named `Rating_dict` and `Satisfied_dict`.
- We used `Rating_dict` dictionary to map `SelfRating` and `ManagerRating` into a new columns.
- We used `Satisfied_dict` dictionary to map `EnvironmentSatisfaction, JobSatisfaction` and `RelationshipSatisfaction` into a new columns.
- We dropped unnecessary Columns from `Emp_merge` data frame which is:
    - `FirstName`

    - **LastName**
    - **State**
    - **Ethnicity**
    - **Education**
    - **StockOptionLevel**
    - **HireDate**
- We dropped unnecessary Columns from **HR** data frame which is:
    - **FirstName**
    - **LastName**
    - **State**
    - **Ethnicity**
    - **Education**
    - **StockOptionLevel**
    - **HireDate**
    - **ReviewDate**
    - **SelfRating**
    - **ManagerRating**

- We created **fix_Markiting()** Function to remove the Extra Space from **"Marketing "**.

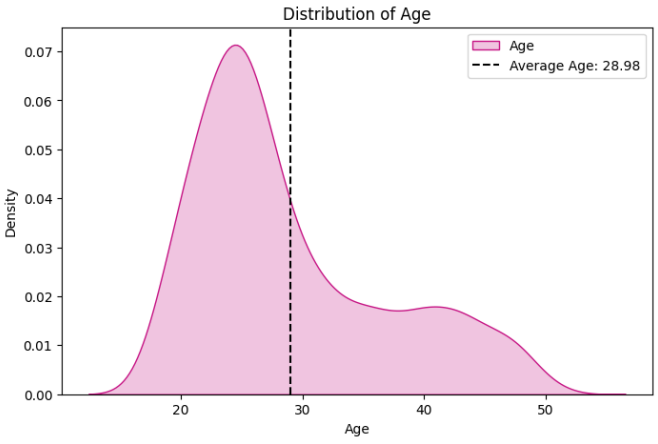
Data Analysis & Insights

- From Salery Distribution we can find that, Average Salery is **112.956K.**

- From Salary Pox Plot, it's clear that, majority of employees earn below the average salary.

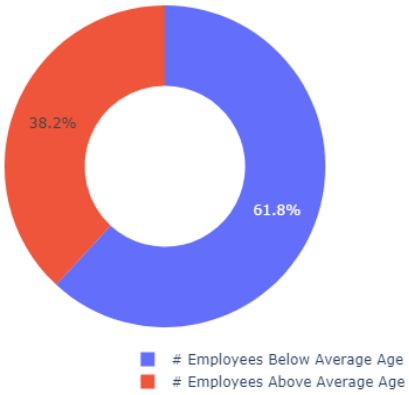
- Average Age is **29.98** Years

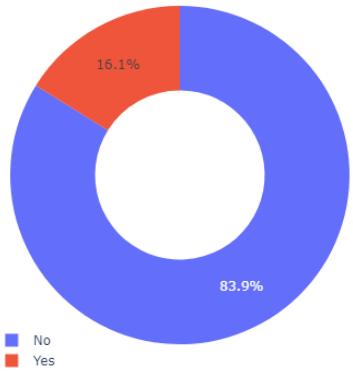
- From Age Distribution, it's clear that, majority of employees' age below the average Age.



- Pie Charts Shows the Percentage of Employees Relative to Average Age.

- **909** Employees from **1470** Below Average Age.



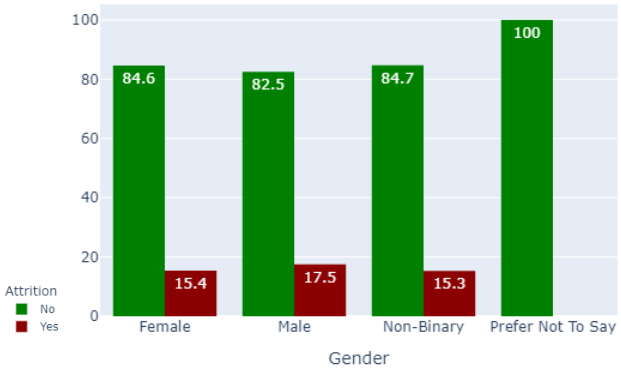


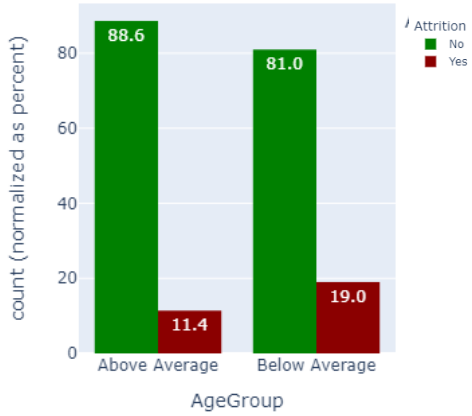
- Pie Charts Shows the Percentage of Employees That Attire.

- **237** Employees from **1470** Attire.

- Par Chats Shows the Percentage of Attrition in Different Genders.

- Percentage is almost the same among different genders.

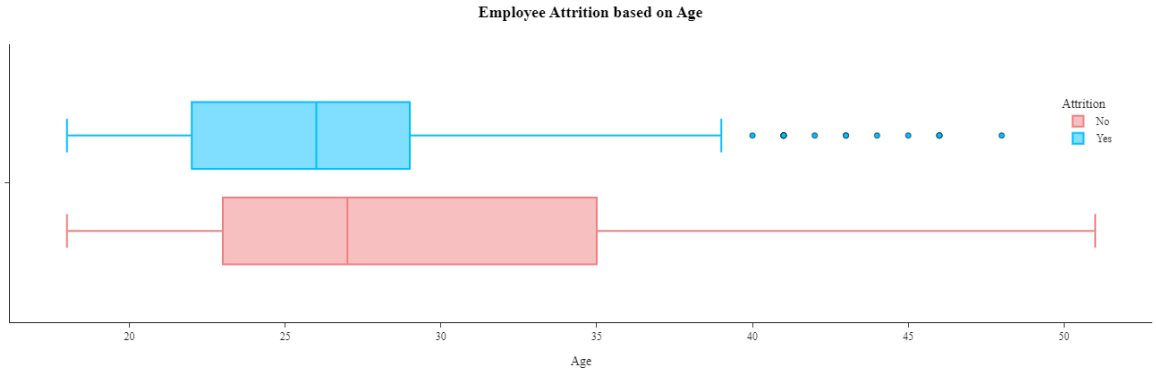




- Par Chats Shows the Percentage of Attrition Based on AgeGroup.

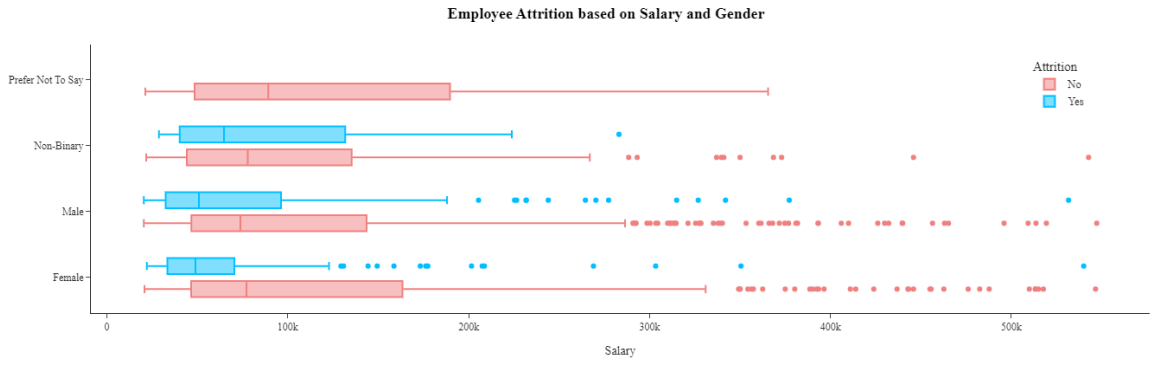
- Employees with Below Average Age have higher Attrition Rate 19%

- Pox Plot Shows Attrition based on Age.
- Younger Employees have a High Attire rate.



- Pox Plot Shows Attrition based on salary
- Most of Employees that Attire Have Low Salery Range

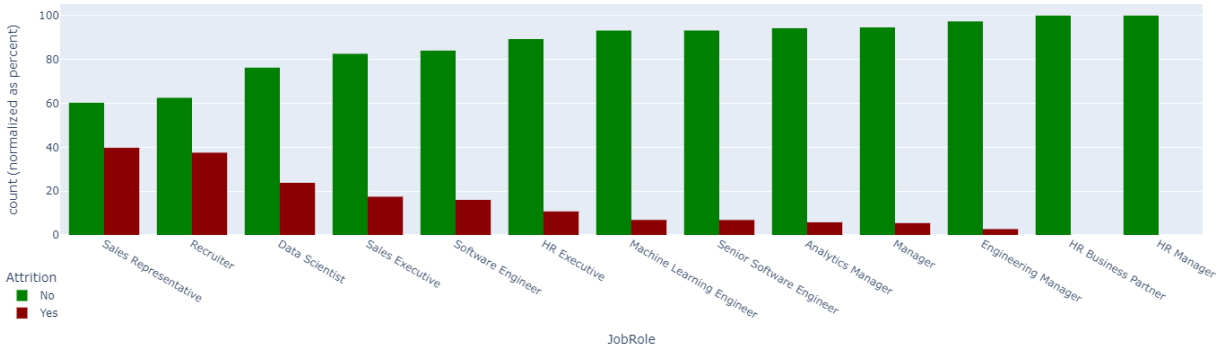
- Pie Chart Shows Attrition based on salary and gender
- The Most Affected Gender by low Salery is Female, they tend to Attire.



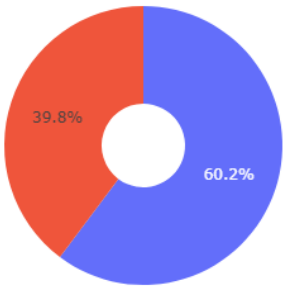
- Par chart shows percentage of Attrition in different Job Roles

- Following Job Roles have the Highest Attrition Rate:

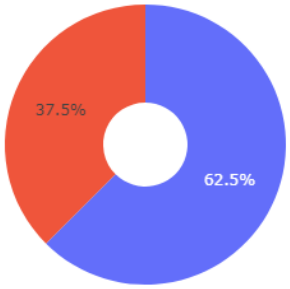
1. Sales Representative
2. Recruiter
3. Data Scientist
4. Sales Executive
5. Software Engineer



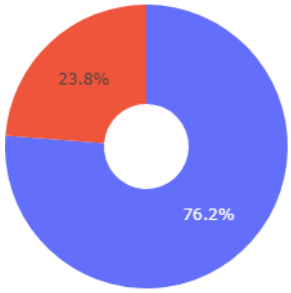
- Following Pie Charts Shows the Percentage of Attrition in the Top Five Job Roles.



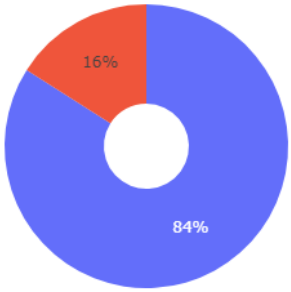
Sales Representative



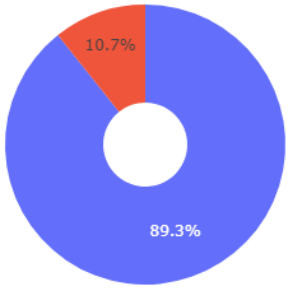
Recruiter



Data Scientist

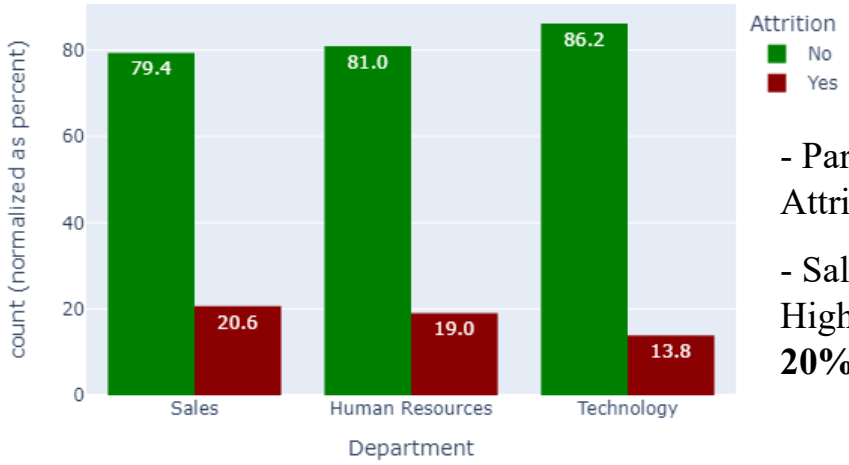


Sales Executive



Software Engineer

- Pox Plot doesn't Shows a difference between Employees who leave the Company and others who don't, based on Distance from Home.

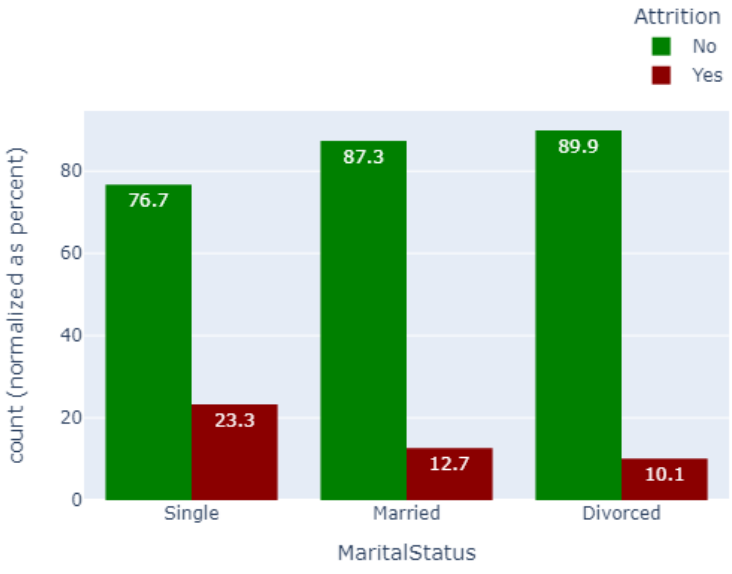


- Par Chart Shows Percentage of Attrition in different Departments

- Sales Department Has the Highest Attrition Percentage of **20%**

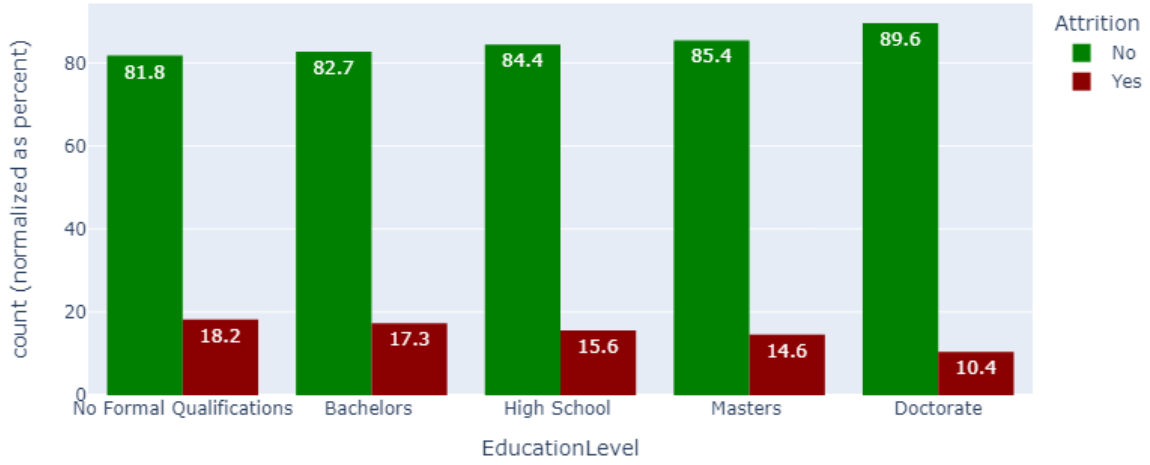
- Par Chart Shows Percentage of Attrition in different Marital Status

- Single Employees Have the Highest Attrition Percentage of **23.3%**



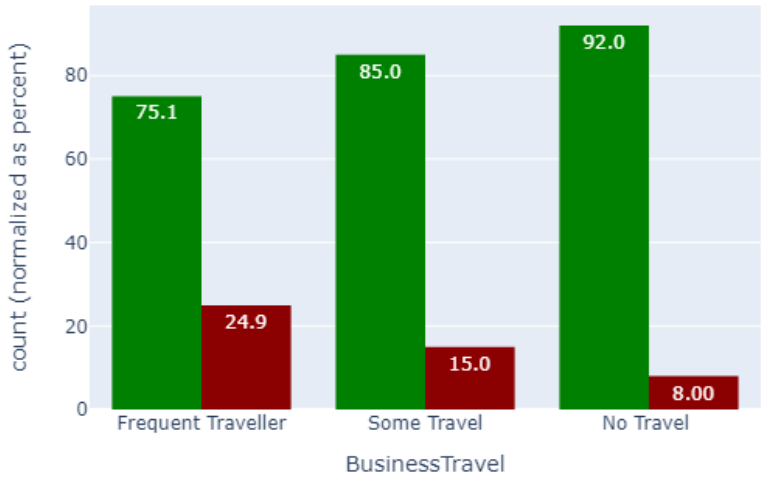
- The Par Chart Shows Percentage of Attrition in different Educational Levels.

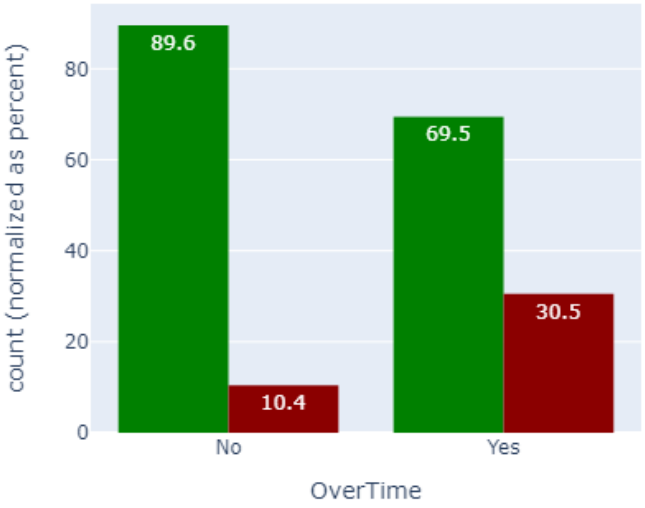
- Higher Educational level (Master, Doctorate) has low attrition rate.



- The Par Chart Shows Percentage of Attrition in different Business Travel Status?

- Frequent travelers have the highest attrition Rate.



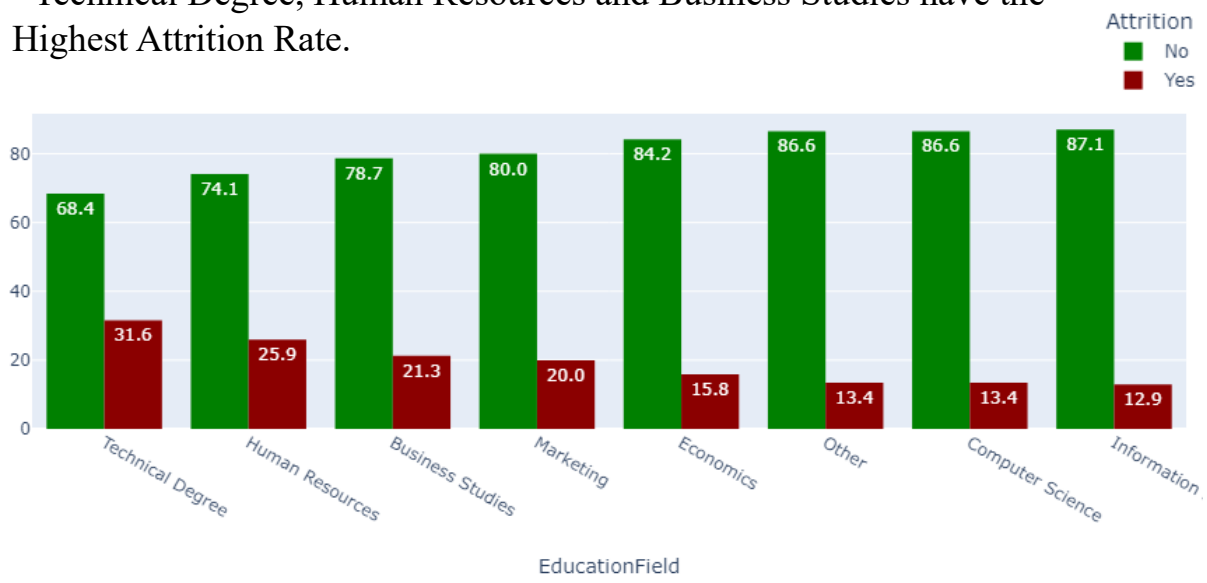


- Par Chart Shows Overtime Effect on Attrition

- **30.5%** of Employees Who have overtime tend to Attire, which is High Percentage Comparing to Employees Who don't have overtime.

- The Par Chart Shows Percentage of Attrition in different Educational Fieldes.

- Technical Degree, Human Resources and Business Studies have the Highest Attrition Rate.



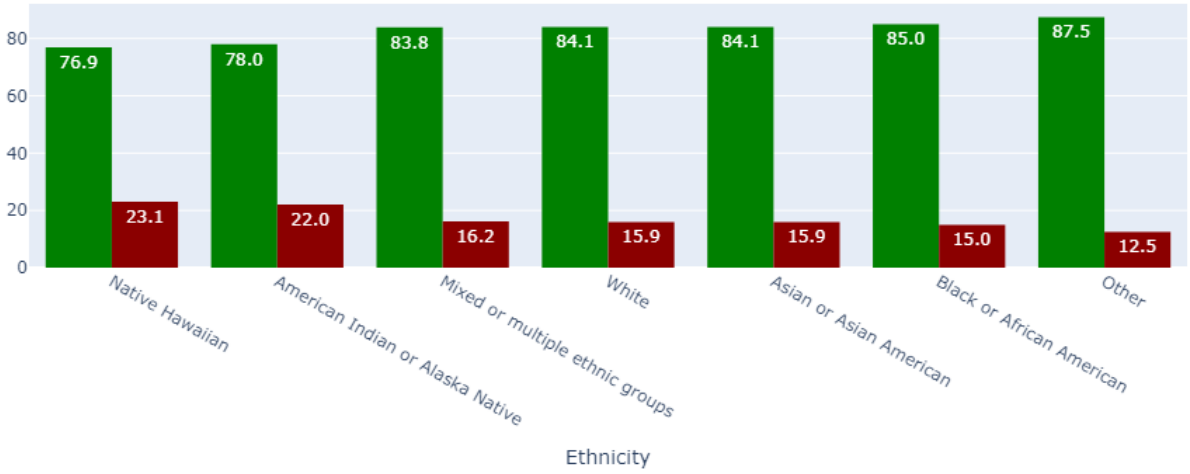
- The Par Chart Shows How Years Since Last Promotion impact attrition.

- **37.9%** of Employees Leaves the Company Directly After Promotion.

- This Percentage decreases with the increase of Years after Promotion.

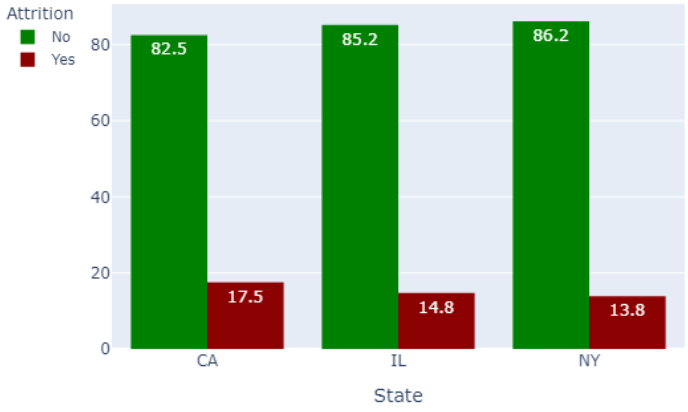
- Most ethnic groups have the same attrition percentage of about 15% except for:

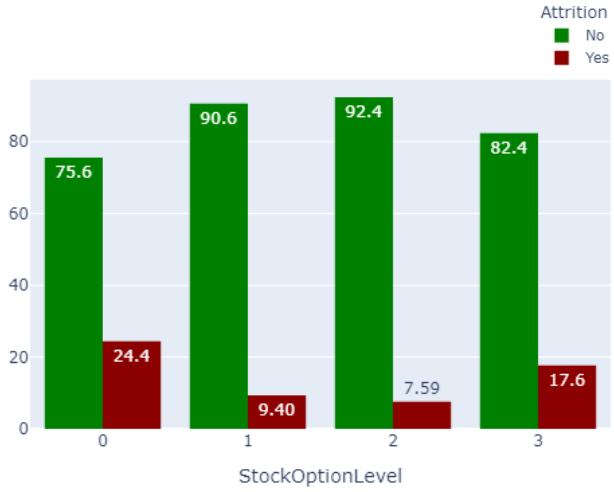
- Native Hawaiians with attrition percentage of **23%**.
- American Indians or Alaska native with attrition percentage of **22%**.



- Par Chart Shows Attrition percentage in different States.

- CA has the highest attrition of **17.48%**.





- Par Chart Shows How Different Stock Option Levels Affect Attrition

- Level 0 Stock has the highest attrition of **24.4%**.