



Employee Attrition Analysis



**The University of Texas at Austin McCombs School of Business
MSBA Class of 2020**

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Problem: IBM has a turnover rate of 16% and they want to know the reasons behind attrition of employees, in order to design retention strategies

Employee turnover and its implications

- Employees are the assets of any organization. Their attrition has detrimental effects on both bottom line and morale of the company
- Employers incur rehiring costs, productivity loss and domino effect on other employees
- On an average, 6 to 9 months of an employee's salary is the cost of rehiring a new person

IBM's current situation

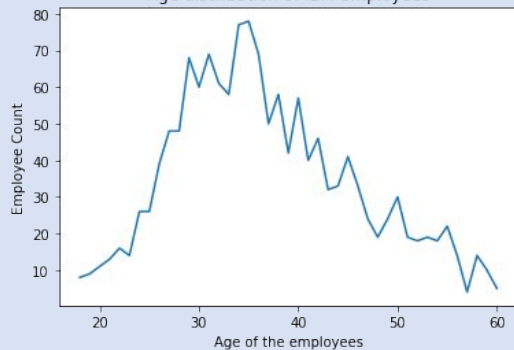
IBM has a turnover rate of 16% in the last year, which is higher than the 13.2% average turnover rate in the tech industry. Hence, they want to understand who leave the organization and why they do so.

The 3 key questions are:

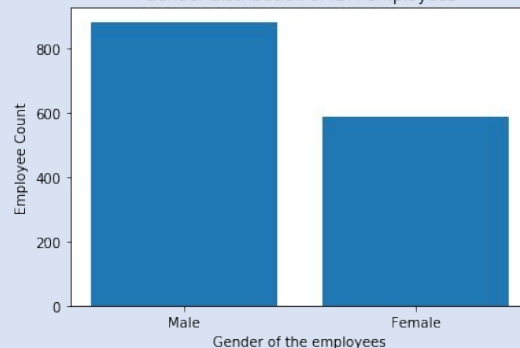
- Which section/category of employees are more likely to attrite?
- What could be the potential causes of attrition?
- What actions can be taken to prevent attrition?

Company Facts: 95% of IBM's workforce is from the Research and Development and the Sales teams

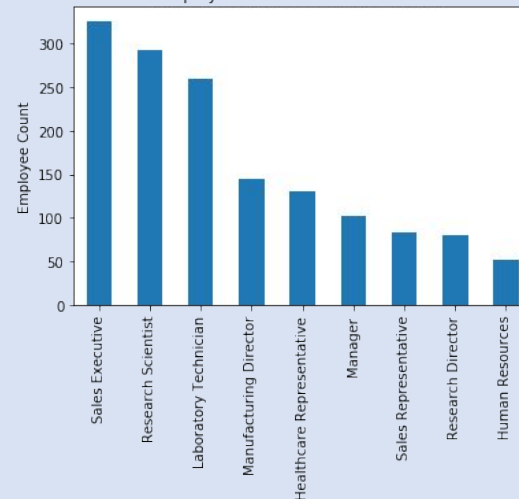
Age distribution of IBM employees



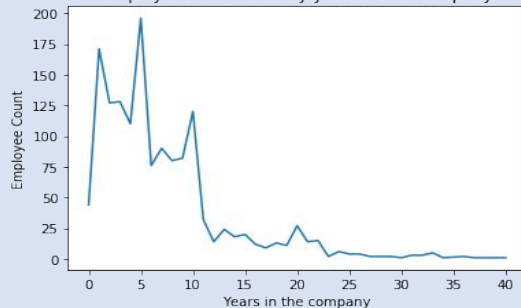
Gender distribution of IBM employees



Employee Distribution across Roles



Employee distribution by years in the company



Summary

- Millennials and Gen Z form ~50% of the workforce
- 40% of the company's workforce are women. This is much higher than the overall tech industry average of 20%
- 95% of IBM's workforce is across the R&D and Sales departments
- Most employees have between 0 and 10 years of association with IBM

Hypotheses: The possible reasons for employee attrition fall under three main categories

1 Better opportunities

- “When millennials see what appears to be a better opportunity, they have every incentive to take it”
- 36% of the millennials report that they will look for a job with a different organization in the next 12 months if the job market improves

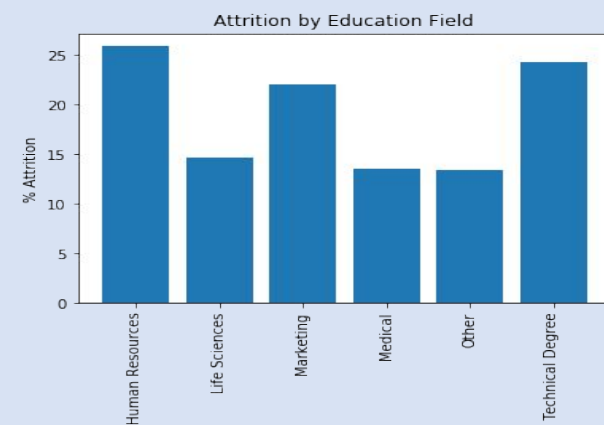
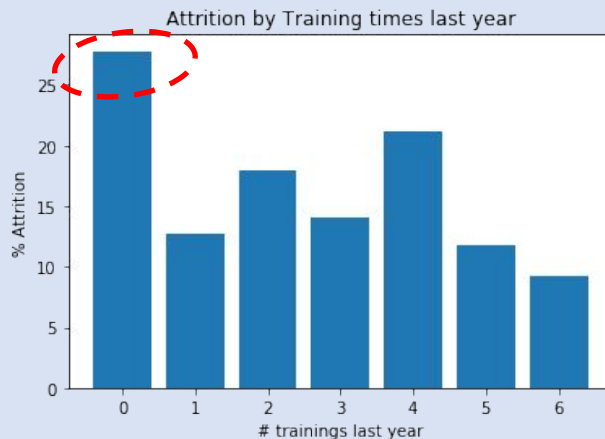
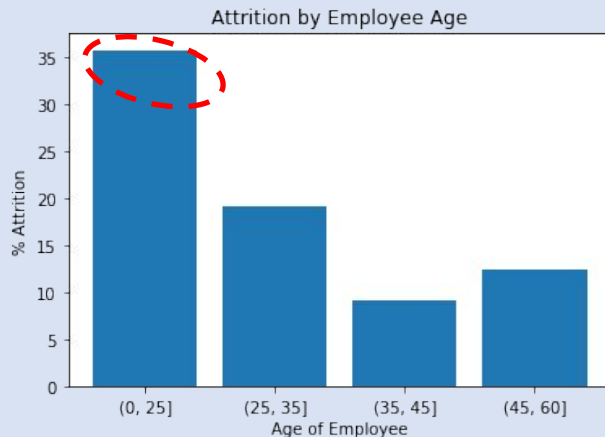
2 Better work life balance

- “Unreasonable workloads are chief contributors to attrition in an organization”
- “Work life balance (64% ranked ahead of both job security (59%) and compensation (54%) in employees’ preferences of organizations”

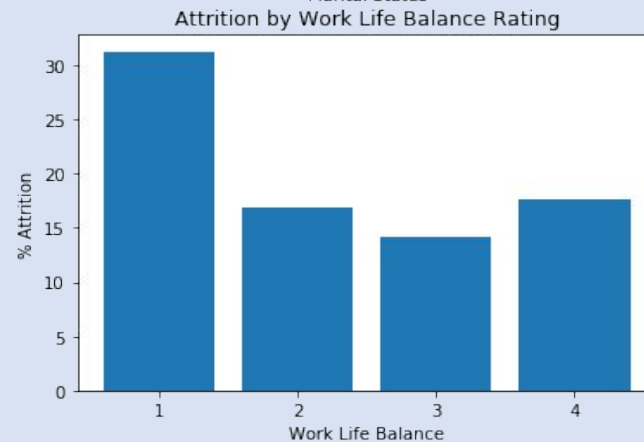
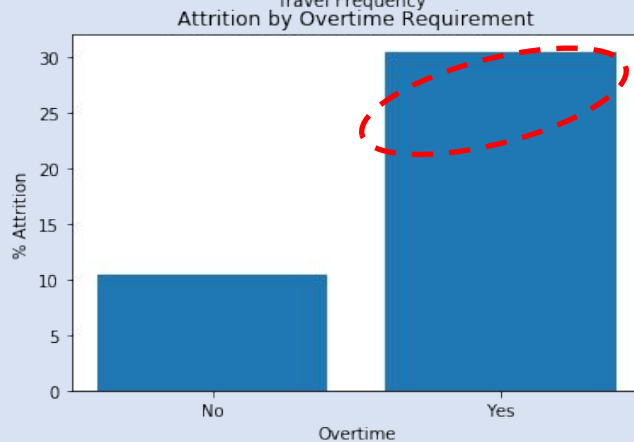
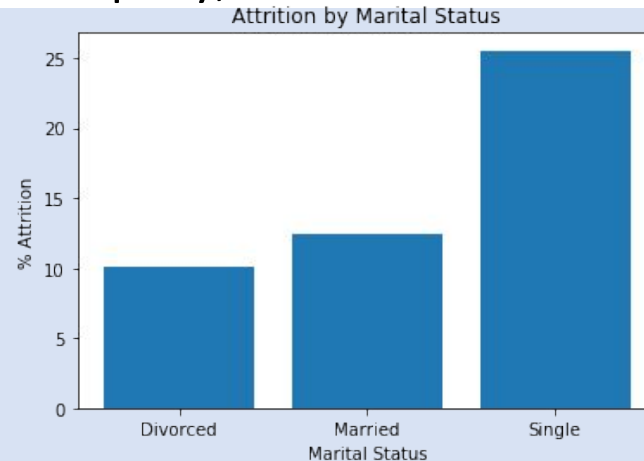
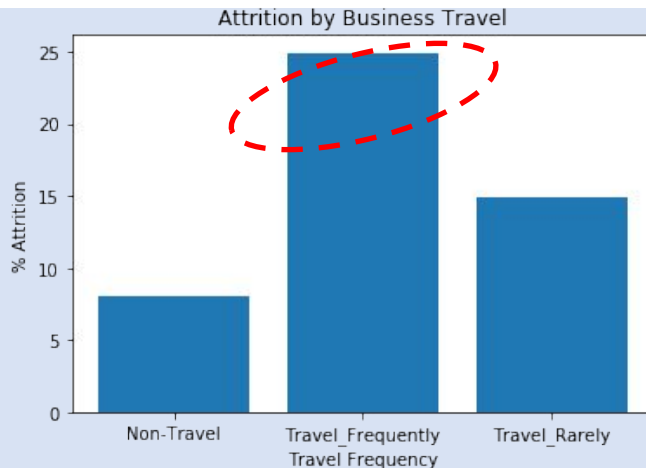
3 Better work environment

- “Positive work cultures encourage happier employees”
- “A good work environment builds a supportive culture that fosters growth for individuals and your organization”

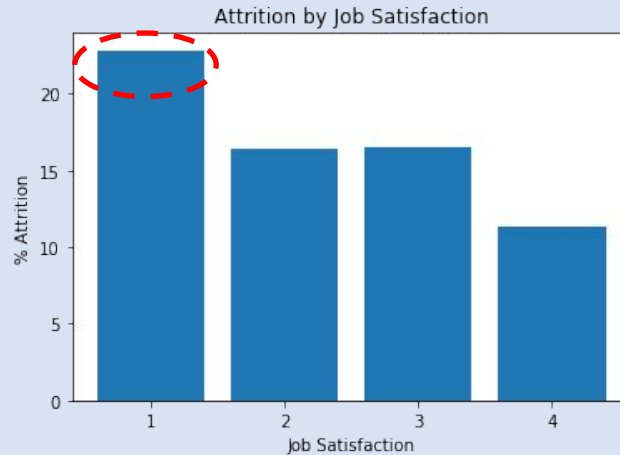
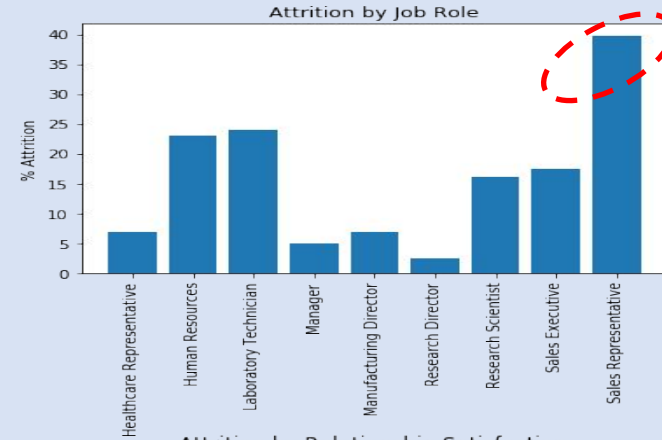
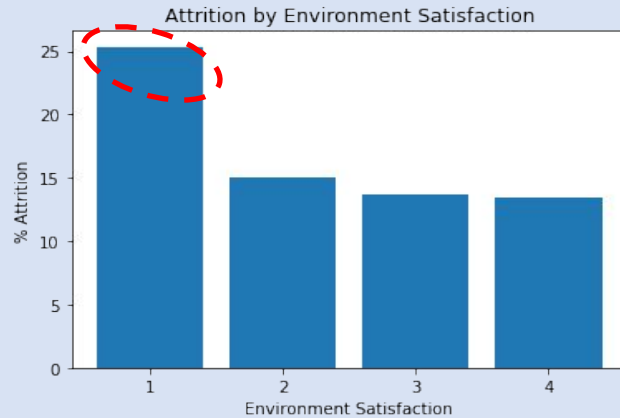
1. Better Opportunities: ~20% of the overall attrition is due to young employees who form only 8% of the workforce. Their turnover rate is 36%!



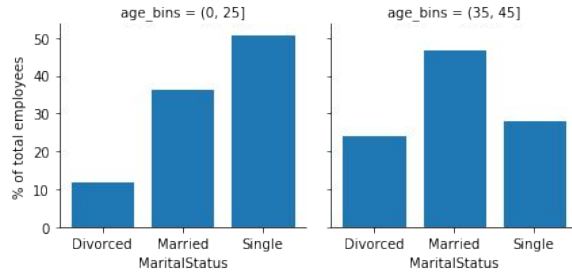
2. Better work life balance: 28% of the employees work overtime and they constitute 54% of overall attrition in the company, with a 31% turnover rate



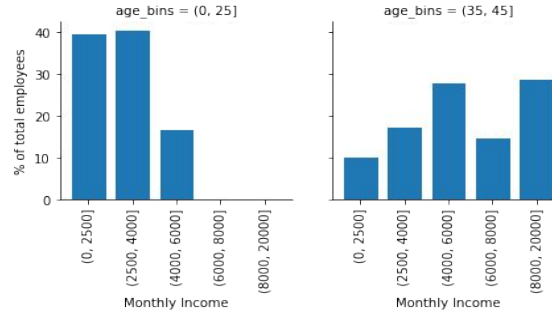
3. Better work environment: Employees who have explicitly stated low job satisfaction levels tend to leave the company



Majority of employees in the [0-25yrs] bin are single



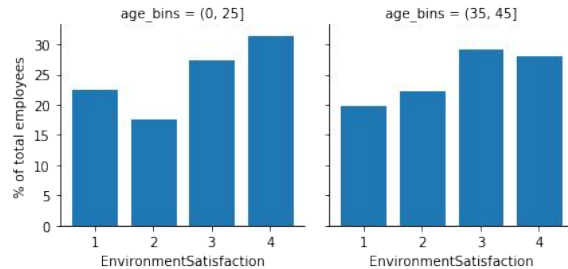
On an average employees in the [0-25yrs] bin earn less



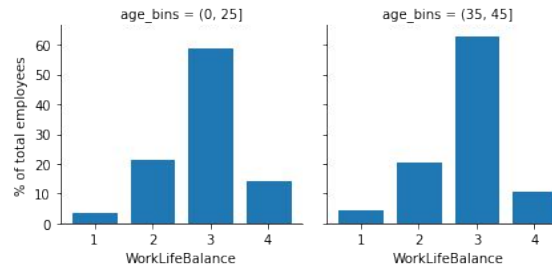
Comparison of workplace perception across Age Groups

- There is no discernible pattern in how employees from different age groups perceive life at IBM
- It could just be told that the younger employees are more likely to leave in search of better opportunities

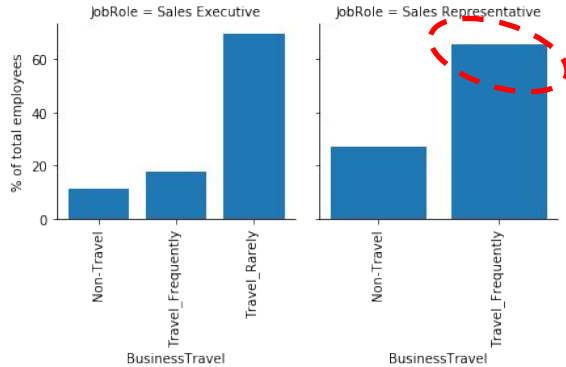
Employees in both age bins have similar Environment Satisfaction scores



Employees in both age bins have similar Work Life Balance scores



Sales Representatives need to travel more than Sales executives



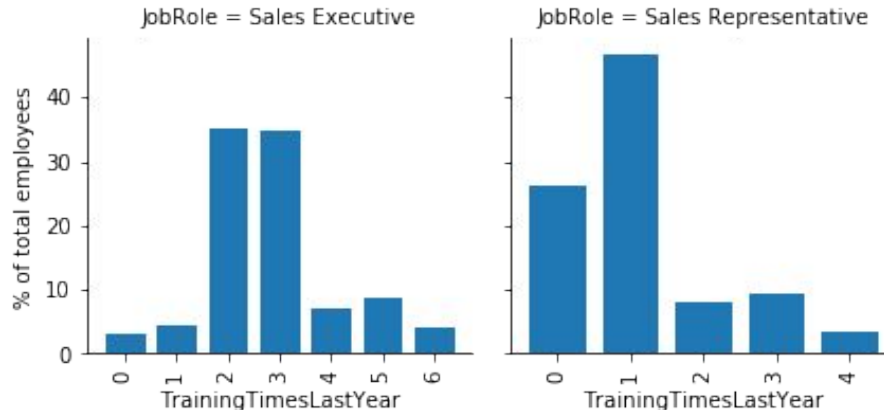
Sales Representatives are relatively younger than Sales Executives



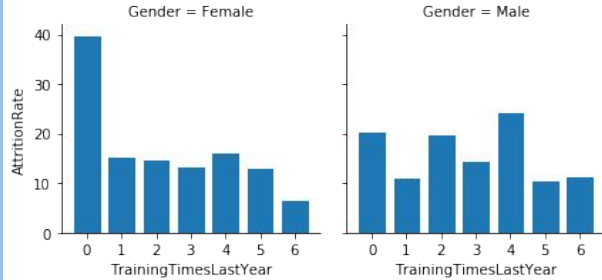
Comparing lives of Sales Representatives and Sales executives

- Sales representatives are younger, travel very frequently and are also less likely to have professional development
- 40% of them end up leaving the company, and they contribute to 14% of overall attrition
- 52% of sales representatives who have left the company have explicitly stated lower job satisfaction levels

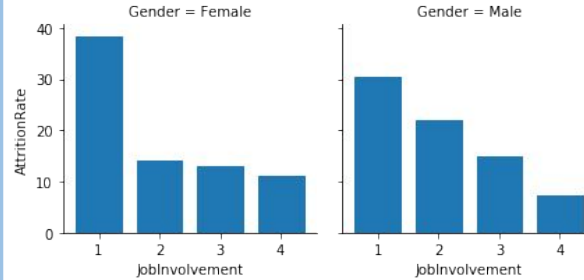
Sales Executives received more job trainings in the last year than Sales Representatives



Women who received less trainings in the last year tend to attrite more



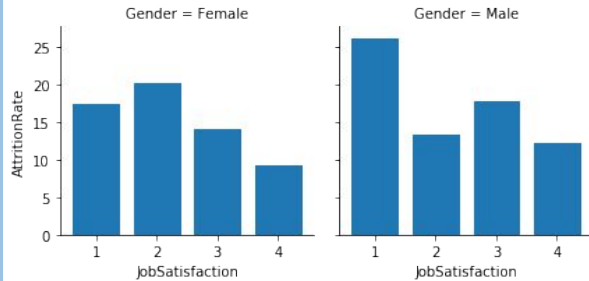
Women who feel less involved in their job tend to attrite more



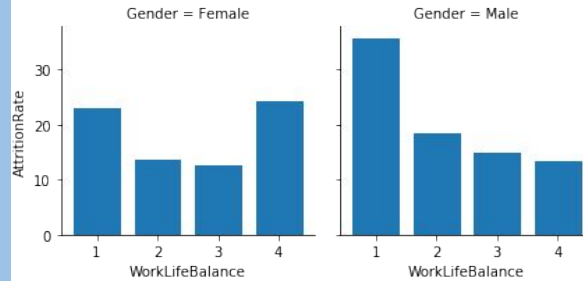
Comparing preferences of men and women

- Women prefer relatively higher job involvement and job trainings
- Men prefer relatively higher job satisfaction and work life balance

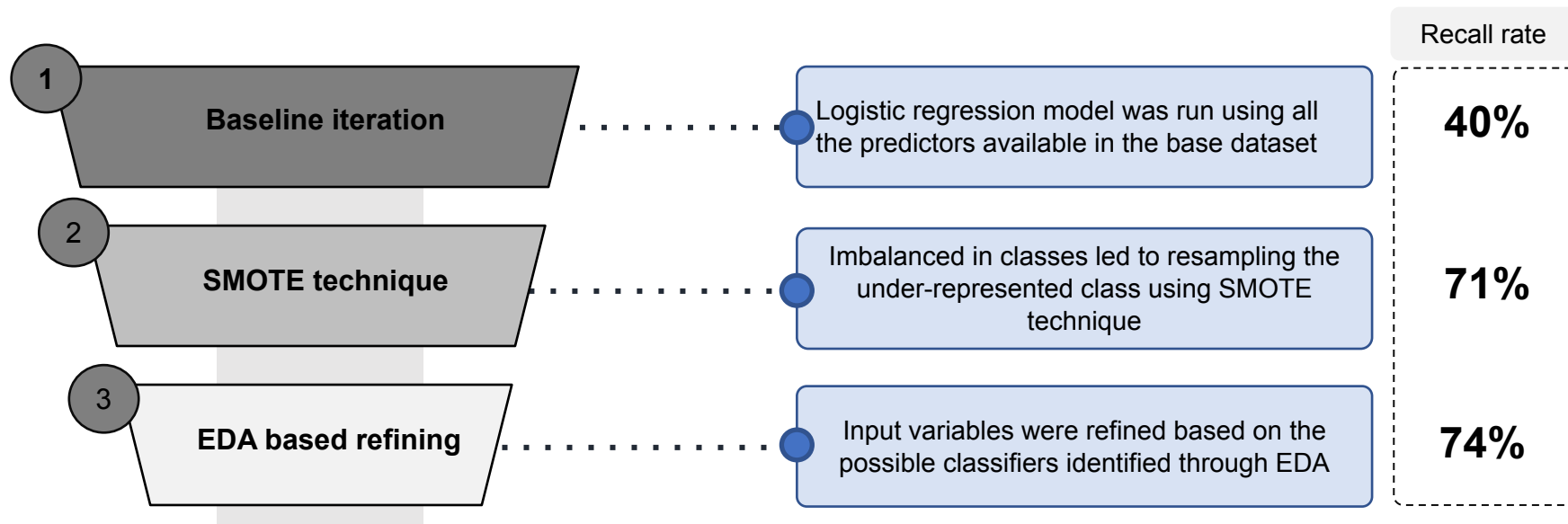
Men with low Job Satisfaction scores tend to attrite more



Men with low Work Life Balance scores tend to attrite more



Our best logistic regression model is able to rightly classify 74% of the employees who are likely to leave the company!



IBM can save 63% of their attrition costs, by implementing our model which rightly identifies 74% of the customers who are likely to attrite

- Matrix contains 74% of the employees who attrite, from the test dataset
- These are the employees which have been rightly classified as 'attrite employees' by our model (Recall rate = 74%)
- Values in the cells indicate the costs incurred due to the employees in the specific bucket combination (calculated as 50% of their salary)

		Salary bucket		
		High (78K to 240K)	Medium (44K to 77.5K)	Low (12K to 43.5K)
Propensity to attrite	High (>68%)	\$ 227,130	\$ 51,198	\$ 59,718
	Med (59% to 68%)	\$ 171,738	\$ 89,214	\$ 48,780
	Low (51% to 58%)	\$ 128,130	\$ 103,818	\$ 74,478
		\$ 954,204		

- Attrite employees form **16% of overall workforce** at IBM and cost the company **\$3M annually**
- Our model** can rightly identify **74% of the 16%**, who cost **\$1.9M to IBM yearly**, in terms of salary provided
- Rehiring costs** for these employees is **~50%** as per industry standards
- Hence, **our model** if implemented can help **save \$954K off the \$1.9M**
- This forms **63% of the overall rehiring costs** due to the 16% turnover rate

- The model** when **extended** to the entire **351K workforce** in IBM US could help identify **41K out of the 56K employees** who are likely to attrite in a year and **save the rehiring costs** associated with the attrition
- They can also design long term org level employee benefit strategies based on the insights obtained from the approach

A young sales representative (aged between 18 and 25), working overtime, traveling frequently and explicitly stating low job satisfaction levels is more likely to attrite when compared to others



Young aged professionals, aged between 18 and 25 are

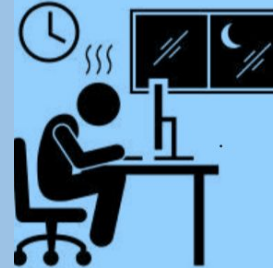
2.5X

times more likely to attrite when compared to other age groups

Sales representatives are

2.7X

times more likely to attrite when compared to employees in other roles



People who work overtime are

3X

times more likely to attrite when compared to people who work normal hours



People who travel frequently are

2X

times more likely to leave when compare to the rest



People who have low levels of job satisfaction are

1.4X

times more likely to leave

APPENDIX

	coef	std err	z	P> z	[0.025	0.975]
Q("BusinessTravel")[Non-Travel]	0.2925	3.306	0.088	0.930	-6.187	6.772
Q("BusinessTravel")[Travel_Frequently]	2.2452	3.287	0.683	0.495	-4.197	8.688
Q("BusinessTravel")[Travel_Rarely]	1.3174	3.274	0.402	0.687	-5.099	7.734
Q("Department")[T.Research & Development]	1.1154	3.072	0.363	0.717	-4.905	7.136
Q("Department")[T.Sales]	0.9776	3.053	0.320	0.749	-5.005	6.960
Q("EducationField")[T.Life Sciences]	-0.4170	0.893	-0.467	0.641	-2.168	1.334
Q("EducationField")[T.Marketing]	0.0537	0.945	0.057	0.955	-1.799	1.906
Q("EducationField")[T.Medical]	-0.5993	0.896	-0.669	0.503	-2.355	1.156
Q("EducationField")[T.Other]	-0.4431	0.961	-0.461	0.645	-2.326	1.440
Q("EducationField")[T.Technical Degree]	0.3720	0.919	0.405	0.686	-1.429	2.173
Q("Gender")[T.Male]	0.2863	0.201	1.428	0.153	-0.107	0.679
Q("JobRole")[T.Human Resources]	2.3562	3.106	0.759	0.448	-3.732	8.444
Q("JobRole")[T.Laboratory Technician]	1.5877	0.514	3.087	0.002	0.580	2.596
Q("JobRole")[T.Manager]	-0.2603	1.091	-0.239	0.811	-2.399	1.879
Q("JobRole")[T.Manufacturing Director]	-0.3502	0.579	-0.605	0.545	-1.484	0.784
Q("JobRole")[T.Research Director]	-1.4641	0.986	-1.484	0.138	-3.397	0.469
Q("JobRole")[T.Research Scientist]	0.5252	0.529	0.992	0.321	-0.512	1.563
Q("JobRole")[T.Sales Executive]	0.8632	1.313	0.657	0.511	-1.711	3.437
Q("JobRole")[T.Sales Representative]	2.2705	1.363	1.666	0.096	-0.400	4.941
Q("MaritalStatus")[T.Married]	0.2611	0.282	0.927	0.354	-0.291	0.813
Q("MaritalStatus")[T.Single]	1.1173	0.283	3.943	0.000	0.562	1.673
Q("OverTime")[T.Yes]	1.7081	0.206	8.307	0.000	1.305	2.111
Q("Age")	-0.0289	0.015	-1.910	0.056	-0.058	0.001
Q("EnvironmentSatisfaction")	-0.3611	0.089	-4.040	0.000	-0.536	-0.186
Q("JobInvolvement")	-0.5087	0.130	-3.904	0.000	-0.764	-0.253
Q("JobLevel")	0.1863	0.328	0.569	0.570	-0.456	0.828
Q("JobSatisfaction")	-0.2906	0.087	-3.331	0.001	-0.462	-0.120
Q("MonthlyIncome")	3.912e-05	8.51e-05	0.460	0.646	-0.000	0.000
Q("NumCompaniesWorked")	0.1241	0.041	3.038	0.002	0.044	0.204
Q("PercentSalaryHike")	-0.0260	0.028	-0.929	0.353	-0.081	0.029
Q("RelationshipSatisfaction")	-0.1039	0.091	-1.138	0.255	-0.283	0.075
Q("TotalWorkingYears")	-0.0483	0.027	-1.789	0.074	-0.101	0.005
Q("TrainingTimesLastYear")	-0.1414	0.082	-1.730	0.084	-0.301	0.019
Q("WorkLifeBalance")	-0.5177	0.139	-3.735	0.000	-0.789	-0.246