Analyze the various factors that influences an employee to Exit the company

Variable Description

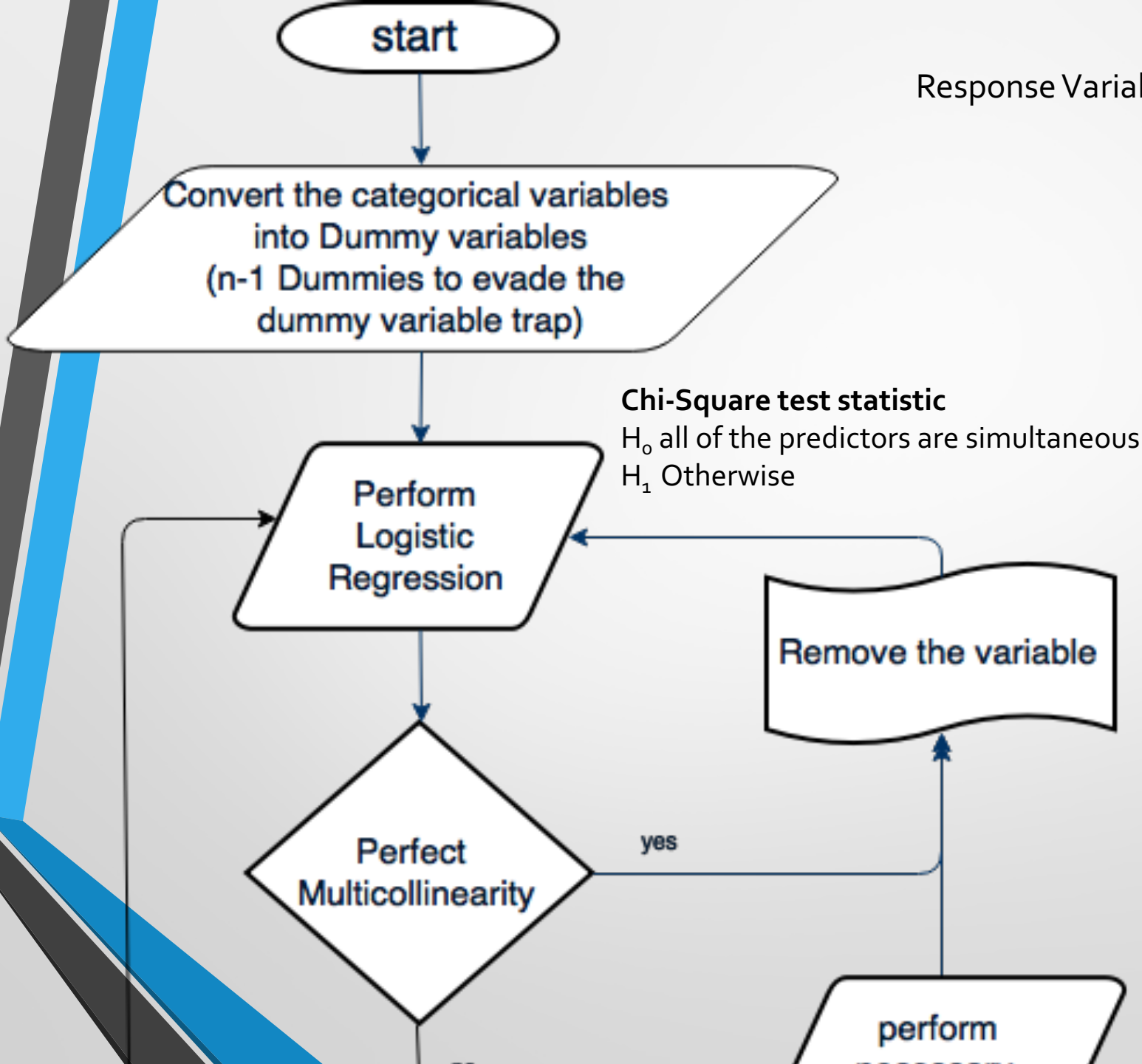
Numeric Type:

Satisfaction Level	0 - 1(Rating)
Last Evaluation	0 – 1(Rating)
Average Monthly Hours	96 – 310(Hours)
Time Spend in Company	2 – 10(Years)
Number of Projects	2 – 7(Count)
Promotion Last 5 Years	0/1(No/Yes)
Work Accidents	0/1(No/Yes)

Character Type:

Salary	High/Medium/Low
Department	Accounting/ HR/ IT/ Management/ Marketing/ Product Management/ R & D/ Sales/ Support/ Technical
Exit	**0/1(No/Yes)**

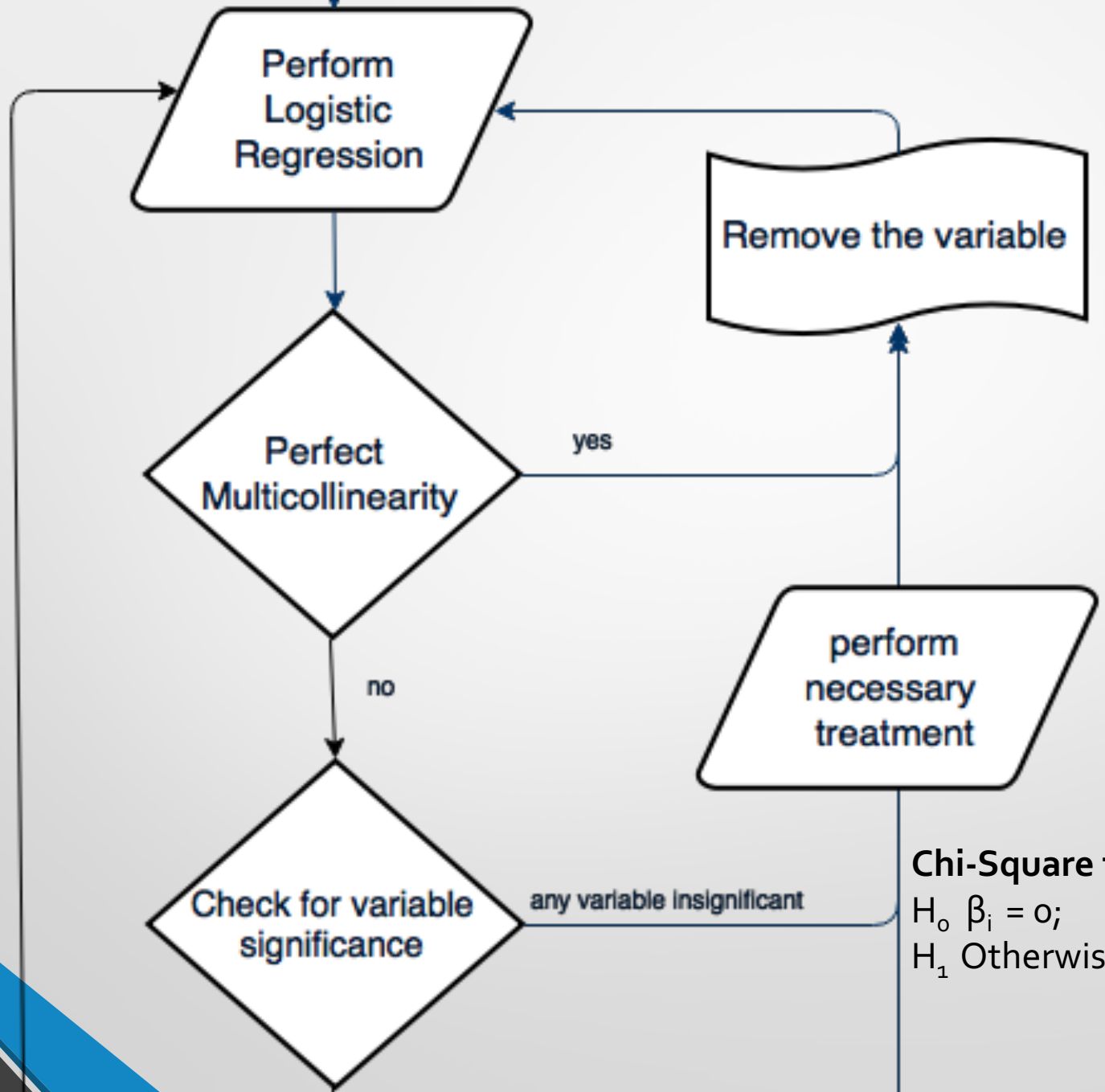
Response Variable: EXIT (Binary)



Chi-Square test statistic

H_0 all of the predictors are simultaneously equal to zero

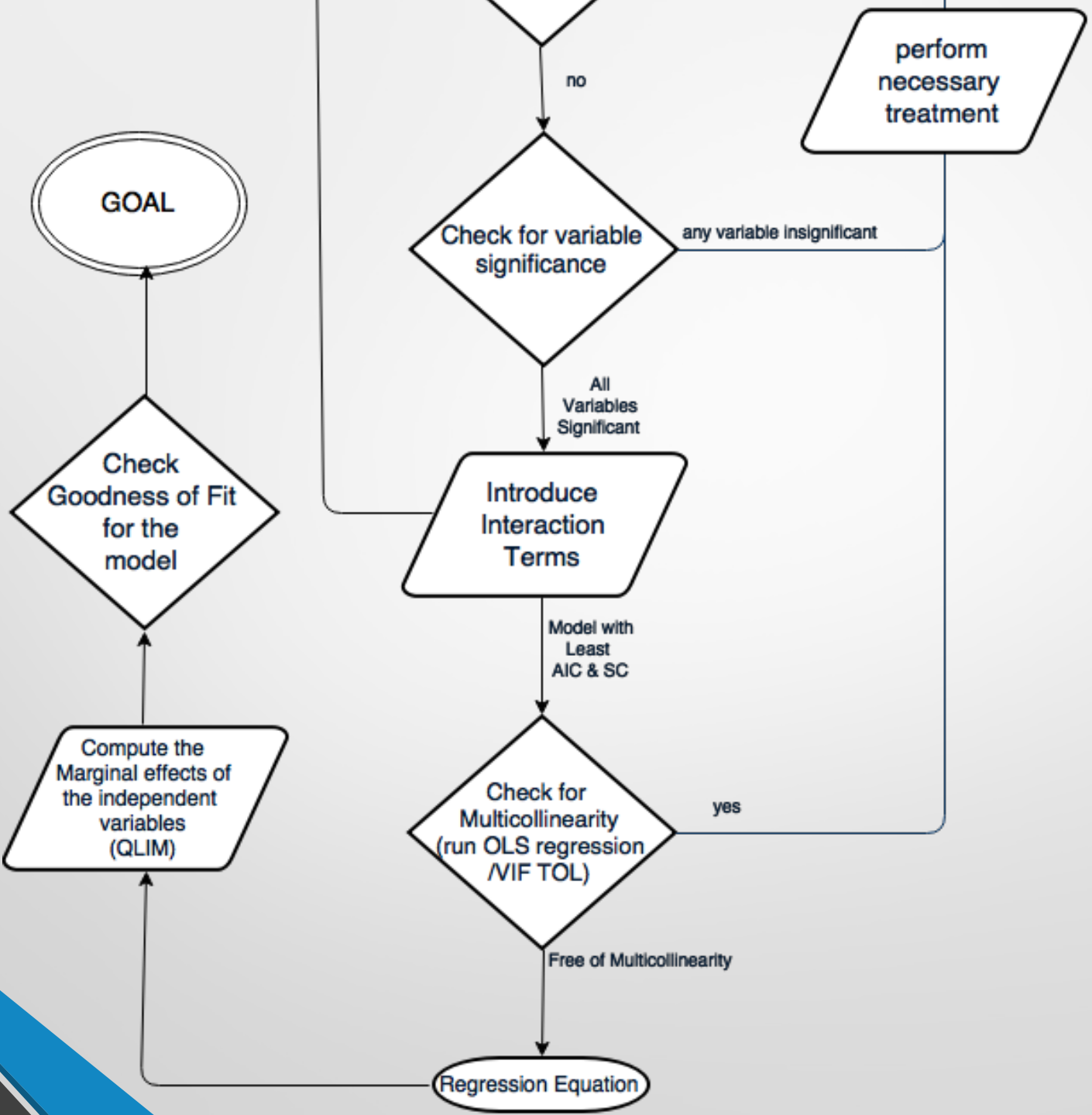
H_1 Otherwise



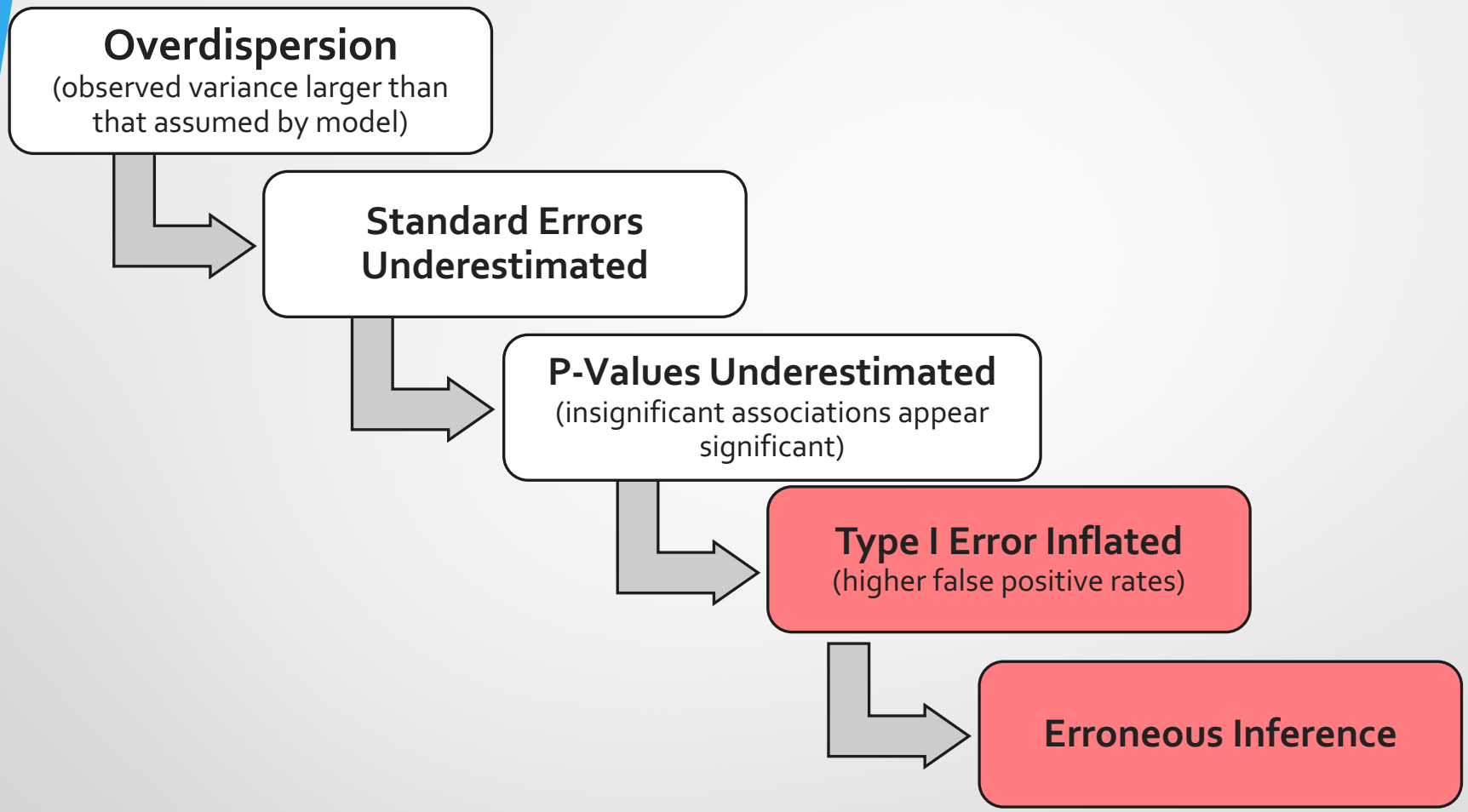
Chi-Square test statistic

H_o $\beta_i = o$;

H_1 Otherwise


perform necessary treatment
no
GOAL
Check for variable significance
any variable insignificant
All Variables Significant
Check Goodness of Fit for the model
Introduce Interaction Terms
Model with Least AIC & SC
Compute the Marginal effects of the independent variables (QLIM)
Check for Multicollinearity (run OLS regression /VIF TOL)
yes
Free of Multicollinearity
Regression Equation

Dispersion and issues associated with it.



Source

Final Model Statistics

Probability modeled is EXIT='1'.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	16466.691	11552.679
SC	16474.306	11697.378
-2 Log L	16464.691	11514.679

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	4950.0117	18	<.0001
Score	4144.3431	18	<.0001
Wald	2721.4398	18	<.0001

Analysis of Maximum Likelihood Estimates						
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq	Standardized Estimate
Intercept	1	-5.3282	0.2653	403.3326	<.0001	
satisfaction_level	1	-4.9141	0.1330	1365.0326	<.0001	-0.6736
last_evaluation	1	6.5504	0.2823	538.3373	<.0001	0.6182
number_project	1	-0.2447	0.0229	114.1295	<.0001	-0.1663
average_montly_hours	1	0.00624	0.000561	123.4768	<.0001	0.1718
time_spend_company	1	0.3496	0.0185	355.2075	<.0001	0.2814
Work_accident	1	-1.5779	0.0943	279.8774	<.0001	-0.3060
promotion_last_5year	1	-1.2914	0.2596	24.7432	<.0001	-0.1027
salary_high	1	-1.2679	0.1684	56.6876	<.0001	-0.1923
salary_mid	1	-0.1432	0.0773	3.4339	0.0639	-0.0391
salary_high*dept_hr	1	1.6372	0.5354	9.3516	0.0022	0.0494
salary_mid*dept_hr	1	0.7778	0.1431	29.5280	<.0001	0.0655
dept_hr*sat_low	1	-0.7892	0.2421	10.6295	0.0011	-0.0352
salary_mid*sat_low	1	-1.1425	0.1293	78.0533	<.0001	-0.1441
salary_high*sat_low	1	-1.1897	0.3296	13.0318	0.0003	-0.0617
salary_mid*sat_mid	1	-0.4537	0.0912	24.7621	<.0001	-0.0916
salary_hig*eval_high	1	-1.0542	0.2748	14.7212	0.0001	-0.1249
time_low*eval_mid	1	-0.8675	0.3351	6.7029	0.0096	-0.1322
eval_mid*time_mid	1	2.8599	0.1045	749.1499	<.0001	0.7176

Goodness of Fit

Classification Table									
	Correct		Incorrect		Percentages				
Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	False POS	False NEG
0.450	2049	10314	1114	1522	82.4	57.4	90.3	35.2	12.9

Logit Marginal Effects

The MEANS Procedure

Variable	Label	Mean	Std Dev
Meff_P2_satisfaction_level	Marginal effect of satisfaction_level on the probability of EXIT=2	-0.6077340	0.4314674
Meff_P2_last_evaluation	Marginal effect of last_evaluation on the probability of EXIT=2	0.8115537	0.5761715
Meff_P2_number_project	Marginal effect of number_project on the probability of EXIT=2	-0.0302697	0.0214903
Meff_P2_average_montly_hours	Marginal effect of average_montly_hours on the probability of EXIT=2	0.000770648	0.000547130
Meff_P2_time_spend_company	Marginal effect of time_spend_company on the probability of EXIT=2	0.0431890	0.0306625
Meff_P2_Work_accident	Marginal effect of Work_accident on the probability of EXIT=2	-0.1950544	0.1384810
Meff_P2_promotion_last_5years	Marginal effect of promotion_last_5years on the probability of EXIT=2	-0.1613746	0.1145697
Meff_P2_salary_high	Marginal effect of salary_high on the probability of EXIT=2	-0.1552084	0.1101919
Meff_P2_salary_mid	Marginal effect of salary_mid on the probability of EXIT=2	-0.0176905	0.0125595
Meff_P2_salary_high_dept_hr	Marginal effect of salary_high_dept_hr on the probability of EXIT=2	0.1657540	0.1176789
Meff_P2_salary_mid_dept_hr	Marginal effect of salary_mid_dept_hr on the probability of EXIT=2	0.0962760	0.0683522
Meff_P2_dept_hr_sat_low	Marginal effect of dept_hr_sat_low on the probability of EXIT=2	-0.0967689	0.0687021
Meff_P2_salary_mid_sat_low	Marginal effect of salary_mid_sat_low on the probability of EXIT=2	-0.1412442	0.1002778
Meff_P2_salary_high_sat_low	Marginal effect of salary_high_sat_low on the probability of EXIT=2	-0.1494416	0.1060977
Meff_P2_salary_mid_sat_mid	Marginal effect of salary_mid_sat_mid on the probability of EXIT=2	-0.0560504	0.0397936
Meff_P2_salary_high_eval_high	Marginal effect of salary_high_eval_high on the probability of EXIT=2	-0.1267102	0.0899593
Meff_P2_time_low_eval_mid	Marginal effect of time_low_eval_mid on the probability of EXIT=2	-0.1015953	0.0721287
Meff_P2_eval_mid_time_mid	Marginal effect of eval_mid_time_mid on the probability of EXIT=2	0.3540741	0.2513788

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
EXIT		14999	0.2380825	0.4259241	0	1.0000000
pred	Estimated Probability	14999	0.2380828	0.2404759	0.000111658	0.9761757

Conclusion

Our Model demonstrated a predictive accuracy of classifying 82.4%.

Factors significantly motivating the Employee not to Exit the company:

- Satisfaction Level
- Work Accident
- Promotion Last 5 Years
- Salary High
- Salary high & Satisfaction Low
- Salary mid & Satisfaction Low
- Salary high & High Last Evaluation
- Low Time spend in company & Mid Last Evaluation

Factors significantly motivating the employee to Exit the company:

- High Salary & HR Department
- Mid Last Evaluation and Mid Time spend in company
- Last Evaluation

References

Data Source: Kaggle Dataset
Logistic Model – Link
Heteroscedasticity in Logistic Regression

- Discussion by Maarten – Link
- Discussion by Dale McLerran - Link

Over-dispersion

- Jessica Harwood, UCLA – Link
- SAS Support – Link
- Theory and Adjustment - Link

Thank You