Voluntary Churn Prediction Model

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Introduction

PREDICTING VOLUNTARY EMPLOYEE CHURN

SITUATION WHERE EMPLOYEES CHOOSE TO LEAVE THEIR JOBS VOLUNTARILY

HELPS IN DEVELOPING STRATEGIES TO RETAIN THEIR VALUABLE EMPLOYEES

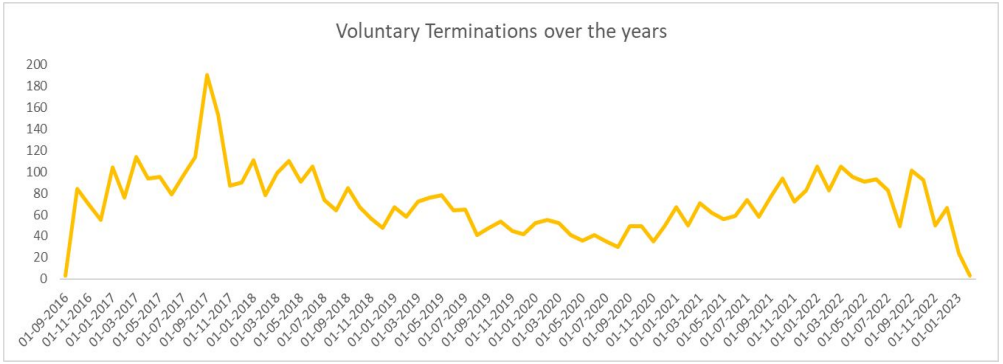
IMPROVES EMPLOYEE SATISFACTION

AVOIDS LOSS OF TALENT, KNOWLEDGE, AND EXPERIENCE

COST OF TRAINING NEW EMPLOYEES > COST OF RETAINING EXISTING EMPLOYEES

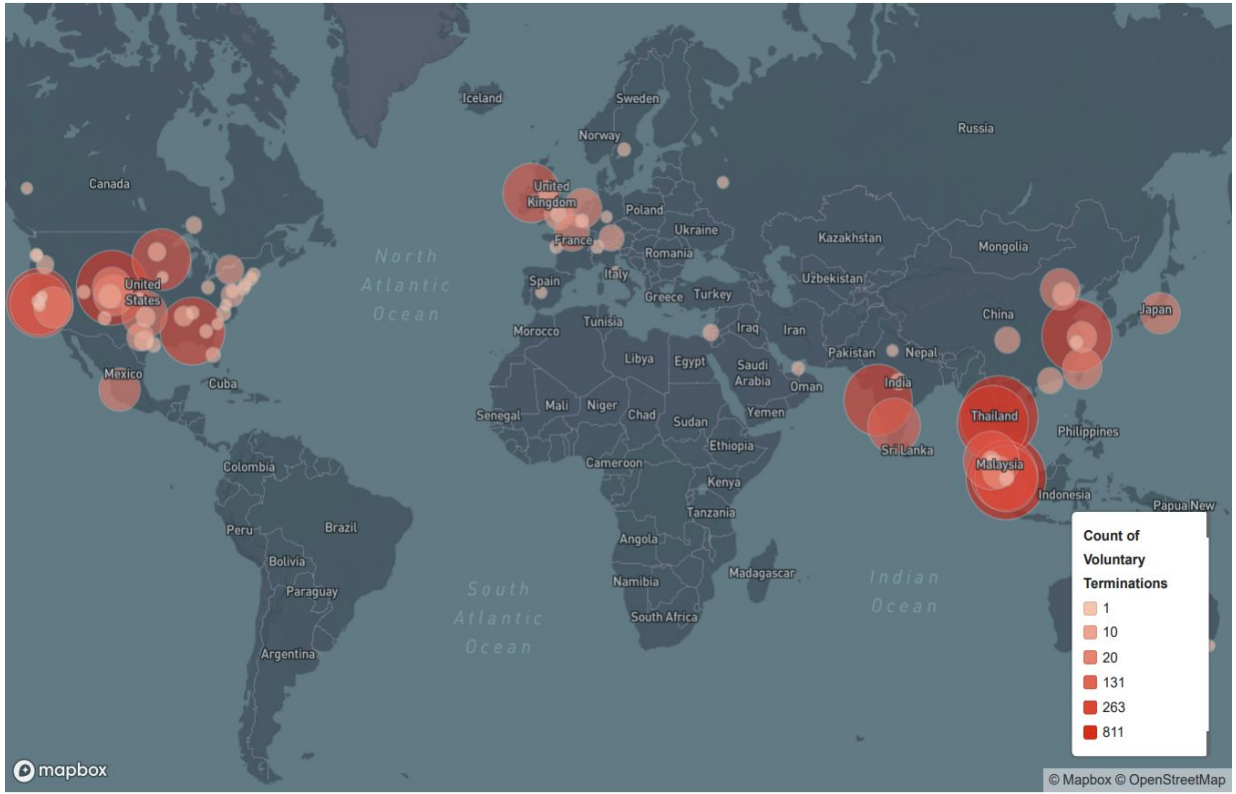
Data Deepdive

Newly added data points



Voluntary employee termination over the years

Voluntary Terminations by Location



Top 10 locations by count of voluntary terminations	
Locations	**Count of Voluntary Terminations**
Korat Thailand	728
Longmont United States	467
Thepharak Thailand	454
Wuxi China	408
Woodlands Singapore W2	401
Pune India	337
Woodlands Singapore W3	317
Johor Malaysia	270
Fremont California USA	263
Normandale United States	248

Geographic Analysis of Voluntary Churn

Modeling

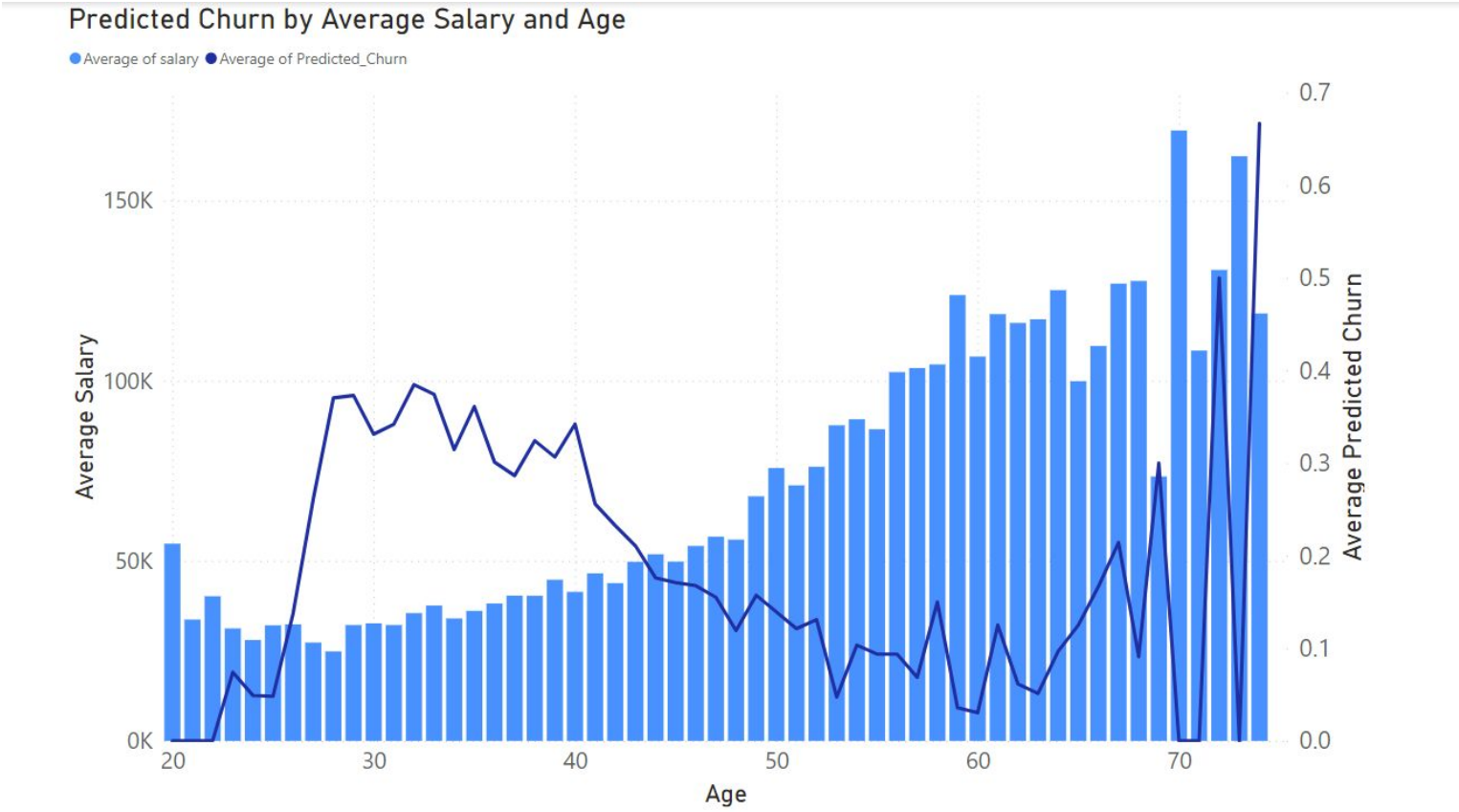
S. No.	Comparison methods	F1 score	AUC	Accuracy	Recall	Precision	**Final Score**
1	**Light GBM with RFE**	**79%**	**84%**	**90%**	**71%**	**88%**	**86%**
2	**XG Boost**	**77%**	**83%**	**89%**	**70%**	**87%**	**84%**
3	**Random Forest**	**73%**	**80%**	**87%**	**63%**	**87%**	**82%**

Final Score: Recall * 0.3 + Specificity * 0.2 + Precision * 0.2 + Accuracy * 0.3

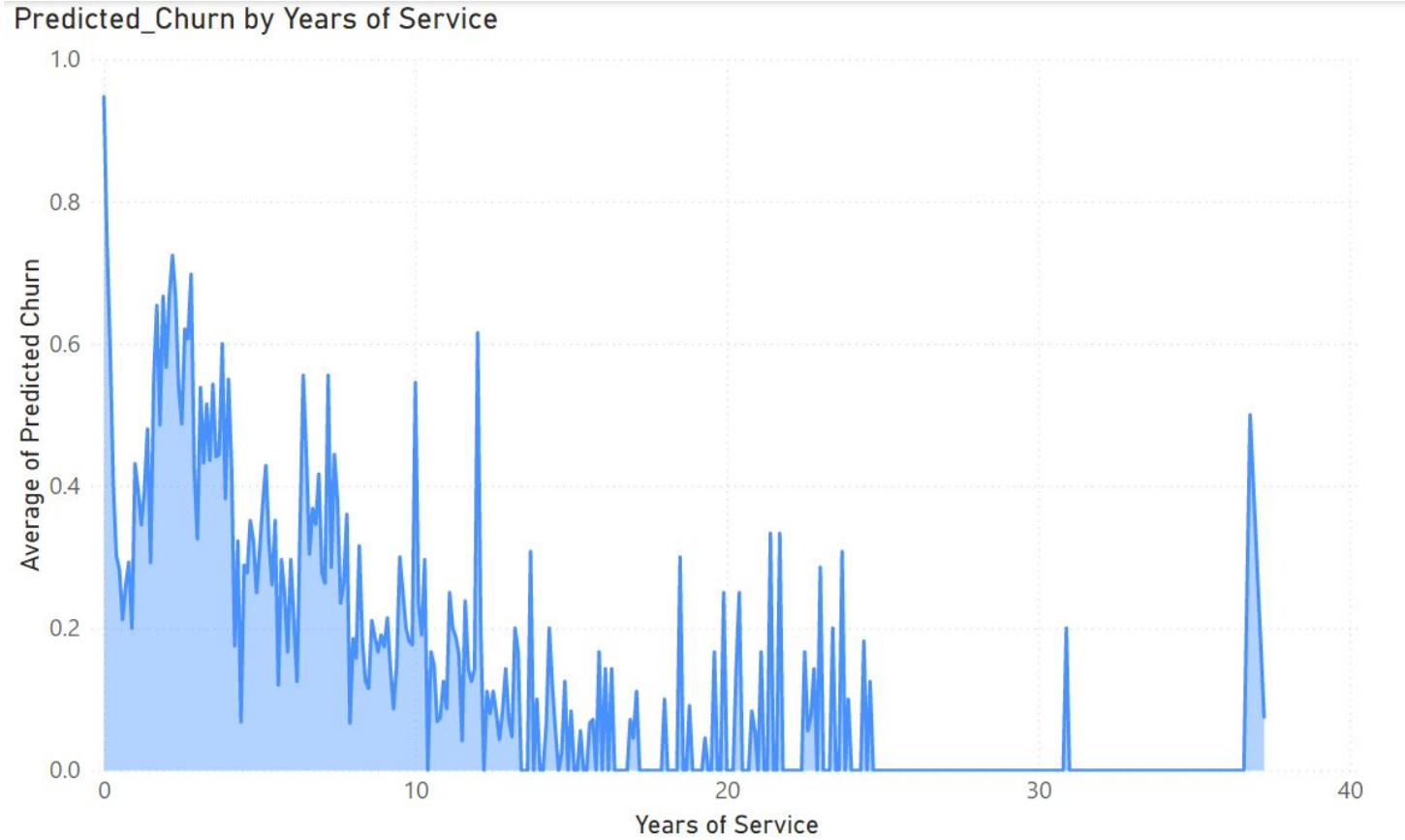
Feature Analysis

Characteristic	Likelihood of Voluntary Churn	Relationship with likeliness to Churn
Years of Service	High years of service -> Less Likely to leave • More invested in the organization • Have stronger ties to their colleagues and work	
Compa Ratio	High Compa Ratio -> Less Likely to leave • Paid below market rate may feel undervalued • More likely to seek out other higher-paying jobs	
Salary	High Salary -> Less Likely to leave • More satisfied with compensation & benefits • More to lose financially by leaving	
Days Since Last Promotion	More Days Since Last Promotion -> More Likely to leave • May feel stagnant in their current role • On a search of new opportunities	

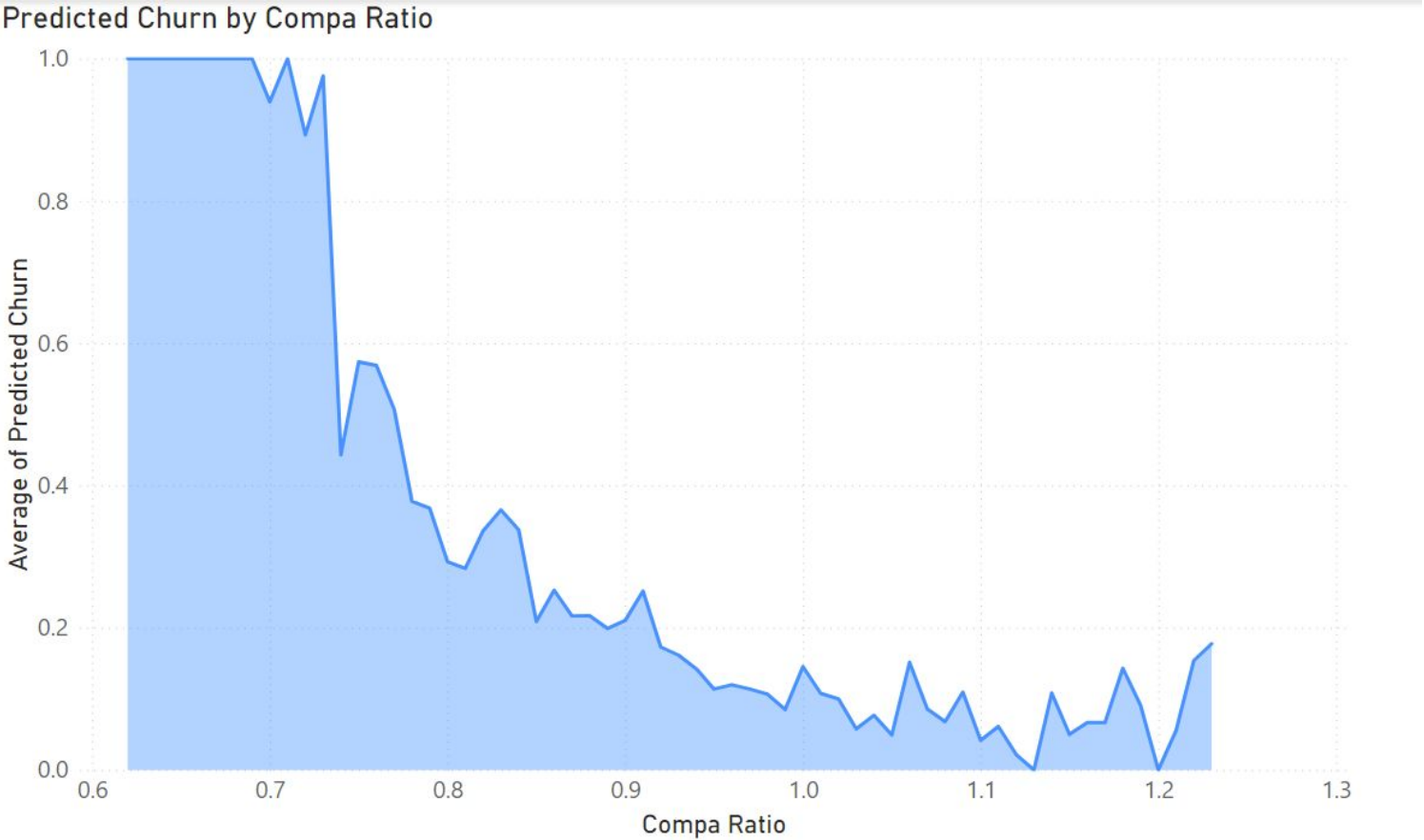
Predicted Employee Churn by Avg Salary & Age



Predicted Employee Churn by Years of Service



Predicted Employee Churn by Compa Ratio



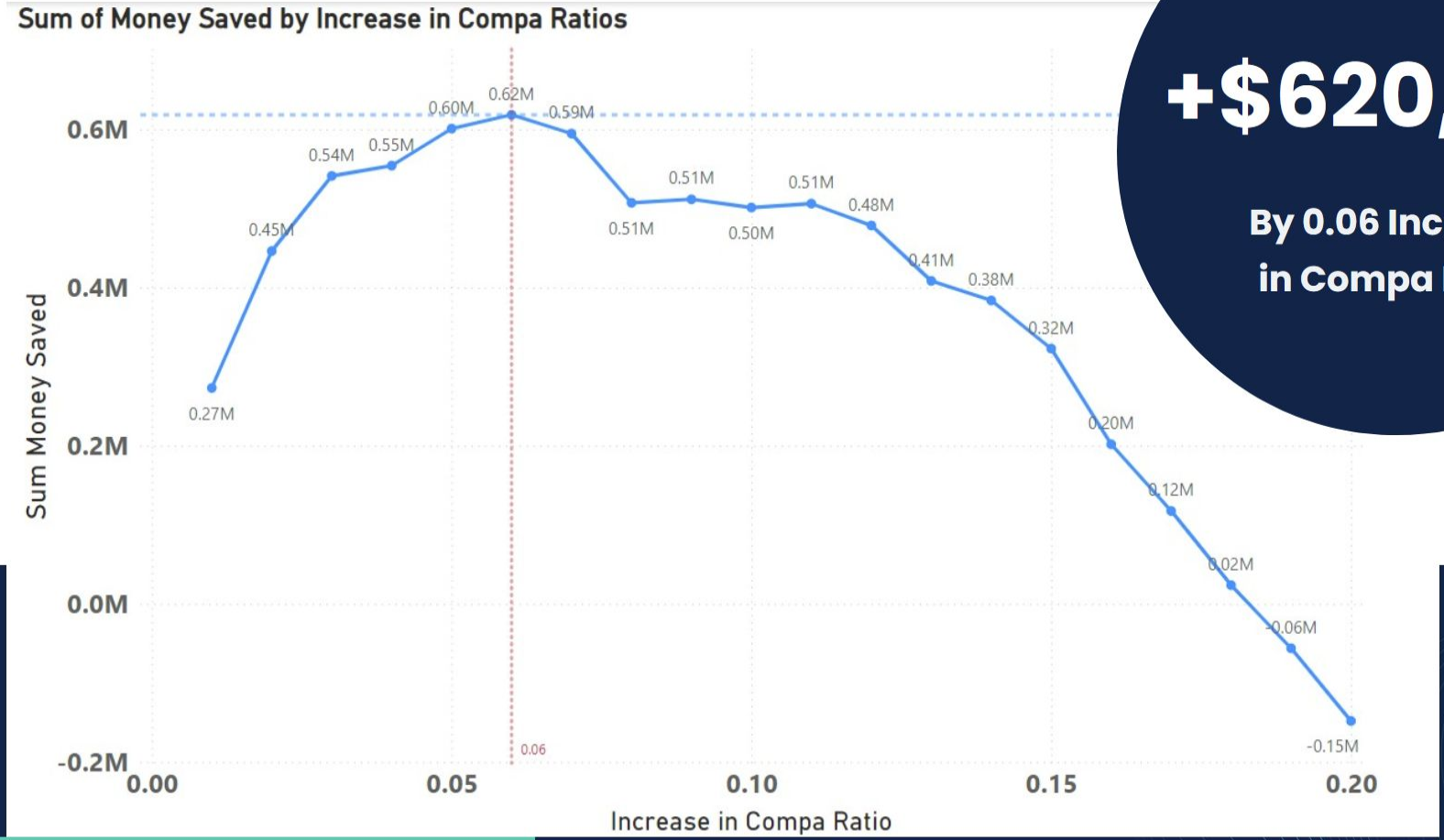
Business Impact - Current Statistics

Since 2022

-$64,700,000
From Voluntary Churn

That is 7.1% of total employee spending

Compa Ratio Adjustment



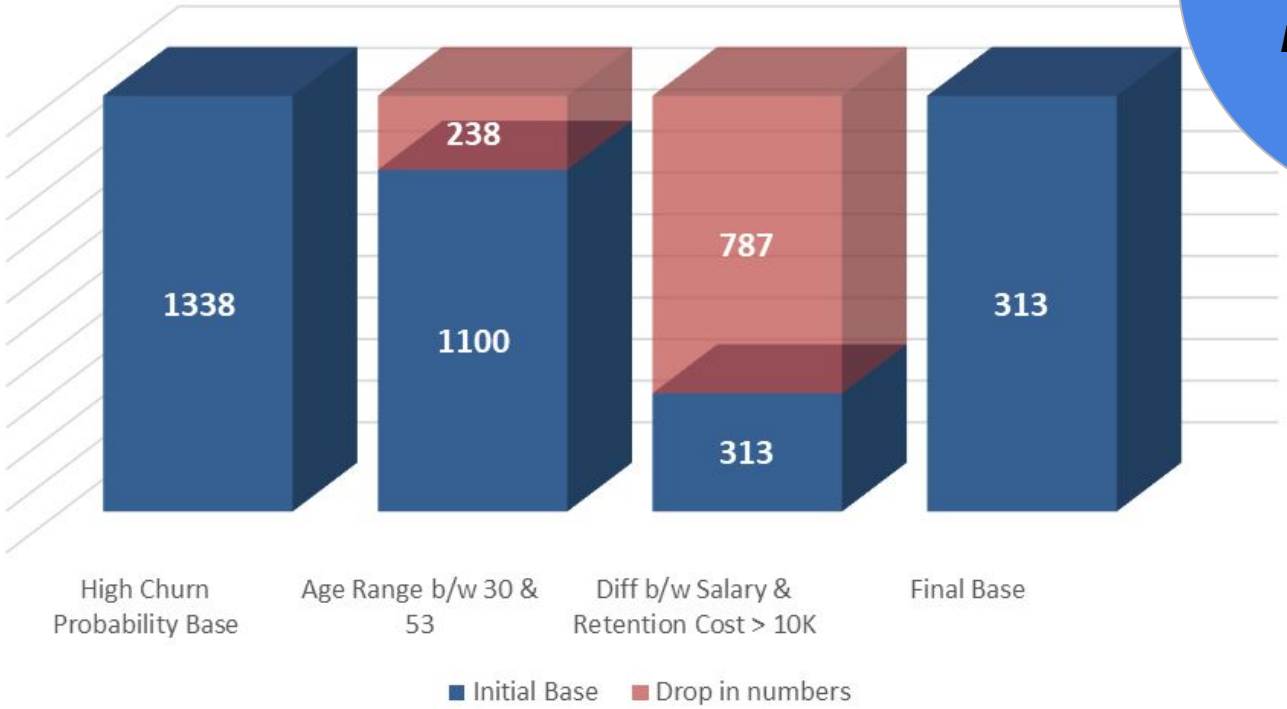
+$620,000

By 0.06 Increase in Compa Ratio

High Value Segment of Employees

~ $5M

By targeting high value segment



Recommendations

Short Term	Long Term
Personalized solutions to at-risk employees	Corporate cultural change
More flexible leave policy	More incentives like 401k
Reward and recognize employees	Offer a competitive salary
Healthy work-life balance	Opportunities of development and continuing education

Results

Using our best model, LightGBM, we were able to determine the golden number for the increase in compa ratio which was **0.06.**

With our analysis, [redacted] can save up to **$620k** by increasing the compa ratio by **0.06** for all employees predicted to churn.

Under the mentioned assumptions, [redacted] can save up to **$5M** by retaining all of employees from the high value segment (**22.5%** of all employees predicted to churn on the test set) by increasing the compa ratio by **0.06**.

Future Improvements

Cohort Analysis

Targeted analysis by building models segregated by years for time series analysis

Termination Reason Prediction

Develop a model to predict termination reason to focus on dissatisfied employees based on salary or compa ratio

Additional Performance Metrics

Improving accuracy by Including more information-rich variables in the model

THANK YOU

Appendix

Key influencers Top segments

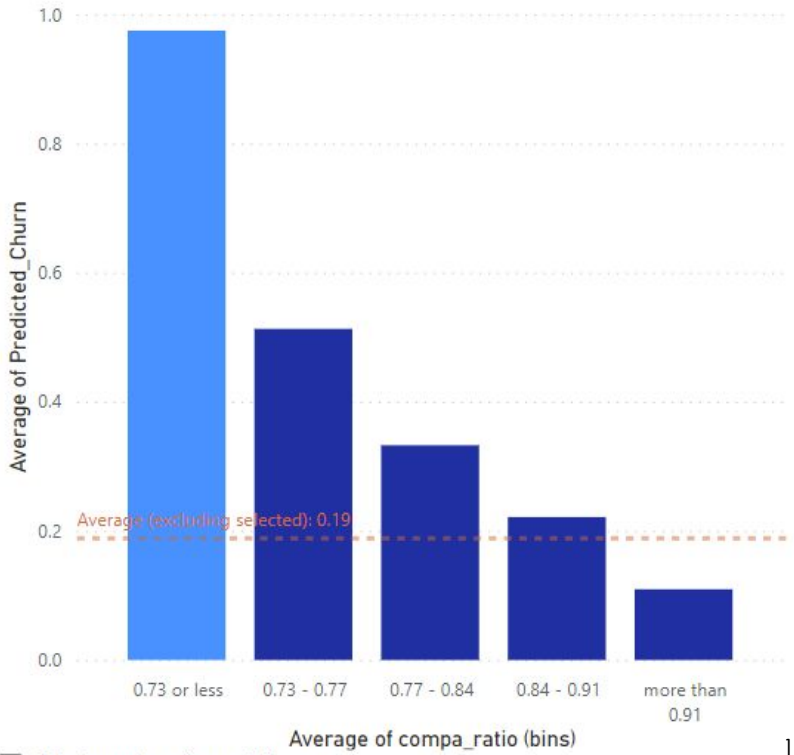
What influences Predicted_Churn to Increase ?

When...

....the average of Predicted_Churn increases by

- Average of compa_ratio is 0.73 or less — 0.79
- Average of years_of_service is 1.5 - 4.1 — 0.36
- Average of compa_ratio is 0.73 - 0.77 — 0.31
- Average of salary is 17187.31 - 22561.54 — 0.17
- Average of years_of_service is 1.5 or less — 0.17

Predicted_Churn is more likely to increase when Average of compa_ratio is 0.73 or less than otherwise (on average).



Only show values that are influencers

Key influencers Top segments

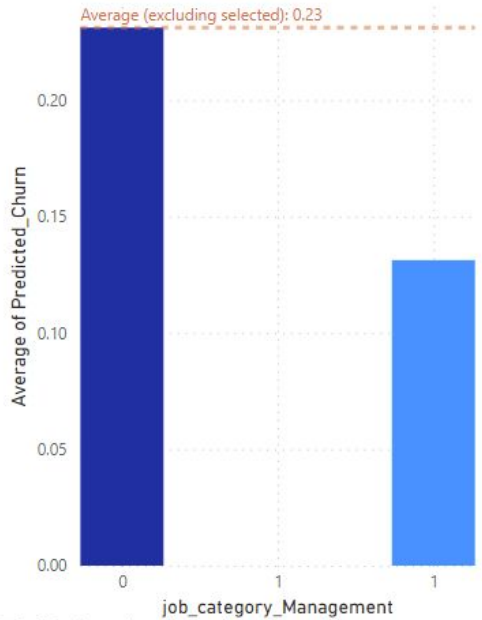
What influences Predicted_Churn to Decrease ?

When...

....the average of Predicted_Churn decreases by

Sum of job_category_Management is 1 → 0.1

← Predicted_Churn is more likely to decrease when Sum of job_category_Management is 1 than otherwise (on average).



Only show values that are influencers

← Predicted_Churn is more likely to increase when management_level_Professional is 1 than otherwise (on average).