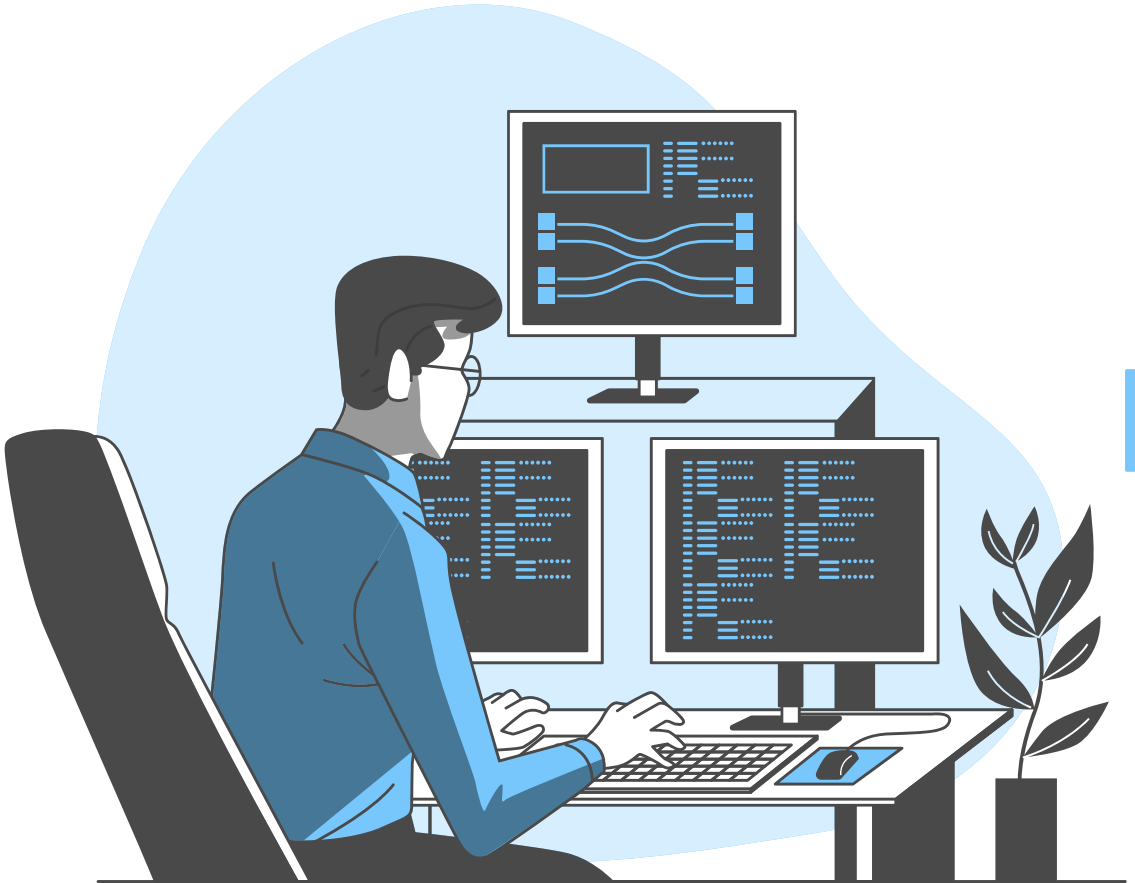

HR Analytics

Exploratory Data Analysis

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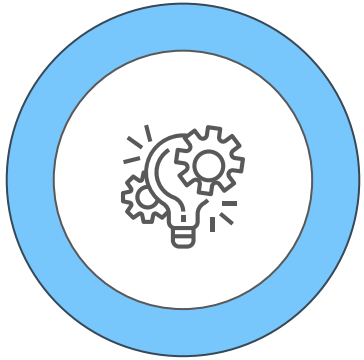
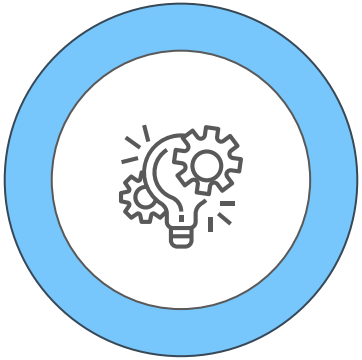
Introduction



HR Analytics

HR departments have a tradition of collecting vast amounts of HR data. Unfortunately, this data often remains unused. As soon as organizations start to analyze their people problems by using their data, they are engaged in HR Analytics.

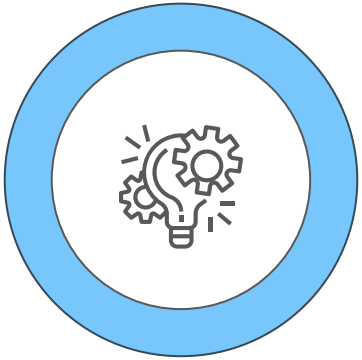
HR Analytics helps us with interpreting organizational data. It helps to find people-related trends in the data and helps the HR Department taking appropriate steps to keep the organization running smoothly and profitably.



At this stage it's just an exploratory data analysis to show what kind of information you can get out of your HR Data easily.

For example we try to answer the following questions

- What is the overall diversity profile of the organization?
- What are our best recruiting sources if we want to ensure a diverse organization?
- Are there areas of the company where pay is not equitable?
- How high is your annual employee turnover?
- What characterizes our most successful managers?



Keep in mind

All data projects start with data, and the work starts with *Data Exploration*. By performing data exploration, the explorer aims to get familiarized and to understand the data, discovering interesting facts and trends such as corruption in the data, correlations, class imbalance.

The more detailed data you have the more useful insights could be discovered. In this EDA it's just an example for what you can get out of the data and there are many more insights which could be investigated.

Data Set

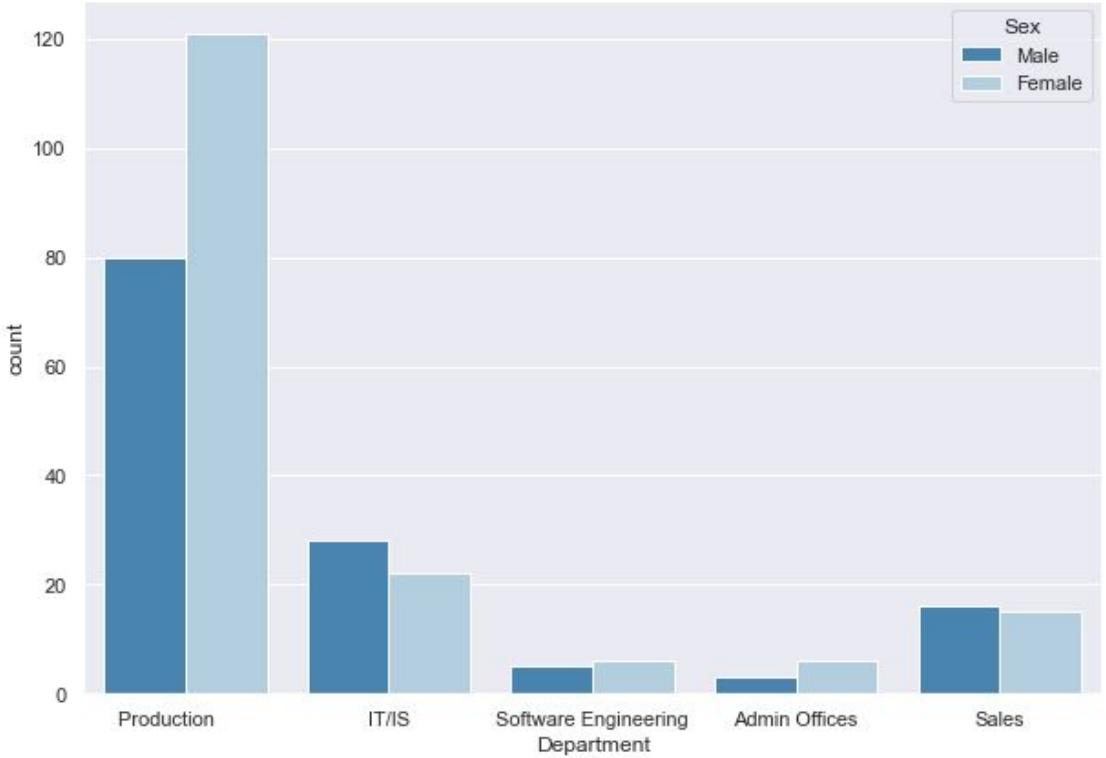
I used a fictional dataset (from kaggle) with the following information, separated in 5 groups.

1. **Employee related information**
   a. Name, Employee ID, Marital Status, Marital Description, Gender, State, Zip, Date of Birth, Age, Citizenship, Race
2. **Job related information**
   a. Employee Status, Department, Position, Manager, Date of hire, Date of termination, Term Reason, Employment Status, Absences, Days late
3. **Satisfaction & Job Involvement**
   a. Performance Score, Engagement Survey, Employee Satisfaction, Last Performance Review (Date)
4. **Salary**
   a. Salary
5. **Others**
   a. Fro Diversity Job Fair, Recruitment Source, Special Projects Count

Diversity

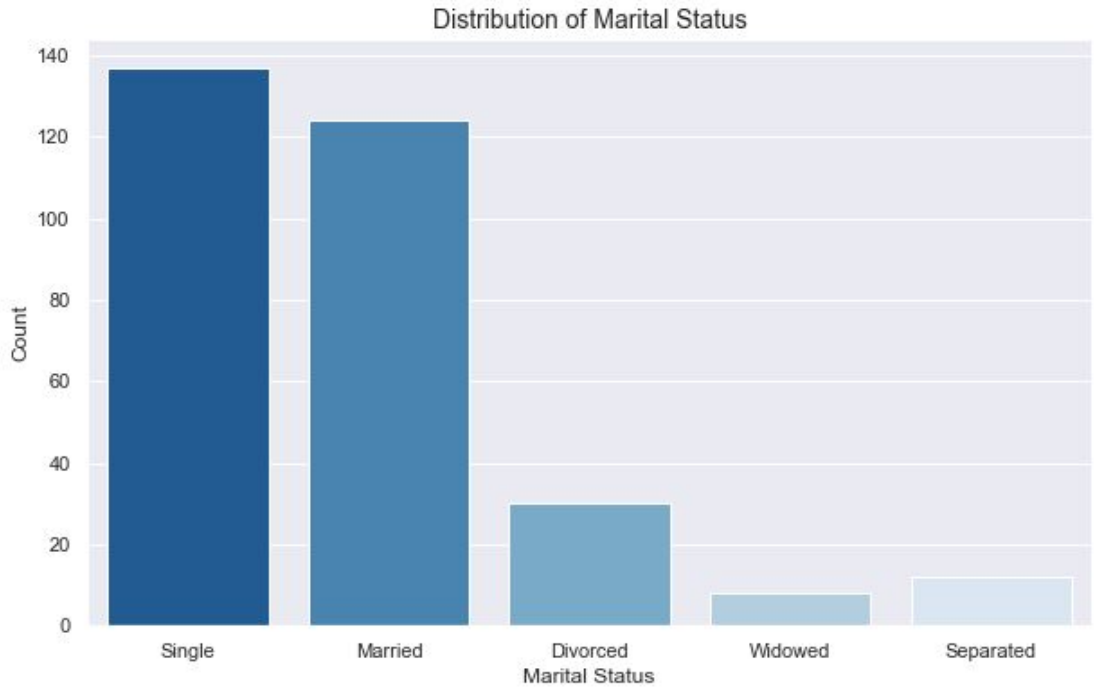
Gender Diversity across departments

- In our dataset there are 171 **female (ca. 56%)** and 132 **male (ca 44%)** employees
- In the following departments there are more female than male employees:
  - Production
  - Software Engineering
  - Admin Offices



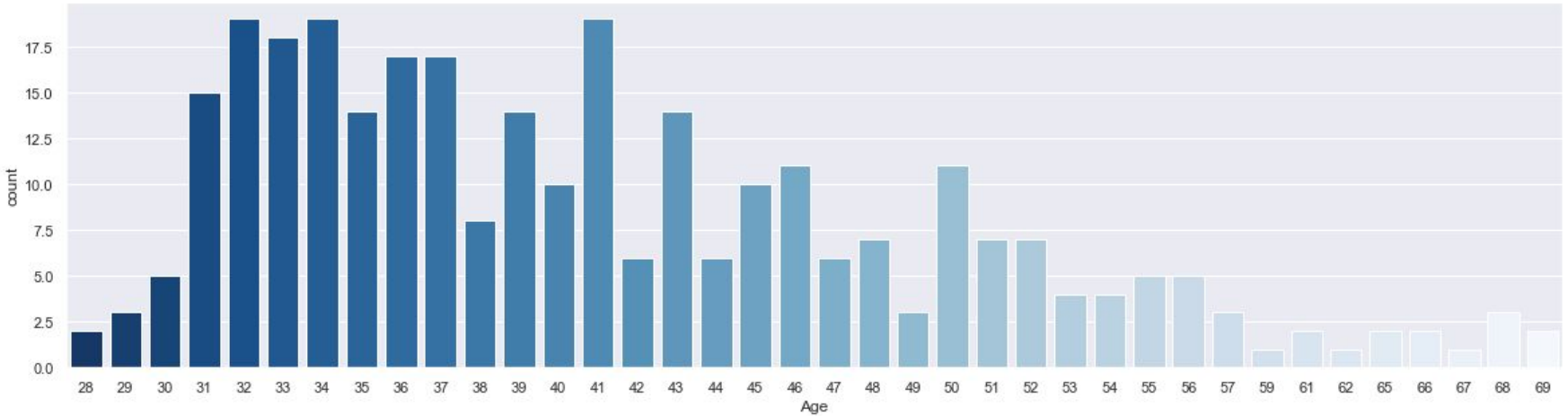
Gender and Marital Status

- Most of the employees are **single (in total = 132)** followed by employees who are **married (122)**
- In our dataset there are 171 **female (ca. 56%)** and 132 **male (ca 44%)** employees



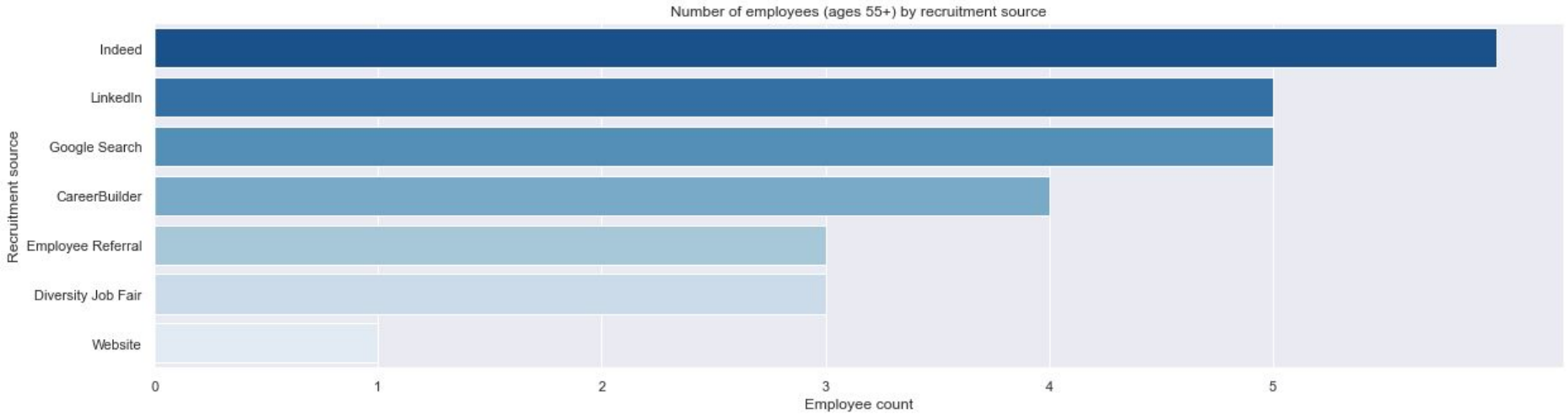
Age Structure

- The youngest employee is **28 years** and the oldest is **69 years** - in **average** (median) our employees are **40 years** old
- The staff's ages are mainly at early to mid-30s, also counting high at early 40s
- The number of employees is substantially lower for ages 53 and over



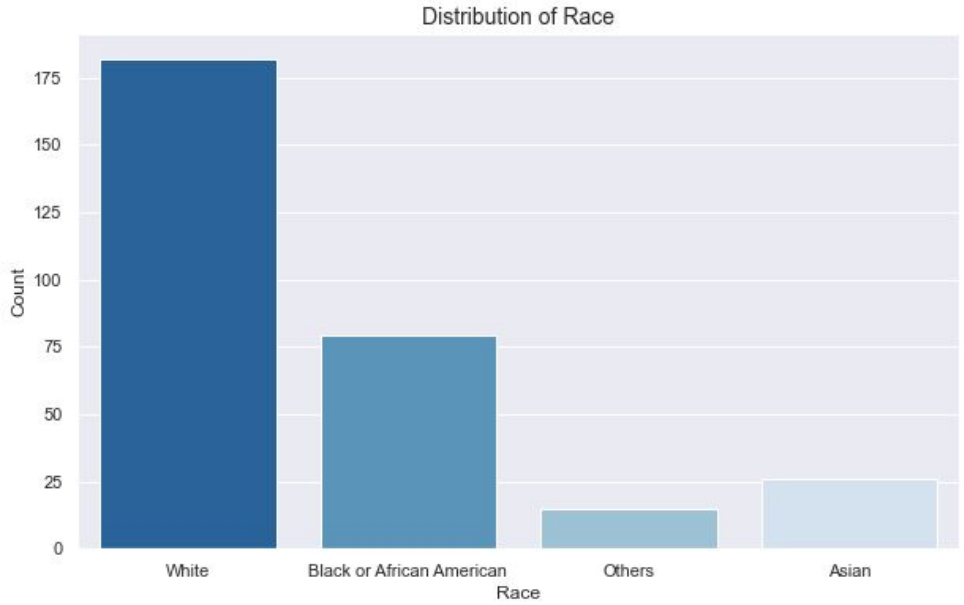
Age Structure

- Considering how low the numbers go when it comes to older workers, it's important that we inquire how age diversity is promoted through recruiting
- Indeed scores the highest, hiring +55 employees, followed by Linkedin. But the numbers are really low, in such a way that no source is currently bringing a reasonable amount of older people to the company.



Race Structure

- Most employees are categorized as "white".
  - Whte: 60%
  - Black or African American: 26 %
  - Asian: 9%
  - Others: 5%
-



Departments & Jobs

Departments

- In the following we will take a closer look at each department and different jobs - focused on different topics

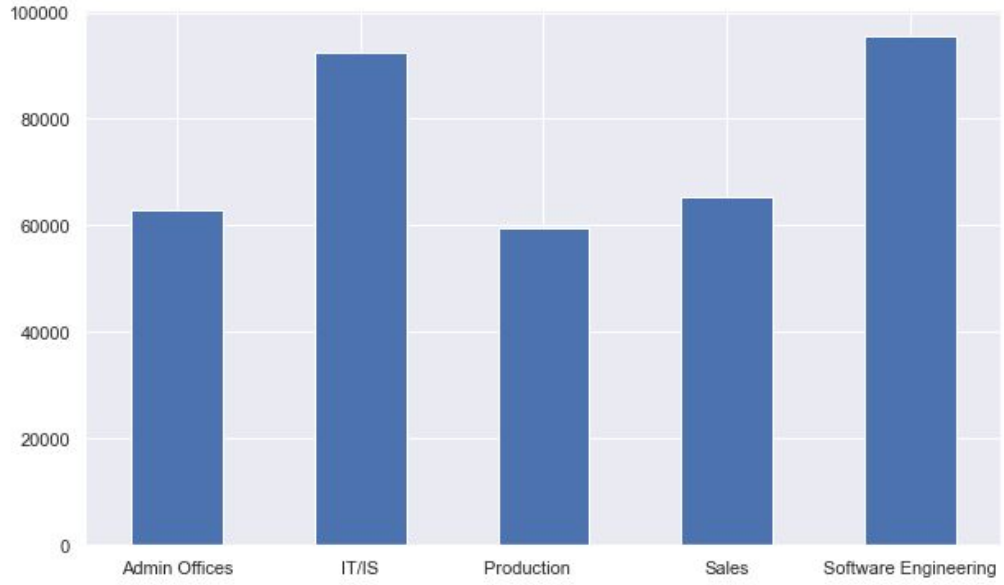
- In our dataset there are 6 different departments
  - Production (201 employees)
  - IT/IS (50 employees)
  - Sales (31 employees)
  - Software Engineering (11 employees)
  - Admin Offices (9 employees)
  - Executive Office (1 employee) - is removed for further investigation as it might be an outlier

- In our dataset there are 31 different jobs (positions); Top 5 positions are
  - Production Technician I (133)
  - Production Technician II (53)
  - Area Sales Manager (27)
  - Production Manager (14)
  - Software Engineer (10)

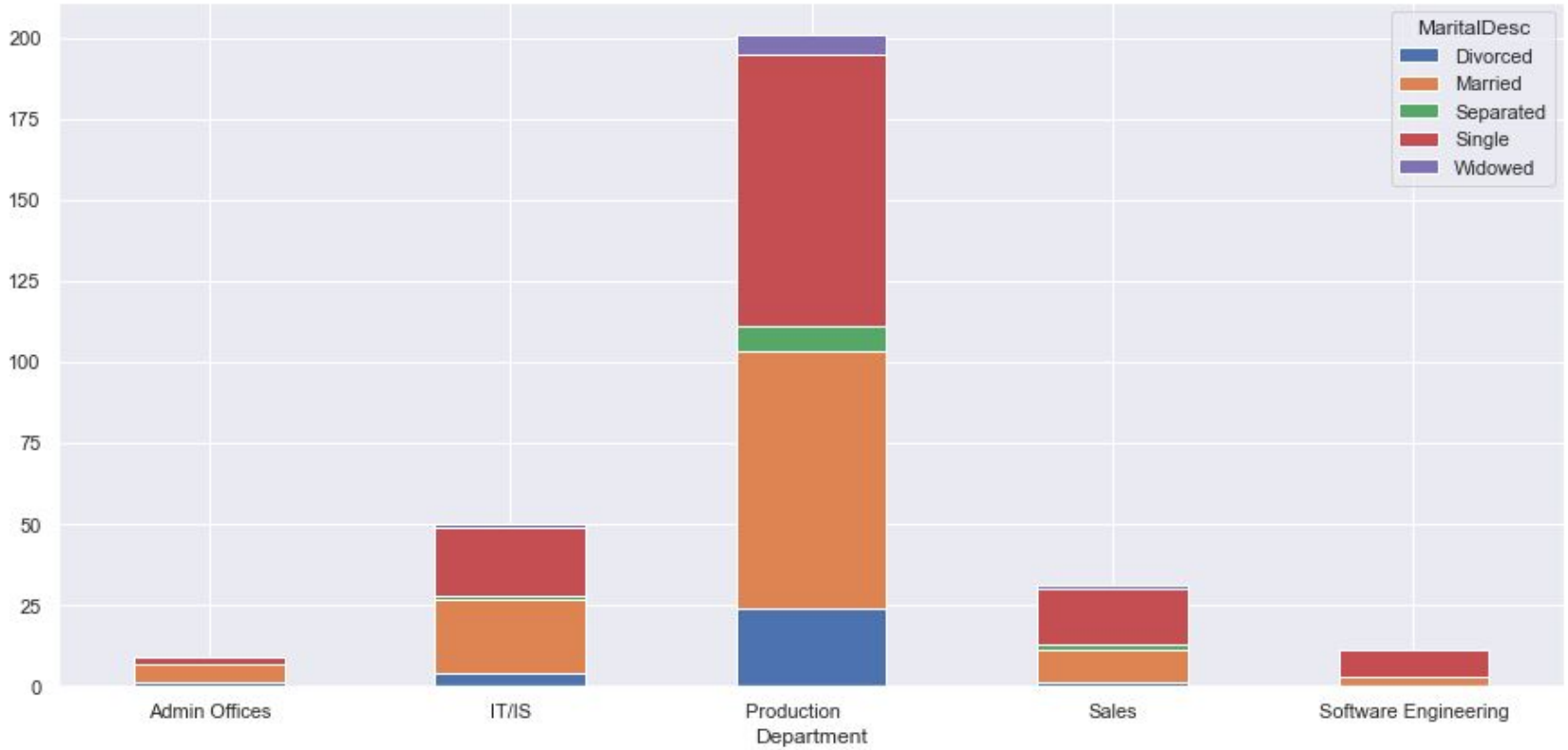
Salary per department

- In total there are the highest salary costs in the production department
  - Production (12.060.430 $)
  - IT/IS (4.853.232 $)
  - Sales (2.140.899 $)
  - Software Engineering (1.044.884 $)
  - Admin Offices (646.127 $)

- In average we can find the highest salary in the IT/IS and Software Engineering Department



Marital status per department



Manager

Which manager does have top performers

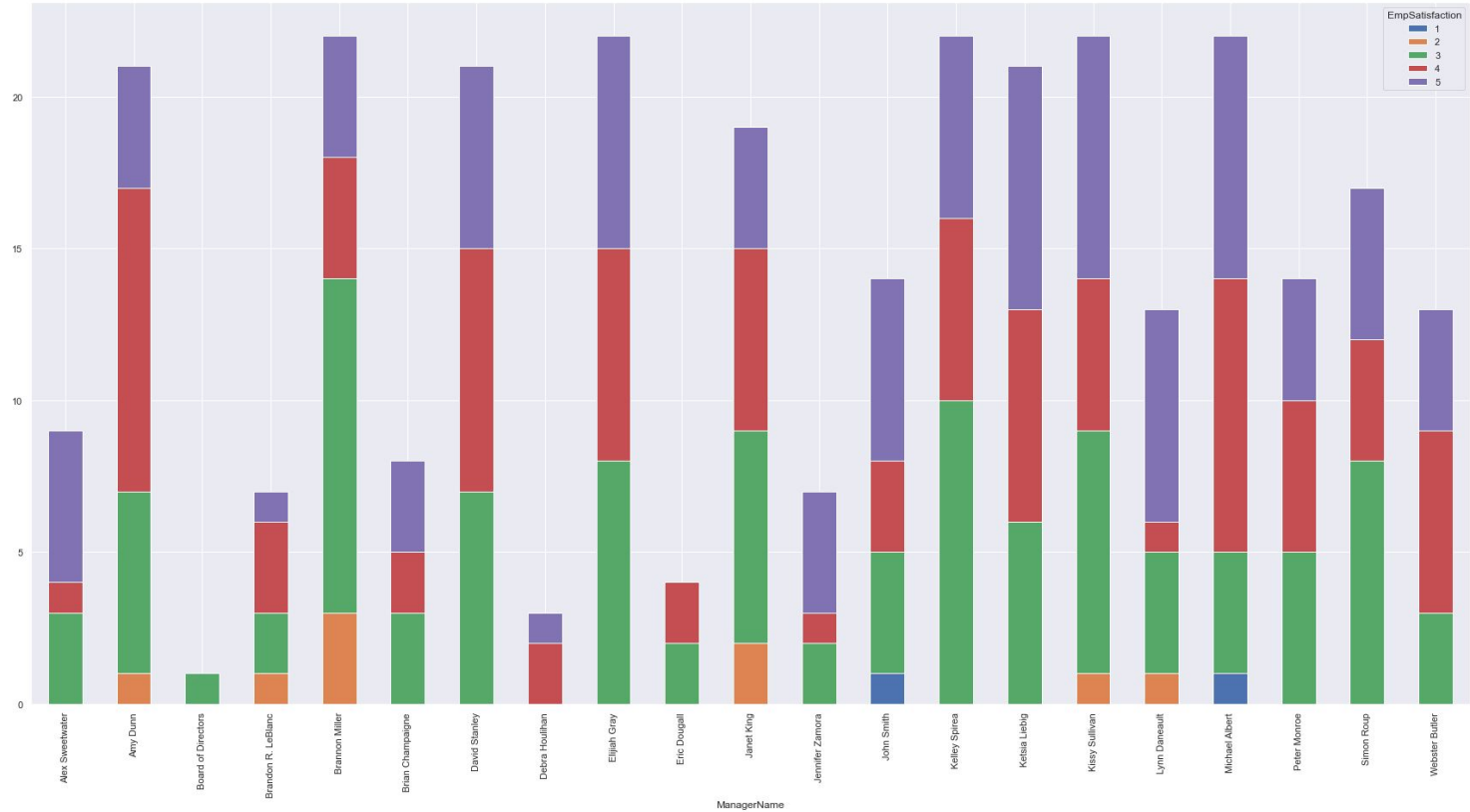
- In average each manager does have an employee performance of 3 (fully meets) which sounds great

- Taking a closer look on employees which we call “low performer” (low performer are employees who got an performance score with “needs improvement” or “performance improvement plan”) the following managers should per checked
    - Brannon Miller (6 employees)
    - Michael Albert (4 employees)
    - Amy Dunn (3 employees)

- Taking a closer look on employees which we call “top performer” (top performer are employees who got an performance score with “fully meets” or “exceeds”) the following managers could be mentioned
    - Kelley Spirea (21 employees)
    - Kissy Sullivan (20 employees)
    - Ketsia Liebig (20 employees)

Employee satisfaction per manager

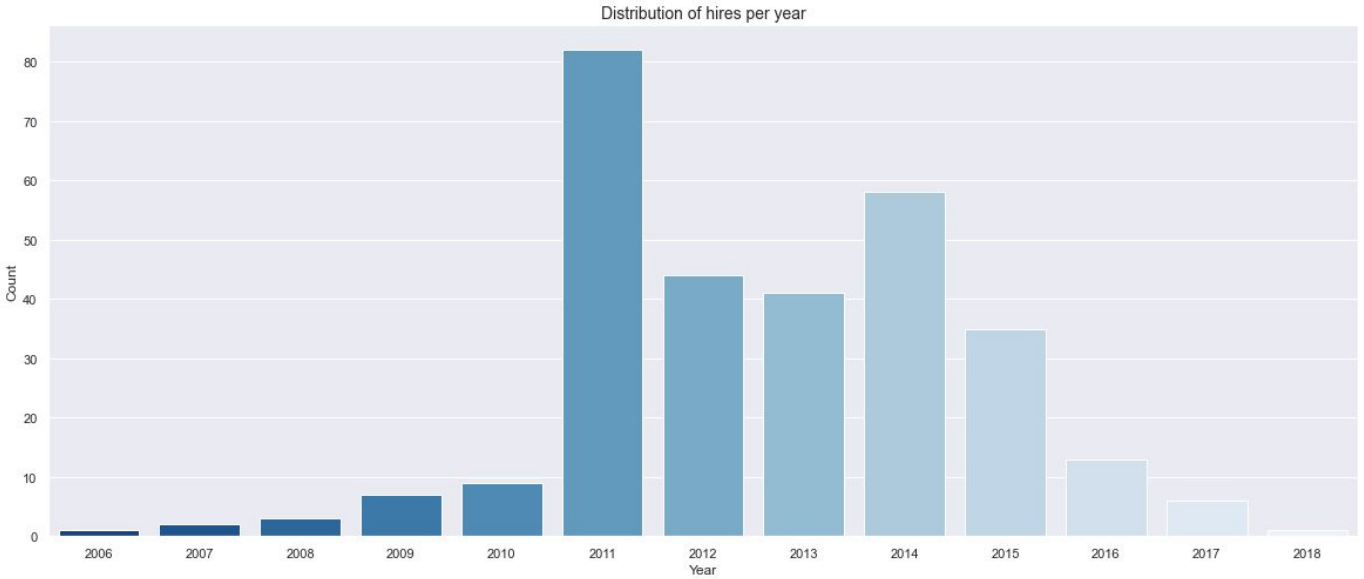
This is just an example, to show that we can explore the employee satisfaction per manager. In this format the plot is not the best cause it's not readable in a presentation



Recruiting

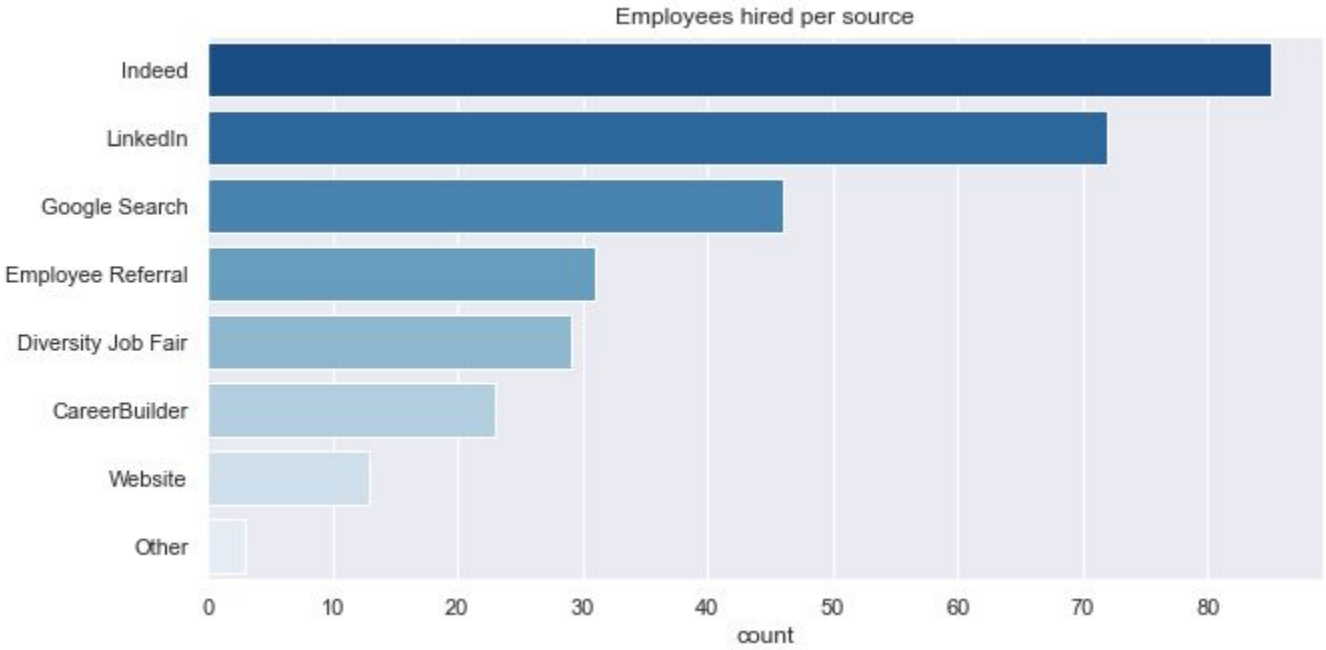
Date of hire

- Most employees were hired in 2011 followed by 2014
- If we just look at the month, overall the top 3 month of hires were
  - January (54)
  - July (41)
  - September (37)



Recruiting Sources

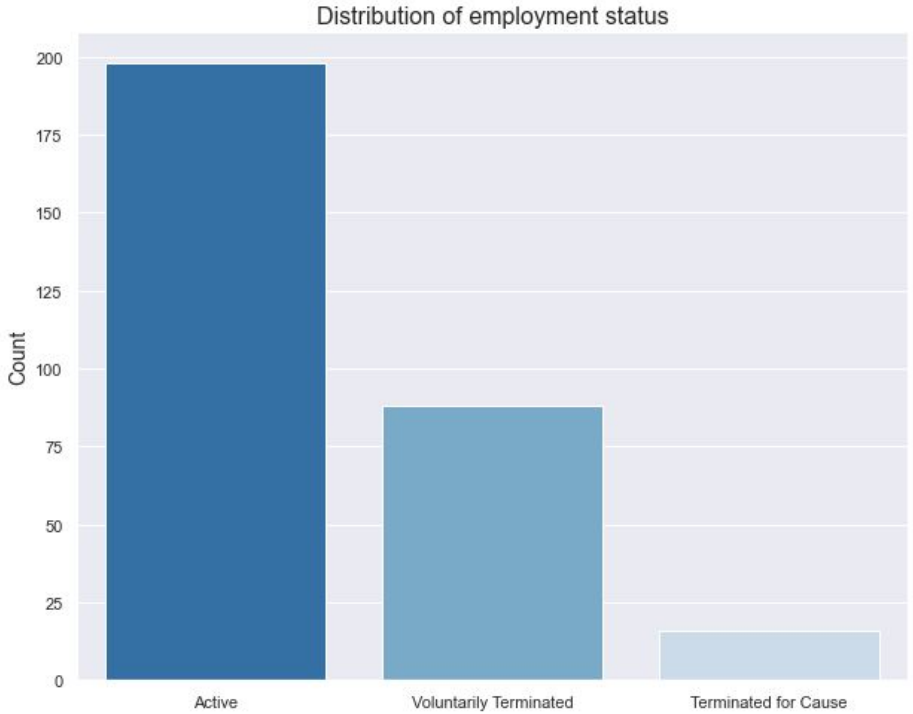
- Most employees are hire from Indeed followed nby Linkedin. The worst recruitment sources are "Career Builder", "website" and “other”
- Sadly we don’t have any costs so we can’t evaluate the costs per hire



Termination & Absences

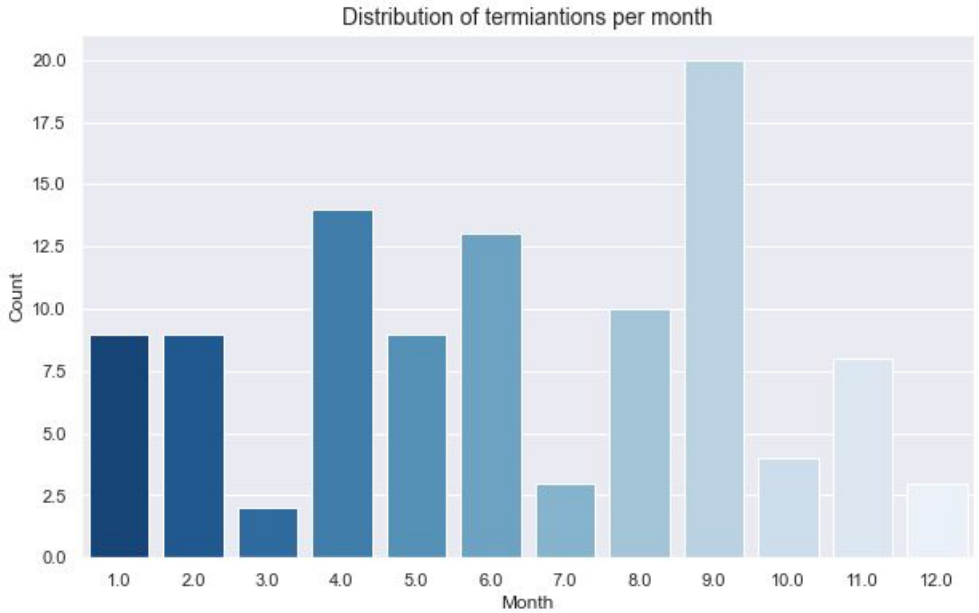
Term Reasons

- Luckily most employees are still active (198)
- **88** employees left the company **voluntary** and **16** terminated in **case of special reasons**
- Top 3 reasons why employees are leaving
  - Another position (20)
  - unhappy (14)
  - more money (11)
- Also it is very interesting that most employees who left the company voluntary were married



Times employees left the company

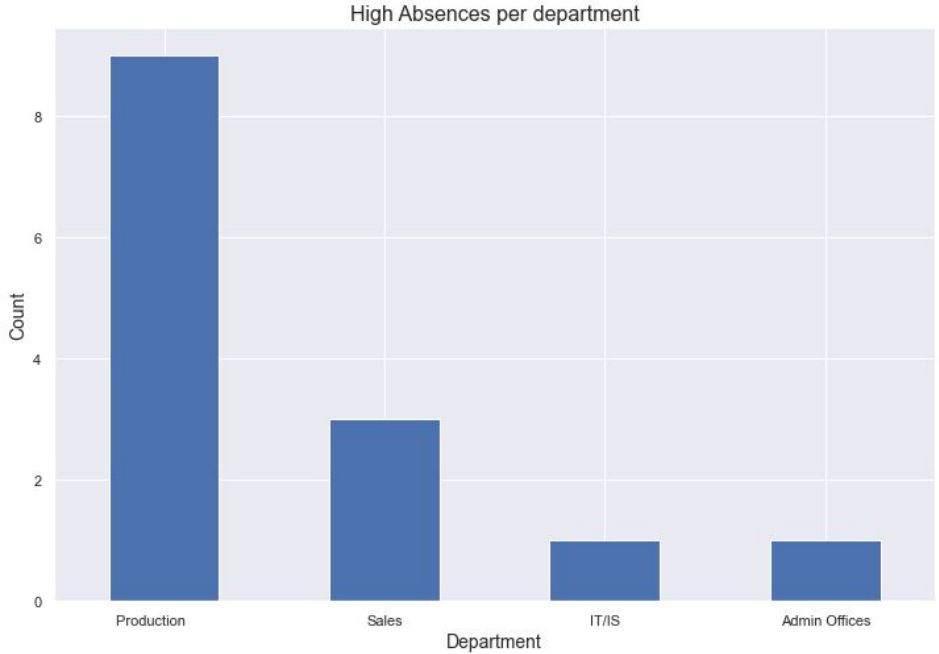
- Most employees left the company in **2015** followed by **2016.**
- If we take a closer look on the month (over all years) most employees left in **september** followed by **april.**



Absences 20 days per Manager & Department

- If we take a closer look on employees who were absent for 20 days and check if there are remarkable v**alues per manager** - luckily I must say “no” - there are four managers with each 2 employees which were absent for 20 days

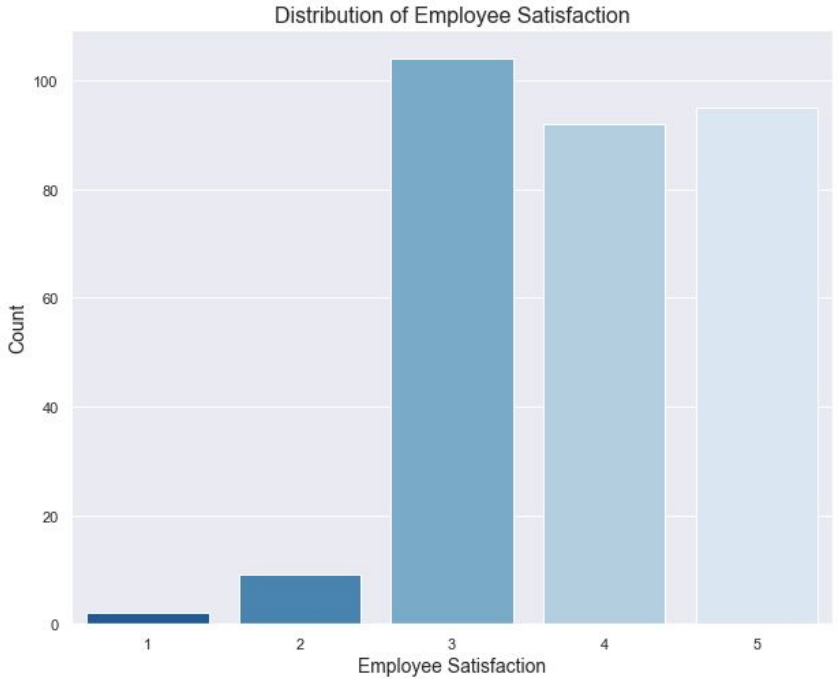
- But it’s interesting that we do have a higher value in the **production department**



Satisfaction & Performance

Employee Satisfaction

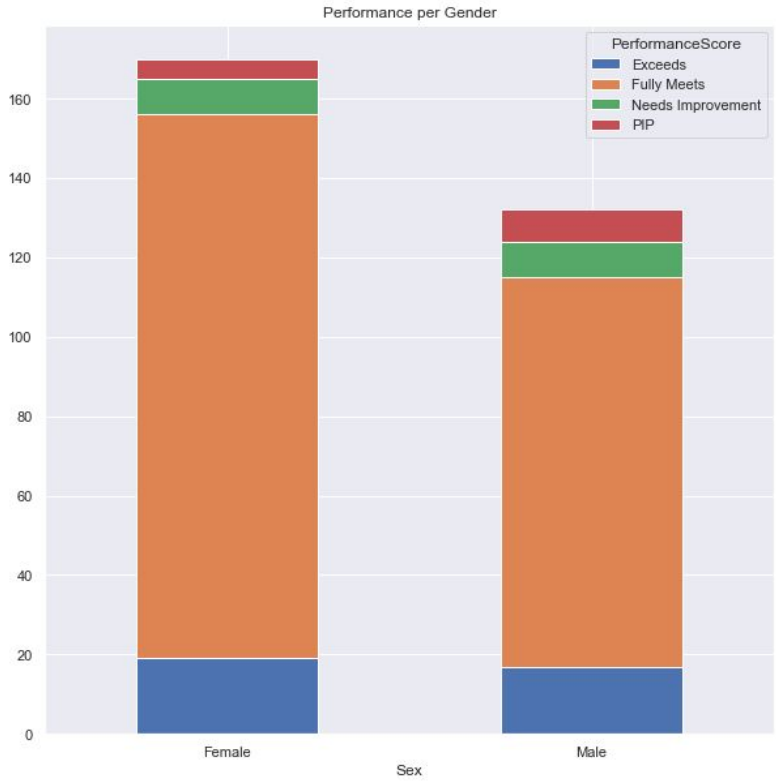
- There are values from 1 up to 5; sadly there is no explanation for it but we assume that 1 is the worst and 5 the best rating
- Over all the results for the employee satisfaction are
  - 3 (104 times)
  - 5 (95 times)
  - 4 (92 times)
  - 2 (9 times)
  - 1 (2 times)
- Luckily the **average** employee satisfaction is **4**



Employee Performance

- There are **4 different performance scores**
  - Fully Meets (235)
  - Exceeds (36)
  - Needs Improvement (18)
  - PIP (13)
- Now we set the following categories
  - Good = exceeds + fully meets
  - Bad = need improvement + PIP

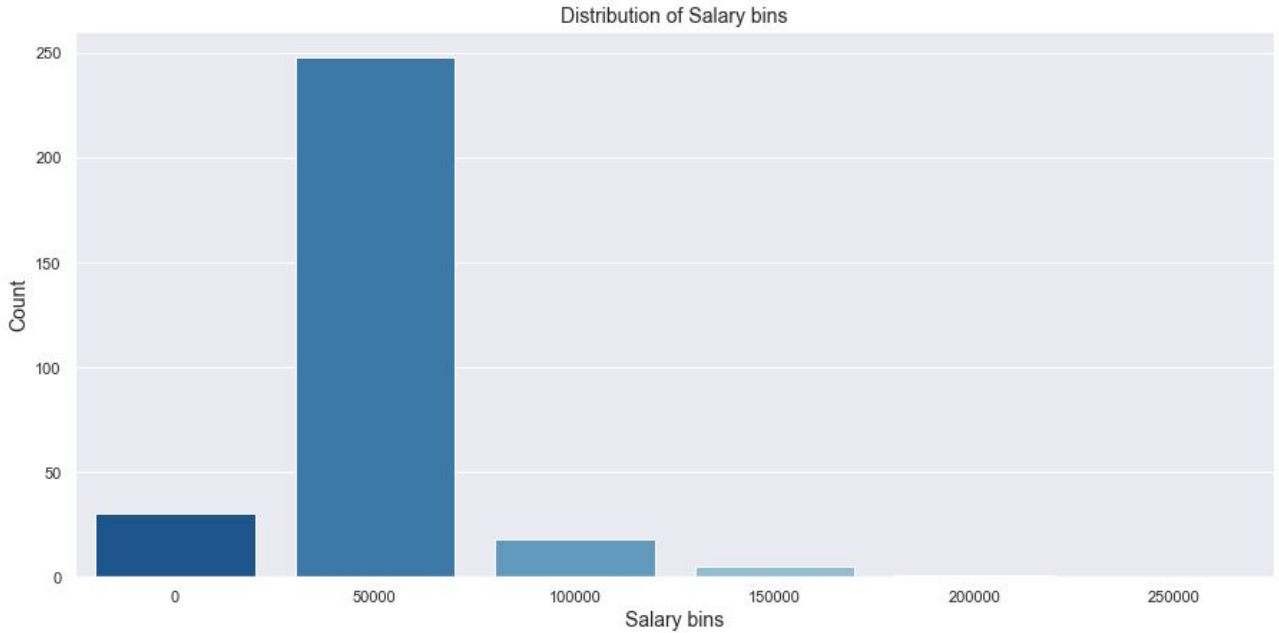
  To check if there is a **difference for gender performance** and we got the following results
  - Female Good = 156 and Female Bad = 14
  - Male Good = 115 and Male Bad = 17



Salary

Salary

- The highest salary is 220.450 USD
- The smallest salary is 45.046 USD
- For a better understanding I've created salary bins; we can see that most employees do have a salary range of 50K - 100K

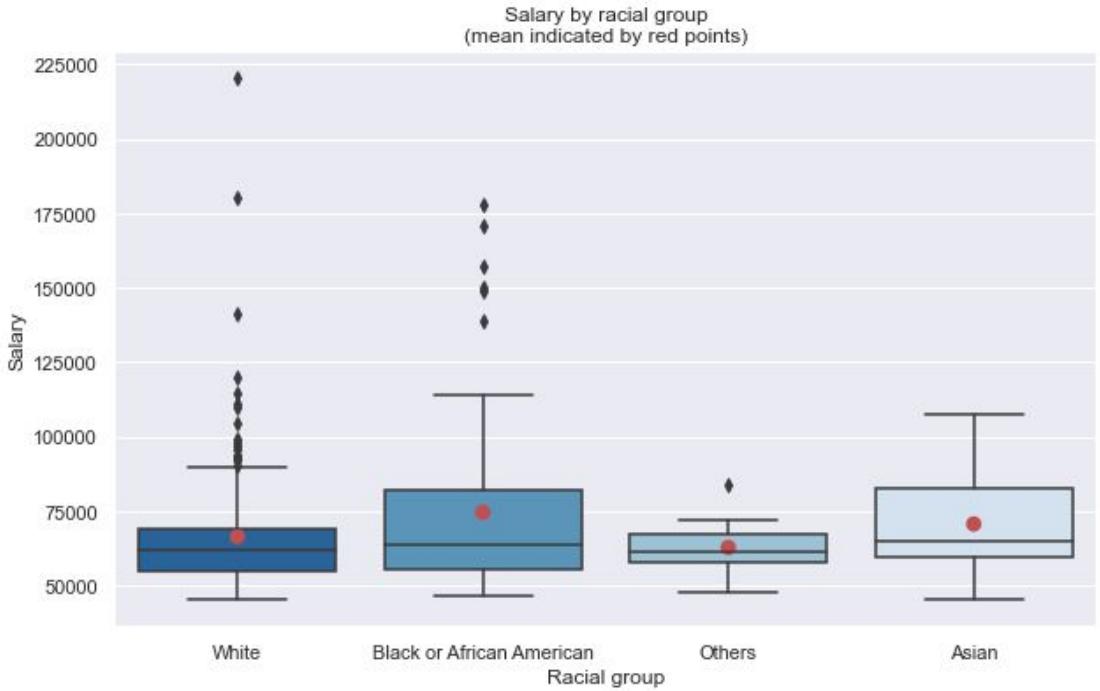


Gender Pay

- When I took a closer look on the average salary for female and male employees I got the following results and we can see that **male employees do earn a bit more**
  - Female: 62.063 USD
  - Male: 63.401 USD
- Checking the **average salary per department per gender** we can see that in the software engineering and sales department female employees do have a higher average salary

Salary per race

- We can see that there are some **outliers** for the “white” and “black / african american” race
- The mean for “black / african american” is higher than the median
- If we check if there are **differences for the salary per race per department** I got the following results
  - In Production we do have one “black / african american” person with a very high salary
  - In sales the salary for each race is nearly the same only the Asian people do earn less
  - In the IT/IS the salary range for black / african american people differs a lot



Thanks!

Do you have any questions?

Contact me at linkedin
https://www.linkedin.com/in/raphaela-boll-298803a2/