

Project Objective: Predict which customers are likely to churn (stop using the service) and send real-time alerts to the business team.

Key features like:

1. Data Collection
2. Exploratory Data Analysis (EDA)
3. Feature Engineering
4. Model Training
5. Model Deployment with FastAPI
6. Real-Time Dashboard (Streamlit)

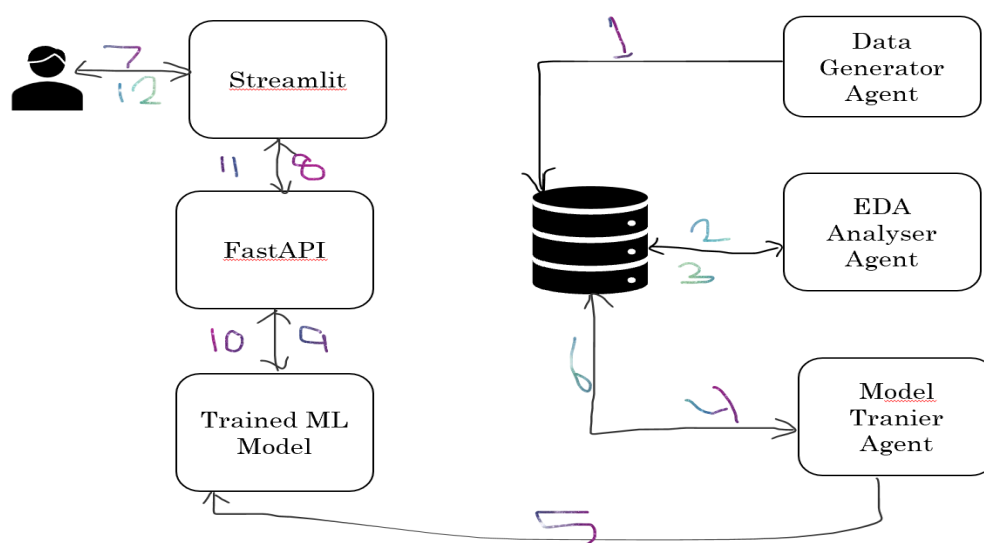
Used Tools & Technologies in Project:

1. Python (main language)
2. Pandas, NumPy, scikit-learn
3. Seaborn, Matplotlib (for EDA/visualizations)
4. Streamlit (interactive dashboard)
5. FastAPI (serve/expose the ML model)

****You can enhance for production grade deployment integrate below features also**

6. Twilio or SMTP (Gmail) (to send SMS/email alerts)
7. Excel/CSV/Database (to store results)

Project architecture:



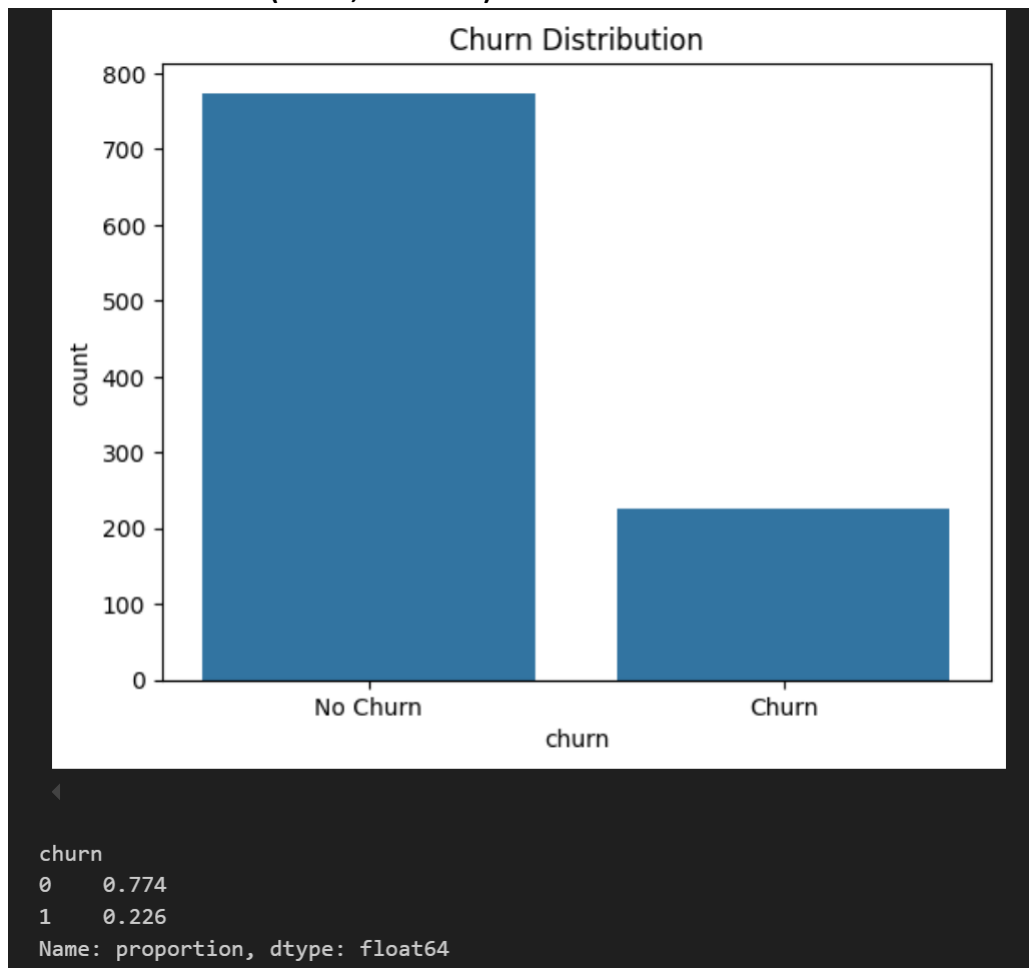
A. Generate The Training Data as below format using NumPy and pandas

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..
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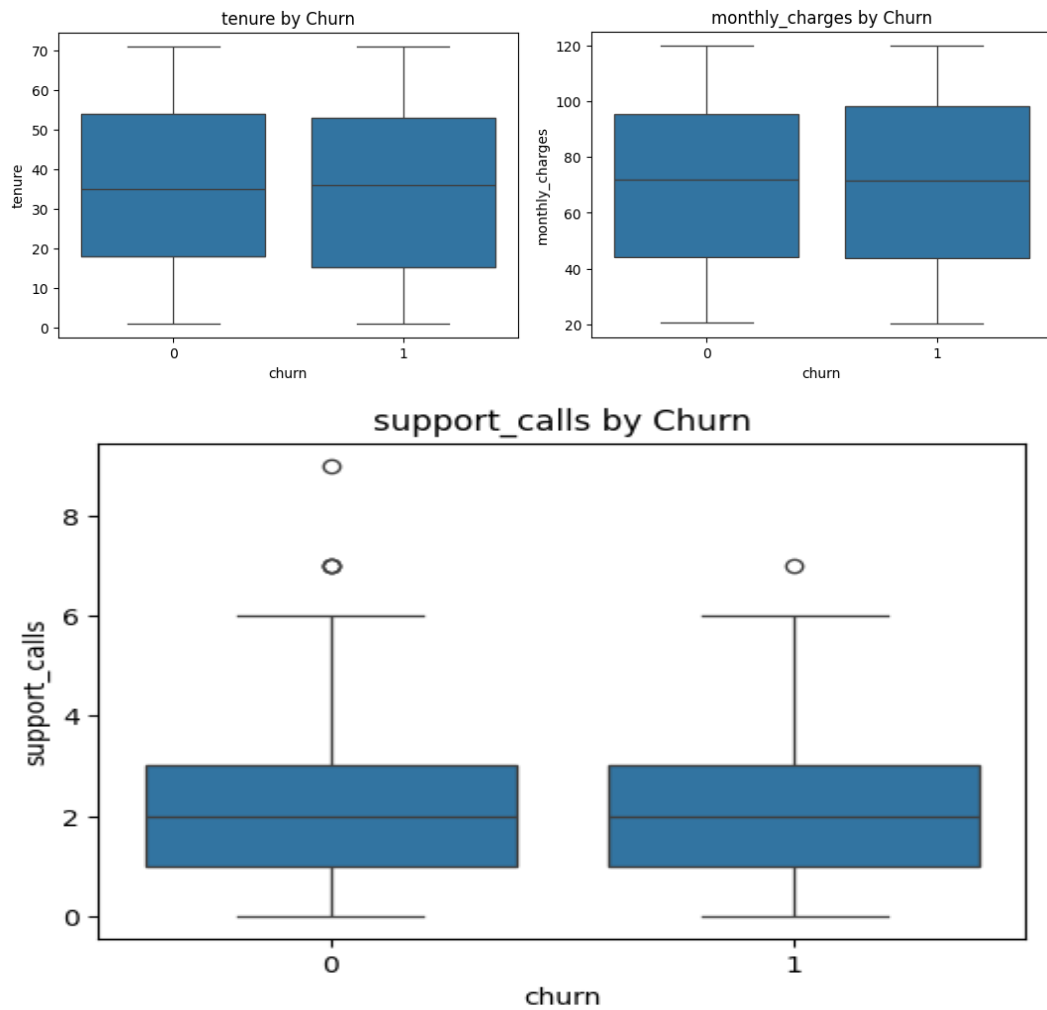
	customer_id	tenure	monthly_charges	contract_type	support_calls	payment_method	churn
0	CUST0000	52	105.57	One year	2	Electronic check	1
1	CUST0001	15	103.02	One year	1	Mailed check	0
2	CUST0002	61	59.72	Two year	1	Mailed check	0
3	CUST0003	21	86.81	Month-to-month	0	Bank transfer	0
4	CUST0004	24	40.50	One year	3	Mailed check	0

B. Exploratory Data Analysis (EDA): Identify trends in churned vs. retained customers. Visualize correlation between churn and other features.

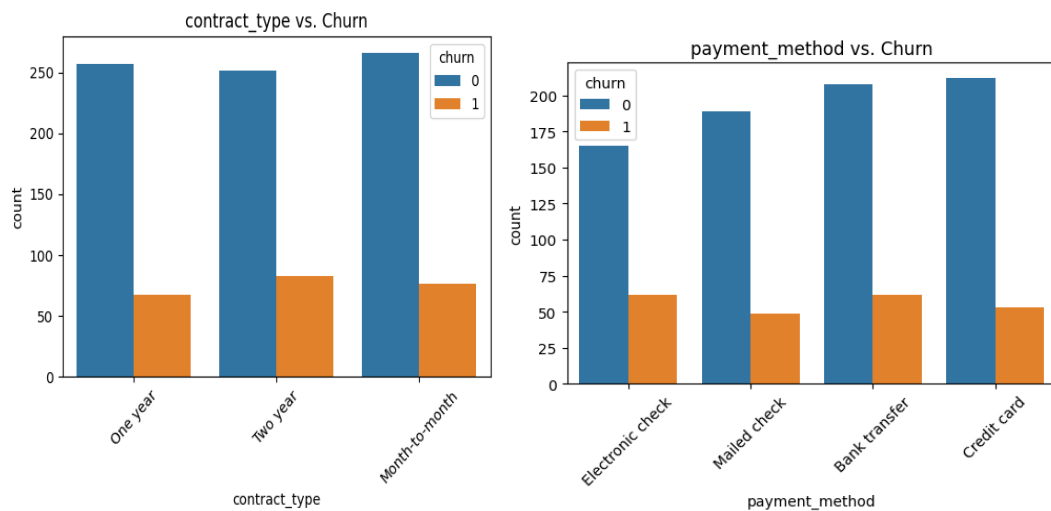
1. Churn Distribution (Churn, No-Churn)



2. Numerical Features vs. Churn based on ('tenure', 'monthly_charges', 'support_calls')



3. Categorical Features vs. Churn by ('contract_type', 'payment_method')



C. Feature Encoding + Model Training (RandomForestClassifier) based on above customer data. Model accuracy is greater than 70%.

	precision	recall	f1-score	support
0	0.78	0.96	0.86	158
1	0.00	0.00	0.00	42
accuracy			0.76	200
macro avg	0.39	0.48	0.43	200
weighted avg	0.62	0.76	0.68	200

D. After Model Training expose the FastAPI for churn prediction, return churn probability

POST

http://127.0.0.1:8000/predict

Send

ParamsAuthorizationHeaders (8)Body●ScriptsSettingsCookies

none

form-data

x-www-form-urlencoded

raw

binary

GraphQL

JSON

Beautify

1 {

2 "tenure": 12,

3 "monthly_charges": 75.50,

4 "support_calls": 3,

5 "contract_type": "Month-to-month",

6 "payment_method": "Credit card"

7 }

8

BodyCookiesHeaders (4)Test Results200 OK • 22 ms • 172 B • ☰

{ } JSON

Preview

Visualize

☰

🔍

🔗

1 {

2 "churn_prediction": 1,

3 "churn_probability": 0.66

4 }

E. Real-Time Dashboard (Streamlit) Upload or simulate real-time customer activity.

Display: Churn predictions

Filters: contract type, region, tenure

Alert status

Real-Time Customer Churn Predictor

Fill in customer details below to check churn probability.

Tenure (months)



Monthly Charges (\$)



Support Calls (last 3 months)



Contract Type

Month-to-month



Payment Method

Credit card



Predict Churn



Churn Probability: 52.00%

High risk of churn!