

Customer Churn Prediction Client Report

DataScienceConsultingPro.com | Machine Learning, Pivot Tables, Interactive Dashboard, and Business Recommendations

Executive Summary

This report demonstrates a complete customer churn analytics solution using real Telco Customer Churn data. The project cleans the raw customer dataset, builds machine learning models, scores customers by churn probability, groups customers into risk bands, and provides pivot-table views for business decision-making.

The best-performing model in this run was Logistic Regression. The output gives managers a practical high-risk customer list, churn driver analysis, model metrics, pivot tables, graphs, and an interactive HTML dashboard.

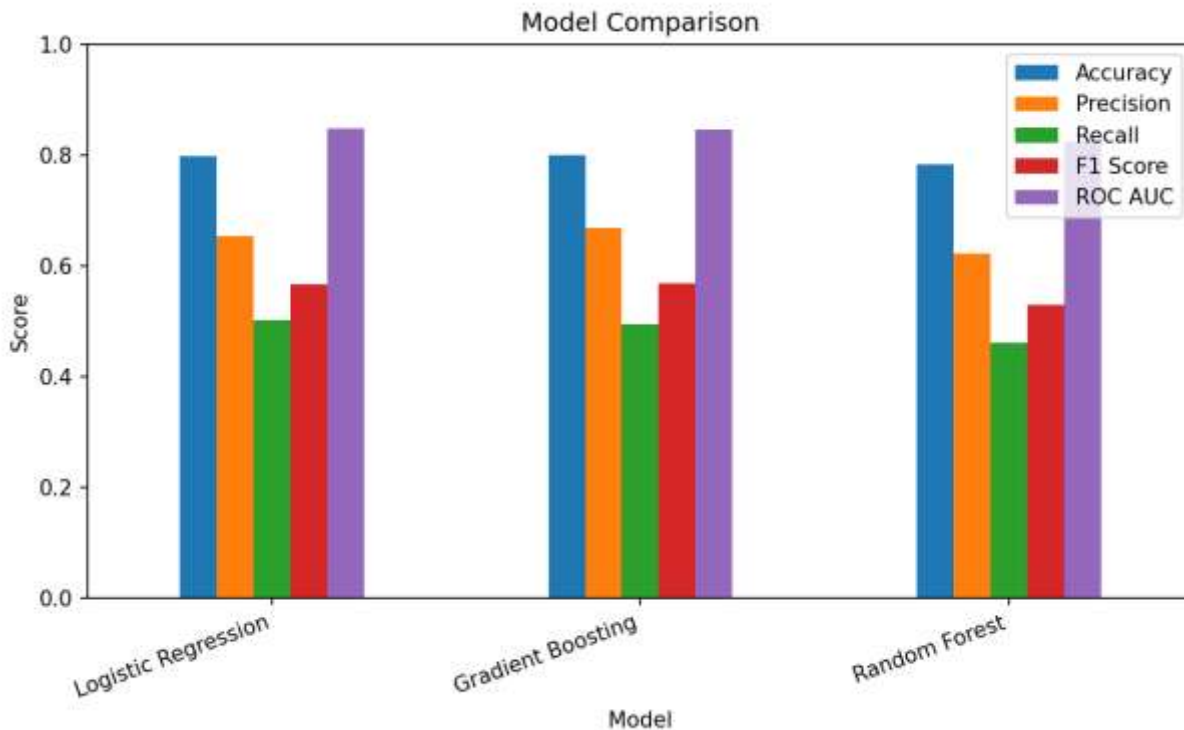
Dataset and Business Problem

The dataset contains 7,043 customer records and 27 columns after feature engineering. It includes customer account details, contract type, payment method, tenure, monthly charges, total charges, internet service, support services, and churn outcome.

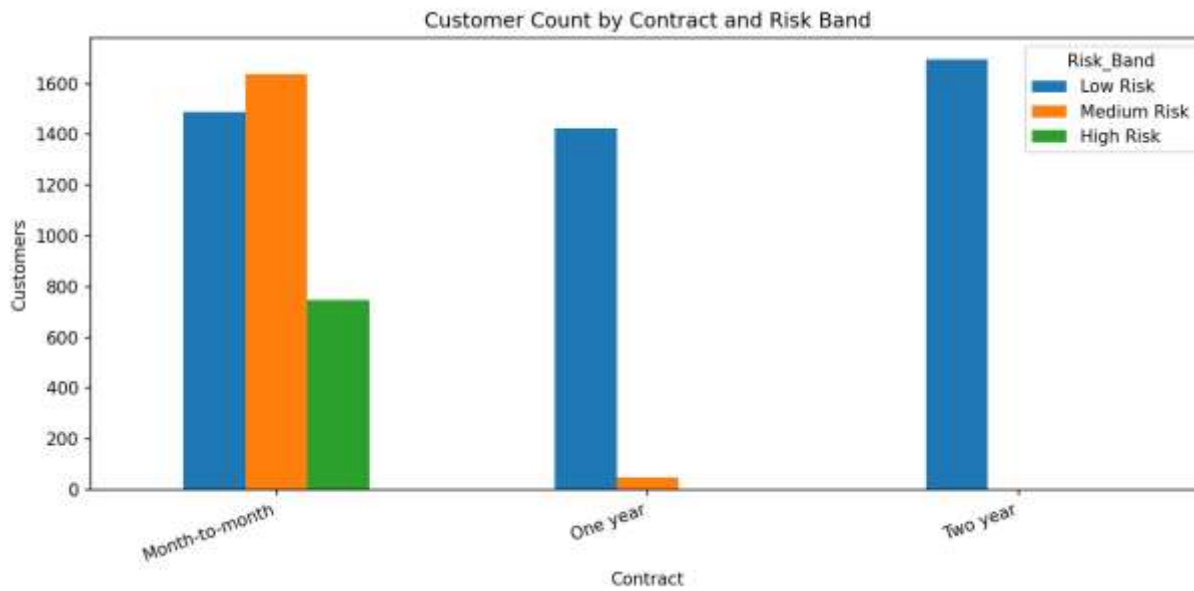
Model Performance

Model Comparison Metrics

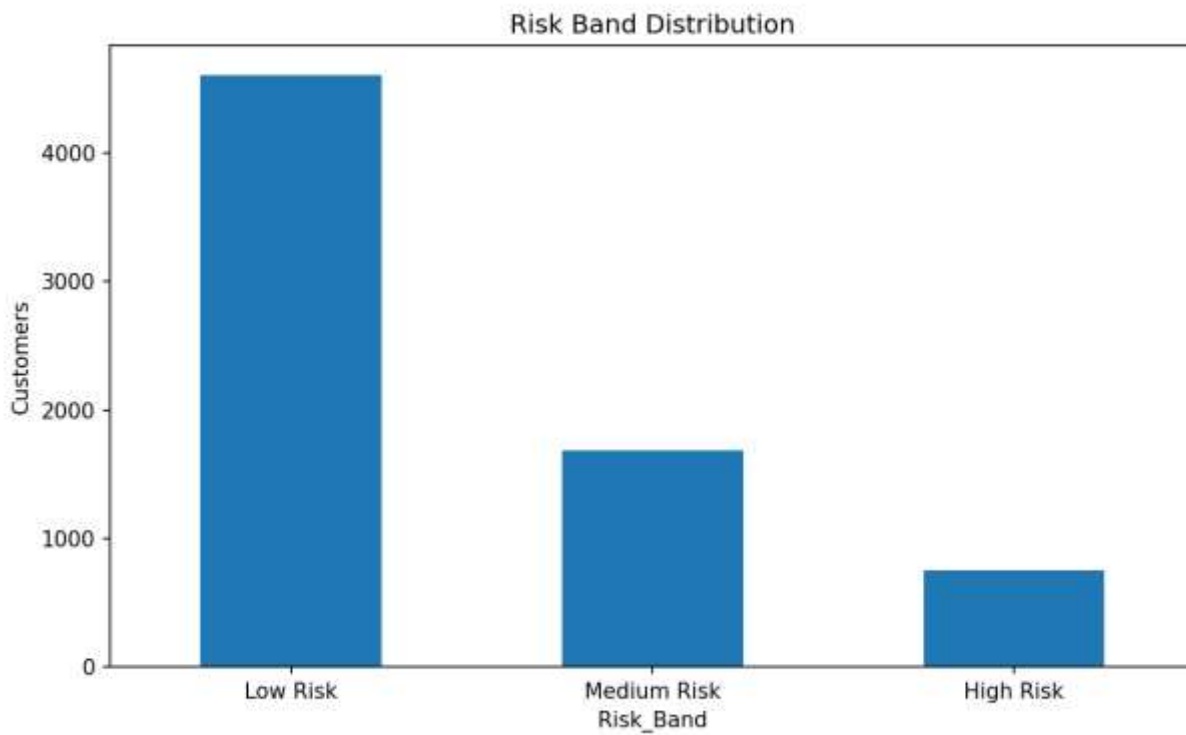
index	Model	Accuracy	Precision	Recall	F1 Score	ROC AUC
0	Logistic Regression	0.797	0.654	0.501	0.567	0.849
2	Gradient Boosting	0.801	0.668	0.495	0.568	0.846
1	Random Forest	0.783	0.621	0.46	0.529	0.824



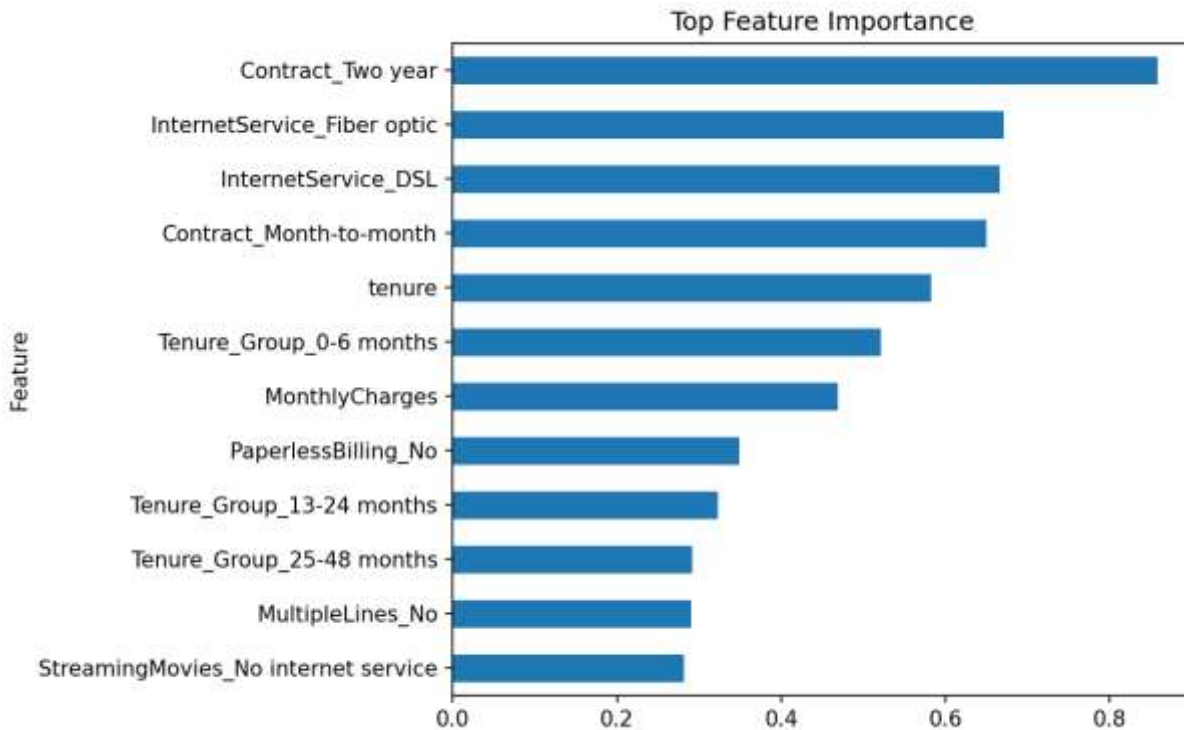
Graphs and Business Patterns



Customer count by contract and risk band.



Distribution of customer churn risk bands.



Top model drivers of customer churn risk.

Pivot Table Results

Pivot 1: Customer Count by Contract and Risk Band

Contract	Low Risk	Medium Risk	High Risk
Month-to-month	1488	1638	749
One year	1423	50	0
Two year	1695	0	0

Pivot 2: Average Churn Probability by Payment Method and Contract

PaymentMethod	Month-to-month	One year	Two year
Bank transfer (automatic)	0.329	0.101	0.03
Credit card (automatic)	0.333	0.095	0.027
Electronic check	0.537	0.181	0.069
Mailed check	0.316	0.074	0.021

Pivot 3: Actual Churn Rate by Tenure Group and Internet Service

Tenure_Group	DSL	Fiber optic	No
0-6 months	0.482	0.742	0.222
7-12 months	0.225	0.611	0.086
13-24 months	0.196	0.488	0.038
25-48 months	0.108	0.366	0.018
49-72 months	0.043	0.171	0.014

Pivot 4: Average Monthly Charges by Risk Band and Contract

Risk_Band	Month-to-month	One year	Two year
Low Risk	48.76	63.94	60.77
Medium Risk	75.38	96.72	nan
High Risk	81.79	nan	nan

Top 25 High-Risk Customers for Retention Action

index	customerID	Contract	PaymentMethod	InternetService	tenure	MonthlyCharges	TotalCharges	Churn_Probability	Risk_Band
1976	9497-QCMMS	Month-to-month	Electronic check	Fiber optic	1	93.55	93.55	0.906	High Risk
4800	9300-AGZNL	Month-to-month	Electronic check	Fiber optic	1	94.0	94.0	0.906	High Risk
3380	5178-LMXOP	Month-to-month	Electronic check	Fiber optic	1	95.1	95.1	0.905	High Risk
3749	4424-TKOPW	Month-to-month	Electronic check	Fiber optic	2	93.85	196.75	0.904	High Risk
2208	7216-EWTRS	Month-to-month	Electronic check	Fiber optic	1	100.8	100.8	0.904	High Risk
6368	2720-WGKHP	Month-to-month	Electronic check	Fiber optic	2	94.0	181.7	0.904	High Risk
1410	7024-OHCKK	Month-to-month	Electronic check	Fiber optic	2	93.85	170.85	0.903	High Risk
997	1374-DMZUI	Month-to-month	Electronic check	Fiber optic	4	94.3	424.45	0.902	High Risk
5989	5567-WSELE	Month-to-month	Electronic check	Fiber optic	3	94.6	279.55	0.902	High Risk
3159	5150-ITWWB	Month-to-month	Electronic check	Fiber optic	3	94.85	335.75	0.9	High Risk
6894	1400-MMYXY	Month-to-month	Electronic check	Fiber optic	3	105.9	334.65	0.897	High Risk
301	8098-LLAZX	Month-to-month	Electronic check	Fiber optic	4	95.45	396.1	0.896	High Risk
3209	8149-RSOUN	Month-to-month	Electronic check	Fiber optic	1	93.85	93.85	0.887	High Risk
2577	4910-GMJOT	Month-to-month	Electronic check	Fiber optic	1	94.6	94.6	0.886	High Risk
6866	0295-PPHDO	Month-to-month	Electronic check	Fiber optic	1	95.45	95.45	0.886	High Risk
6482	5419-JPRRN	Month-to-month	Electronic check	Fiber optic	1	101.45	101.45	0.884	High Risk
5933	6496-SLWHQ	Month-to-month	Electronic check	Fiber optic	3	105.0	294.45	0.883	High Risk
1148	7851-WZEKY	Month-to-month	Electronic check	Fiber optic	2	95.15	196.9	0.883	High Risk
6215	2446-BEGGB	Month-to-month	Electronic check	Fiber optic	6	98.25	560.6	0.882	High Risk
969	3158-MOERK	Month-to-month	Electronic check	Fiber optic	2	96.0	174.8	0.881	High Risk
5282	3049-SOLAY	Month-to-month	Electronic check	Fiber optic	3	95.2	292.85	0.881	High Risk

279 7	6023- YEBUP	Month- to- month	Electronic check	Fiber optic	3	100.95	329.95	0.88	High Risk
623 2	9681- OXGVC	Month- to- month	Electronic check	Fiber optic	5	100.5	514.0	0.88	High Risk
218 4	4695- WJZUE	Month- to- month	Electronic check	Fiber optic	2	88.55	179.25	0.878	High Risk
458 5	1069- XAIEM	Month- to- month	Electronic check	Fiber optic	1	85.05	85.05	0.878	High Risk

Business Recommendations

- Contact High Risk customers first because they show the strongest probability of leaving.
- Review month-to-month contracts and improve retention offers for flexible-contract customers.
- Strengthen onboarding for customers with low tenure because early customer loss is often preventable.
- Monitor high monthly charge customers and demonstrate value before they switch providers.
- Use the notebook and HTML pivot dashboard monthly to update churn scores and prioritize retention action.

Files Included in Client Pack

- 01_raw_data_telco_customer_churn.csv
- 02_customer_churn_prediction_jupyter_notebook_with_pivot_tables.ipynb
- 03_customer_churn_interactive_pivot_dashboard.html
- 04_customer_churn_prediction_client_report.docx