

CUSTOMER CHURN PREDICTION

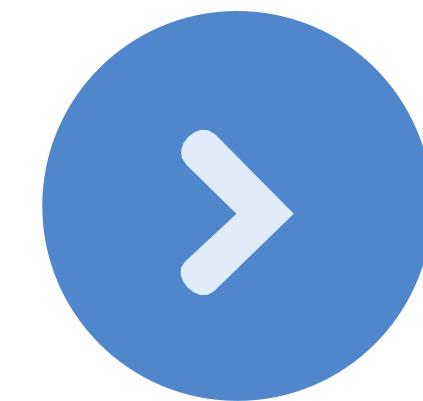
Name: Ankita

Roll no: 12300258

Stream: B.tech CSE



Company Profile



**CERTIFICATION :"ISO 9001:2015/ISO 27001
CERIFIED."**

Specializations:

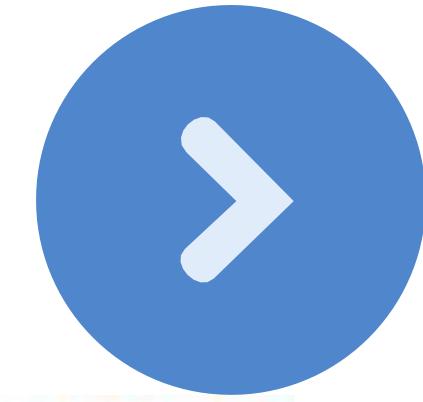
- web Development
- Mobile Application Development
- UI/UX Design
- QA & Software testing
- Cloud Solutions
- Data Analytics & BI

Headquarters:Mohali,punjab

Branch Office: Chandigarh



Company Profile



Company Name: Sensation software solutions

Founded: 2013

Certification: ISO 9001:2015 Certified

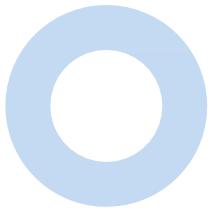
Specializations:

- Mobile Development
- Web Development
- Software Development
- Digital Marketing
- IT Integration

Experience: Over 12 years

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INTRODUCTION



Customer churn refers to the phenomenon where customers stop using a company's products or services over a period of time. Predicting customer churn is the process of identifying which customers are likely to leave a business in the near future.

Churn prediction is important because acquiring new customers is often more expensive than retaining existing ones. By identifying potential churners in advance, businesses can take proactive measures—like offering personalized deals, improving services, or enhancing customer engagement—to retain them.

The process typically involves analyzing historical customer data, such as transaction history, usage patterns, customer feedback, and demographic information. Machine learning algorithms like Logistic Regression, Decision Trees, Random Forests, and Neural Networks are commonly used to build predictive models.



TECH USED

Python

Python being an object-oriented programming language. It has a very easy syntax despite being case-sensitive and interpreted. Indentation increases readability.



JUPYTER LAB

JupyterLab is an advanced, web-based interface for working with Jupyter Notebooks. It supports code, text, terminals, and data visualization in a flexible, multi-tab layout—ideal for data science and research.



PYTHON LIBRARIES

Pandas is a powerful open-source Python library used for data manipulation and analysis. It provides data structures like **DataFrames** and **Series**, making it easy to clean, filter, and transform structured data efficiently.



NumPy is a fundamental Python library for numerical computing. It supports multi-dimensional arrays and provides a wide range of mathematical, statistical, and linear algebra operations, making it ideal for scientific computing.



Matplotlib is a Python plotting library used for creating static, interactive, and animated visualizations. It gives users full control over figure styling and layout, and it's commonly used to create line, bar, and scatter plots.

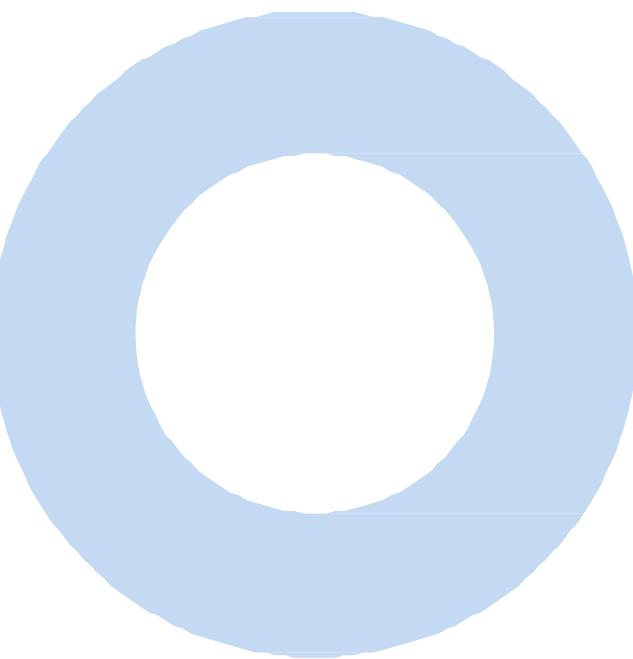


Streamlit is a Python library for building interactive web applications, especially for data science and machine learning projects. It allows quick creation of user-friendly interfaces using simple code and integrates seamlessly with Python libraries for real-time visualizations and interactions.

Seaborn is a data visualization library built on top of Matplotlib. It simplifies visualizations with minimal code and is especially effective for statistical heatmaps, boxplots, and distribution charts.



Goals and Objectives



★ Main Goal

The main goal of Customer Churn Prediction is to identify customers who are likely to stop using the company's service so the business can take early actions to retain them and reduce revenue loss.

✓ Objectives

1. To predict customer churn using machine learning

Identify whether a customer will churn (leave) or stay based on their past and current behavior.

2. To analyze customer behavior and patterns

Understand which factors (tenure, charges, contract type, service quality) influence churn the most.

3. To reduce customer loss

Help the company take preventive measures like offers, discounts, or improved service to stop customers from leaving.

4. To support business decision-making

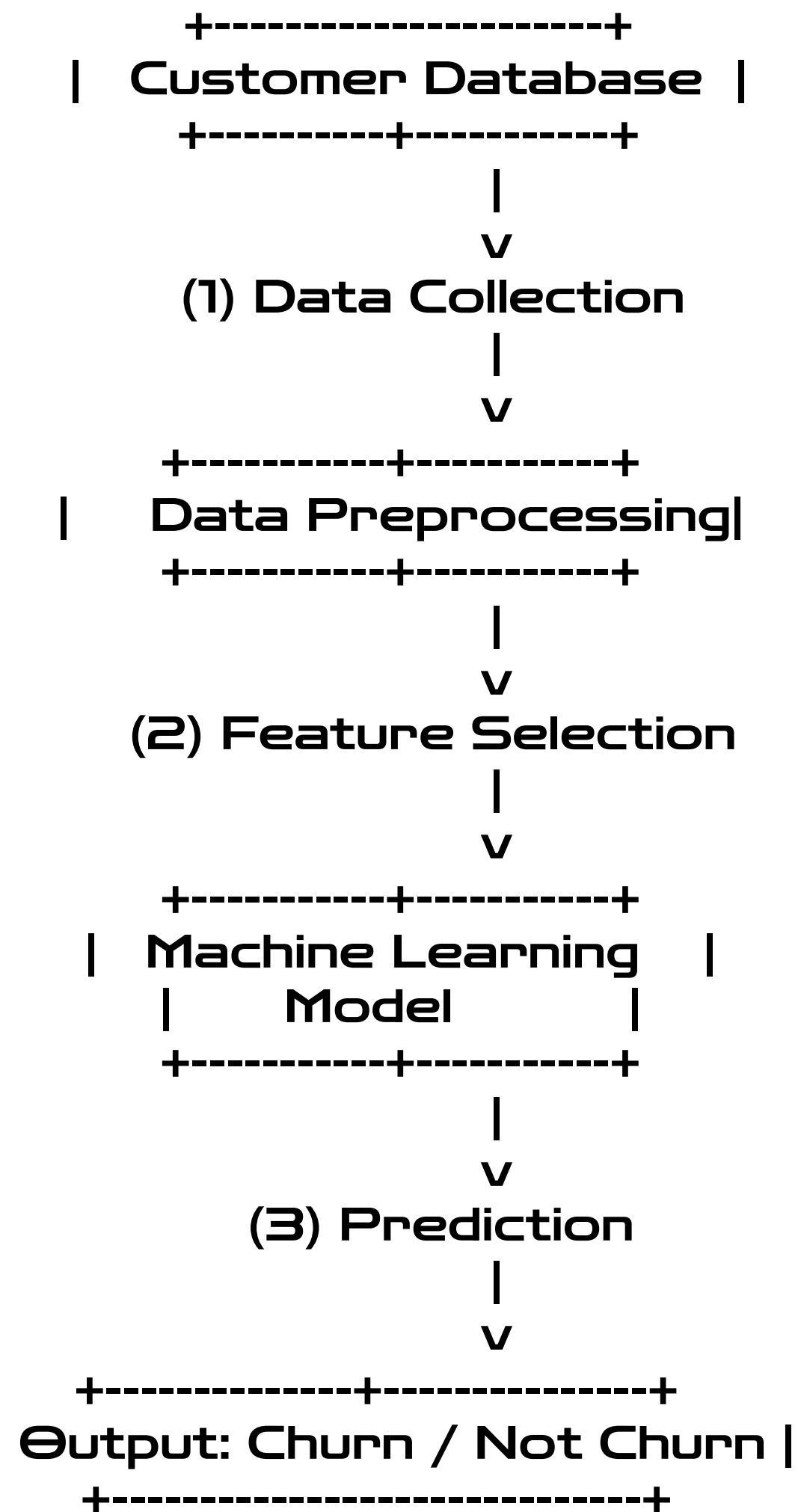
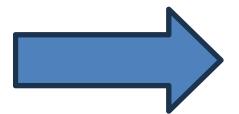
Provide useful insights so the management can make better marketing and retention strategies.

5. To improve customer satisfaction

Identify unhappy customers early and improve their experience to increase loyalty.



Data flow diagram



customer churn prediction

localhost:8501

Churn Prediction App

Please enter the values and hit the predict button for getting a prediction.

enter age
50

Enter the Gender
Female

Enter Tenure
20

Enter Monthly Charge
60

predict!

Predicted: Yes

EXPLORER

CUSTOMER CHURN PREDICTION

- .venv
- etc
- Include
- Lib
- Scripts
- share
- .gitignore
- pyvenv.cfg
- app.py
- churn.py
- model.pkl
- scaler.pkl

churn prediction (1).ipynb

model.pkl

app.py

age,gender_selected,tenure,monthlycharge]

np.array(x)

x_array= scaler.transform([x1])

prediction = model.predict(x_array)[0]

predicted = "Yes" if prediction == 1 else "No"

balloons()

write(f"Predicted: {predicted}")

Please enter the values and use predict button

PROBLEMS 8 TERMINAL

(.venv) PS C:\Users\DELL\Downloads\customer churn prediction> streamlit run app.py

estimator StandardScaler from version 1.5.1 when using version 1.7.2. This might lead to breaking code or invalid results. Use at your own risk. For more info please refer to:
https://scikit-learn.org/stable/model_persistence.html#security-maintainability-limitations

warnings.warn(
c:\Users\DELL\Downloads\customer churn prediction\.venv\Lib\site-packages\sklearn\utils\validation.py:2749: UserWarning: X does not have valid feature names, but StandardScaler was fitted with feature names
warnings.warn(

Ln 54, Col 63 Spaces: 4 UTF-8 CRLF { } Python Signed out 3.13.7 (.venv)

20°C Sunny

Search

Cloud Storage

File Explorer

Terminal

PowerShell

Microsoft Edge

LinkedIn

Camera

VS Code

ENG IN

28-11-2025

12:56

Conclusion

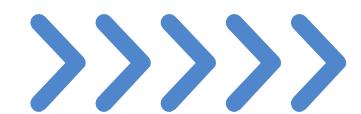


The Customer Churn Prediction model provides valuable insights into the factors that influence customer behavior and helps businesses identify customers who are at high risk of leaving. By analyzing customer demographics, usage patterns, service issues, and account information, the model can accurately predict churn and allow organizations to take proactive retention actions.

The results show that machine learning techniques such as Logistic Regression, Random Forest, or XGBoost can effectively classify churn and reveal the most significant drivers — such as contract type, monthly charges, service quality, and customer support interactions. With these insights, companies can design targeted marketing campaigns, offer personalized solutions, and improve customer experience.

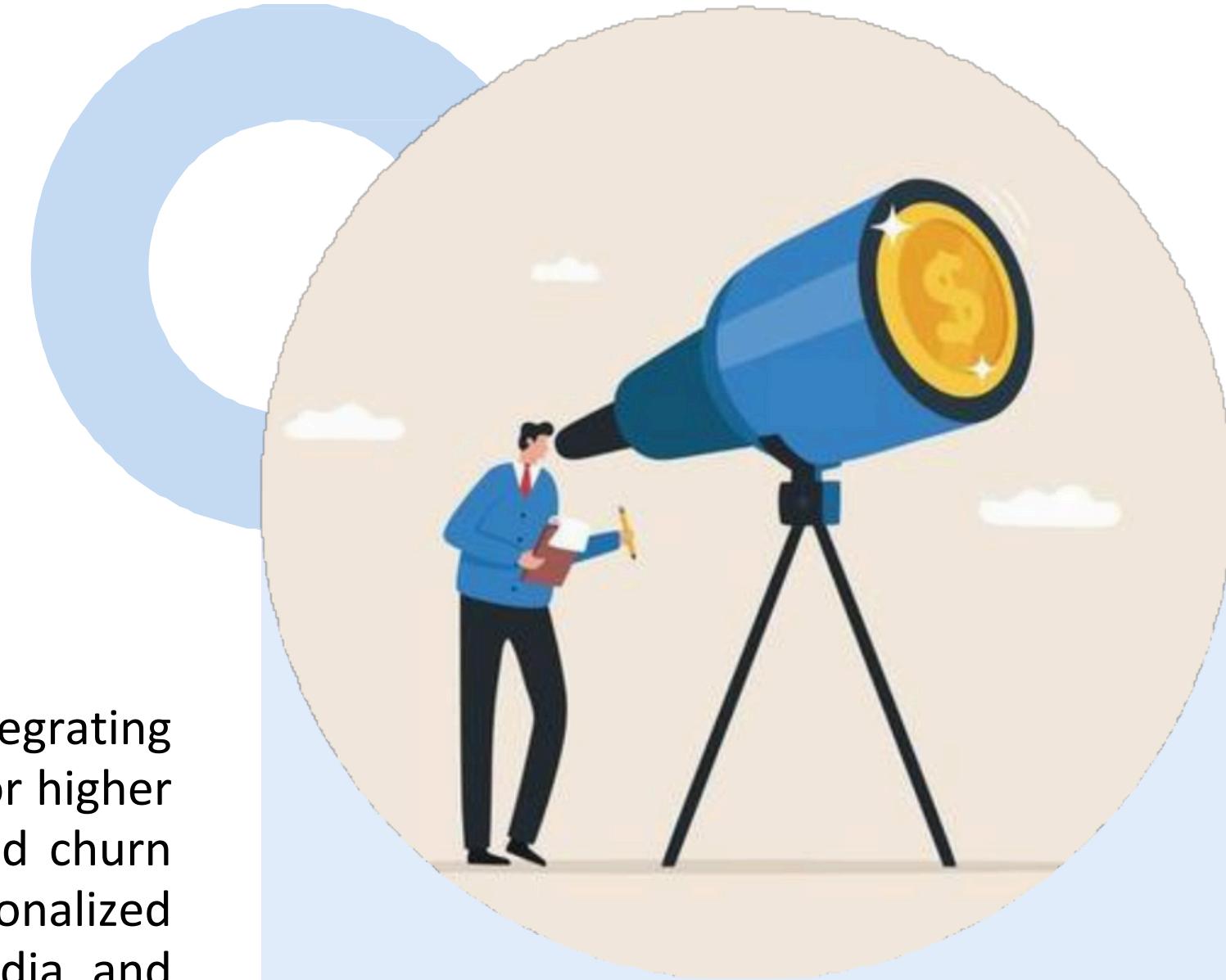
Overall, the churn prediction system serves as a powerful decision-support tool that reduces customer loss, increases revenue, and strengthens long-term customer relationships. Implementing such a model enables businesses to become more data-driven, competitive, and customer-centric.





Future Scope

The future scope of customer churn prediction includes integrating real-time analytics, using advanced deep learning models for higher accuracy, and applying explainable AI to better understand churn factors. The system can be expanded to recommend personalized retention strategies, include sentiment data from social media, and integrate with CRM tools for automated action. Continuous learning models and interactive dashboards can further improve decision-making and help businesses reduce churn more effectively..

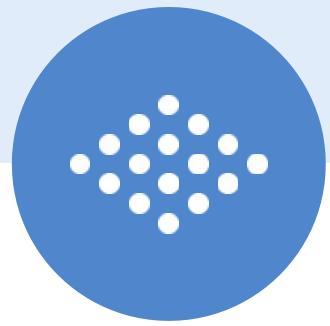


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**THANK
you.**

