

DAT 430 Project 2 Part 2

Daniel Palhano

...

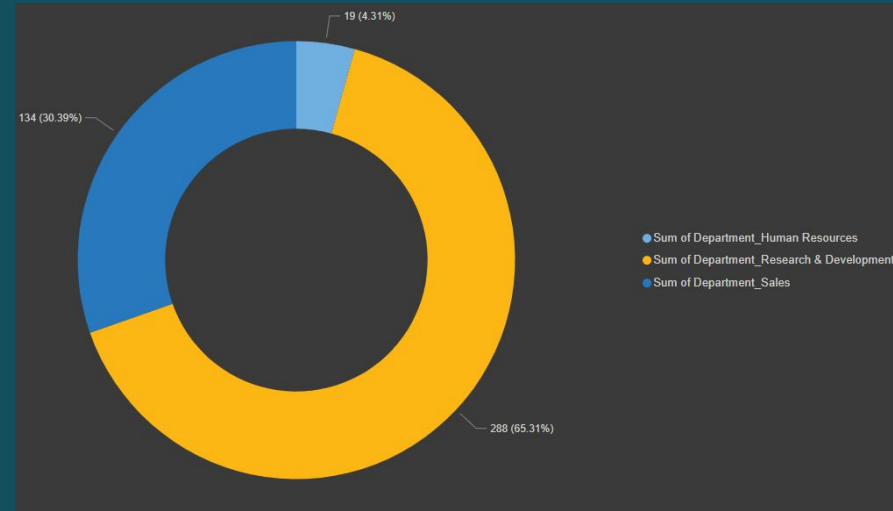
October 19, 2025

Overview of Project

Core Question - What factors are causing attrition currently within the company?

Theory - Lack of direct engagement and job satisfaction due to rapid company growth

With current data sets, the core factors that should be looked into is overall job satisfaction and what else could be impacting engagement. Is engagement being hindered by income, current management, or even how long they have been with the company; or could it be other factors.

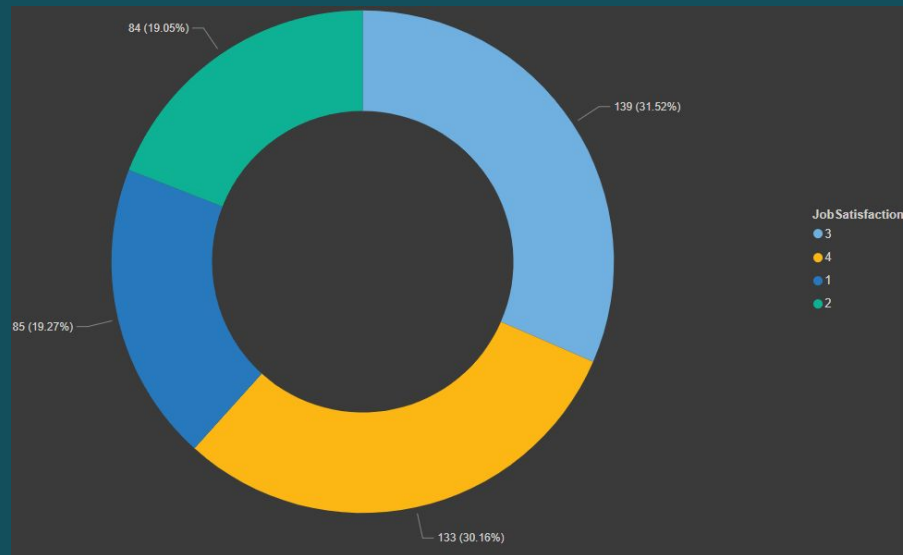


Current Breakdown of Company

65.31 % (288) in Research and Development
30.39 % (134) in Sales
4.31 % (19) in Human Resources

Job Satisfaction

- Looking towards the job satisfaction ratings for the company, specifically with the research and development, sales, and human resources departments; we need to look at the breakdown of satisfaction company wide prior to trying to figure out what is causing attrition.
- Seeing what satisfaction looks like across the board will allow us to explore more possibilities of what could be causing attrition.
- What could be affecting attrition in sales, might be different within HR and R&D departments due to the nature of their work, roles, and responsibilities.



Job Satisfaction Company Wide

61.68 % rated 3 or greater

38.32 % rated 2 or less

While 62% of employees being satisfied is a good number, 38% is relatively high being a cause for concern generally.

Attrition Rates and Prediction

- We took 2 data sets from HR which included employee information that is anonymous and included specific factors that would allow us to predict attrition.
- Running a random forest and ada boost model, we then were able to get models which predicted the rates of attrition based on multiple factors that would be related to engagement.

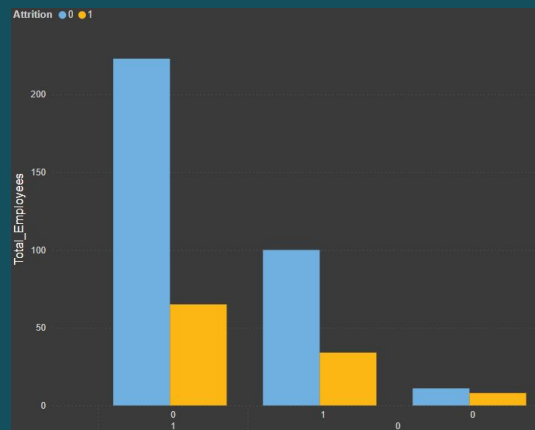
Key Findings

The actual attrition values were higher than what was predicted. This could mean either the models are underestimating the predicted attrition or we need to engineer more features or filter out some to see if we can truly find what is causing attrition.

R&D
Actual - **65**
Predicted - **45**

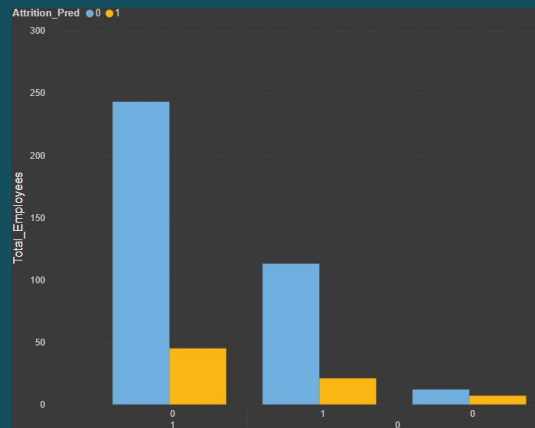
Sales
Actual - **34**
Predicted - **21**

HR
Actual - **8**
Predicted - **7**

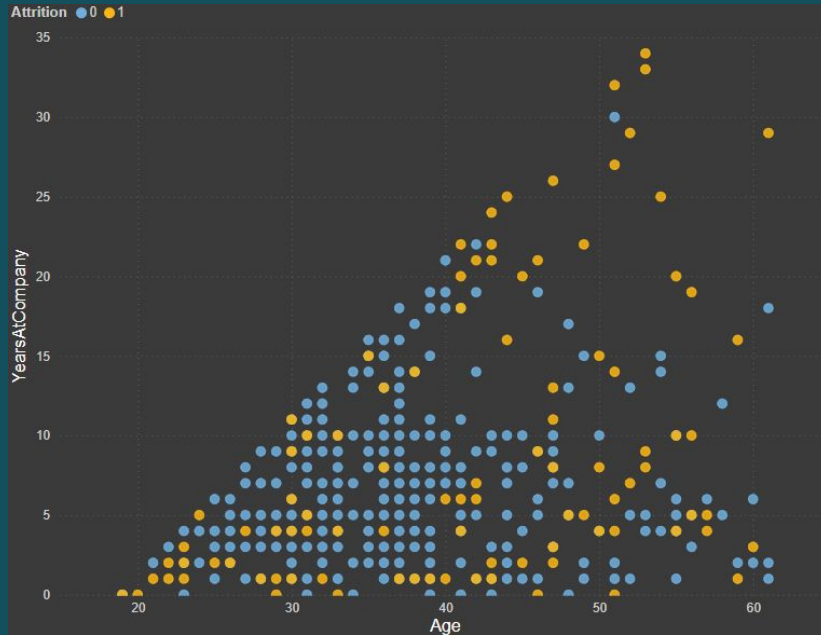


Actual Attrition Bar Chart Per Department (Above)

Predicted Attrition Bar Chart Per Department (Below)



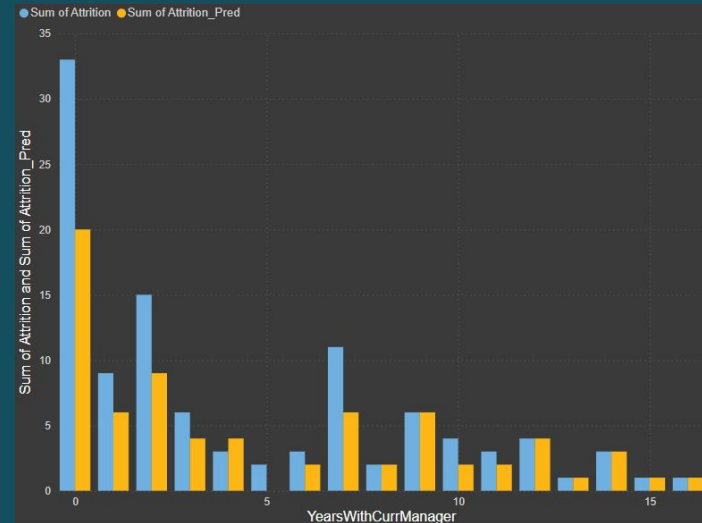
Factors Causing Attrition



Scatterplot for age against years at company

(Blue dots are still with the company)

It is important to look at rough ages of where people are leaving along with how long they have worked with current manager. We do see a trend that the majority of workers do happen to leave within the first 3 years which could either mean they did not work out or simply sought out other opportunities. This trend could be a factor in what is causing attrition to seem higher even according to the predictive models. The newer hires being added to the company could be causing others to think they need to move on within these departments.

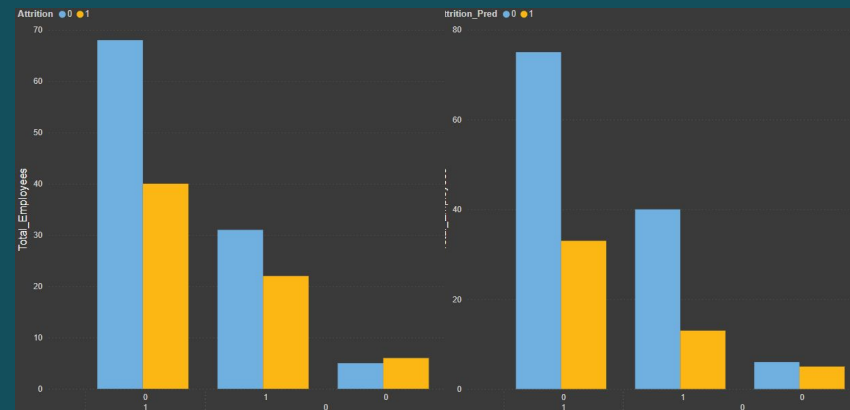


Bar charts for years with current manager against attrition (Prediction in yellow)

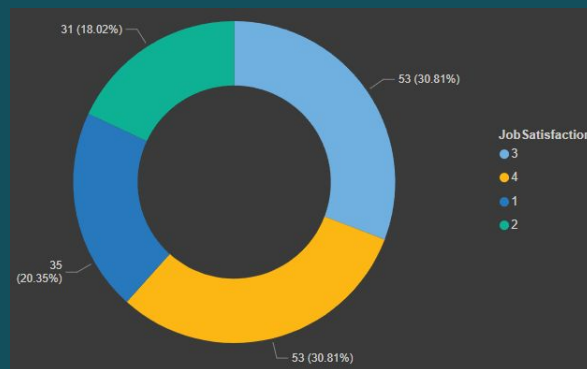
Conclusions and Opportunities

Pt. 1

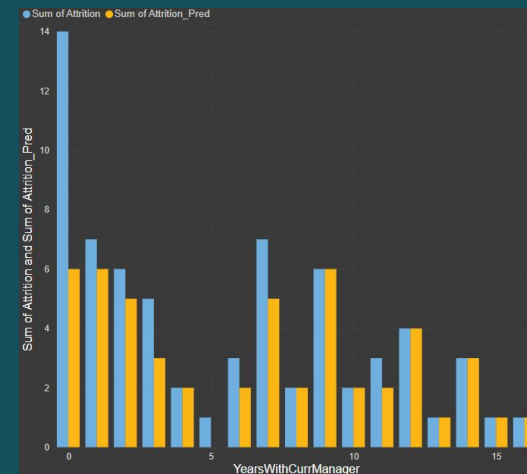
- Data points to those who are 40+ being the main leavers within the company. This could either be due to being established in their role and seeking better opportunities rather than purely job satisfaction.
- Workers within the 40+ age range typically are in greater roles than entry level jobs given to those younger than the age group. This could disprove the lack of engagement theory originally thought by the leadership team.
- The graphs point to this group being relatively content with their jobs yet being the majority of leavers within their departments.



Attrition Bar Charts per Department for 40+ employees
(Actual Attrition to Left, Prediction to Right)



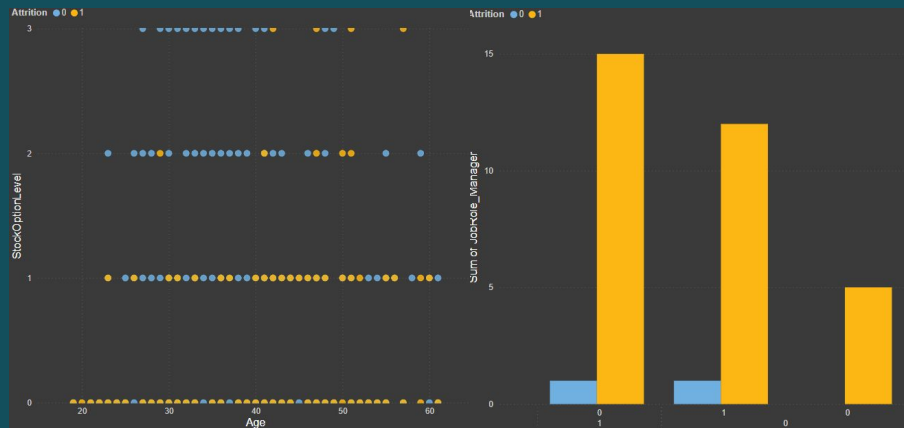
Job Satisfaction Donut Chart for 40+ (Above)
Bar Chart for Years with Current Manager
(Right)



Conclusions and Opportunities

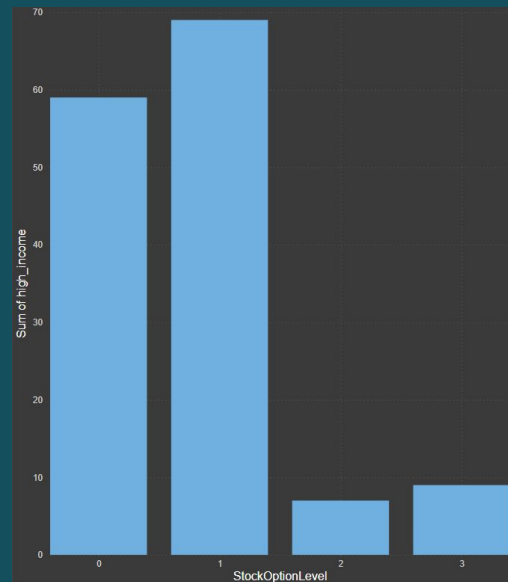
Pt. 2

- Those within a management role nearly all left, the numbers were the same for both the prediction and actual attrition numbers. This points to an issue with management roles and the sheer either difficulty of the roles currently or lack of support or benefits with the responsibilities that come with these roles.



Scatterplot for Stock Options
(0 is Entry Level, 3 is Senior Level)

Bar Chart for Attrition for All Ages



Bar Chart for Sum of High Income Earners in each
Stock Option Level

- A change for the benefits within these roles need to be made since there currently seems to be a huge uptick in management leaving for other opportunities. Providing management or those in higher ranking roles with more stock options instead of a salary bump would benefit engagement. Data points to those who have a higher stock option level typically stay more than those with junior or entry level.