INTERNSHIP ON

AI-Powered Sales Forcasting and Churn Prediction Dashboard

Under The Guidance Of:
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AGENDA

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2. Internship Overview
3. Introduction
4. Certificate
5. Task 1- AI Powered Sales forcasting dashboard
6. Task 2-Churn Prediction
7. Outcome of the Internship
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INTERNSHIP OVERVIEW

This internship provided hands-on experience in building real-world Machine Learning solutions for business analytics.The work focused on understanding end-to-end ML workflows—from data collection and cleaning to model development, evaluation, and visualization.Through two major projects, the internship strengthened skills in Python programming, data preprocessing, predictive modeling, and interpreting model outputs for business decision-making. The experience demonstrated how ML can be used to forecast future trends, identify customer risks, and support strategic planning across industries.

INTRODUCTION TO TASK 1

AI POWERED SALES FORCASTING DASHBOARD

This internship provided hands-on experience in building real-world Machine Learning solutions for business analytics. The work focused on understanding end-to-end ML workflows—from data collection and cleaning to model development, evaluation, and visualization. Through two major projects, the internship strengthened skills in Python programming, data preprocessing, predictive modeling, and interpreting model outputs for business decision-making. The experience demonstrated how ML can be used to forecast future trends, identify customer risks, and support strategic planning across industries.

INTRODUCTION TO TASK 2

CUSTOMER CHURN PREDICTION SYSTEM

Task 2 focused on developing a machine learning model that predicts which customers are likely to discontinue a service. Using an industry-standard churn dataset, the project involved cleaning and encoding customer attributes, engineering features such as contract type and monthly charges, and training an XGBoost classifier. The model outputs were interpreted through churn probability scores, feature importance metrics, and visual dashboards. This task demonstrated how organizations can use ML to improve customer retention, reduce revenue loss, and understand the key factors driving churn.

INTERNSHIP CERTIFICATE

TASK 1

AI POWERED SALES FORCASTING DASHBOARD

TECHNOLOGIES USED

1. **Python Programming Language:**
   - Used for data preprocessing, feature engineering, and developing the time-series forecasting model.

2. **Pandas & NumPy:**
   - Data cleaning, transformation, and aggregation
   - Handling date-time formats

3. **Prophet (Prophet):**
   - Core forecasting algorithm used in the project
   - Generates predicted sales values (yhat)
   - Handles seasonality and trend modeling automatically

4. **Jupyter Notebook / Google Colab:**
   - Environment for writing and executing the ML code
   - Used for EDA, model training, and generating final forecast results

5. **Microsoft Power BI Desktop:**
   - Dashboard creation and visualization
   - Importing forecast output and actual sales

KEY FEATURES

1. Actual vs Forecasted Sales Visualization

Displays historical sales alongside Prophet model predictions, allowing users to compare past performance with future trends.

2. Confidence Interval Forecast Band

Shows upper and lower prediction limits, helping businesses understand possible best-case and worst-case sales scenarios.

3. KPI Cards for Quick Insights

- **Total Sales**
- **Total Profit**
- **Forecasted Sales**
- **Quantity Sold**

4. Monthly and Yearly Trend Analysis:

Helps identify seasonality, monthly peaks, slow periods, and long-term performance patterns.

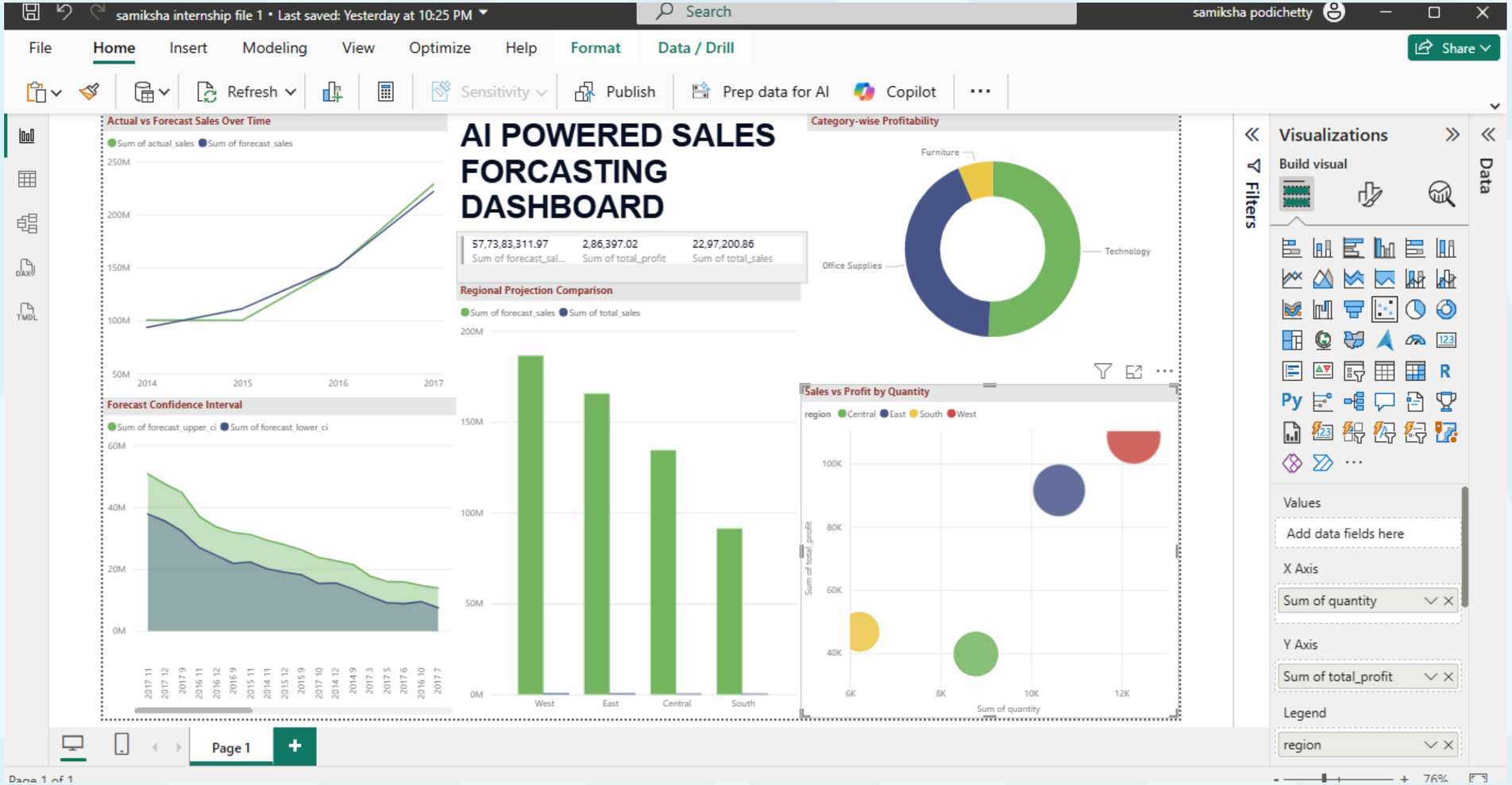
5. Region-Wise Sales Breakdown:

Shows which regions generate the highest revenue and how regional performance changes over time.

6. Category-Wise and Sub-Category Insights:

Highlights sales and profit performance across product categories such as Furniture, Office Supplies, and Technology.

DASHBOARD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Copilot
Actual vs Forecast Sales Over Time
Sum of actual_sales
Sum of forecast_sales
AI POWERED SALES FORCASTING DASHBOARD
57,73,83,311.97
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Sum of total_sales
Category-wise Profitability
Furniture
Technology
Office Supplies
Regional Projection Comparison
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West
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Central
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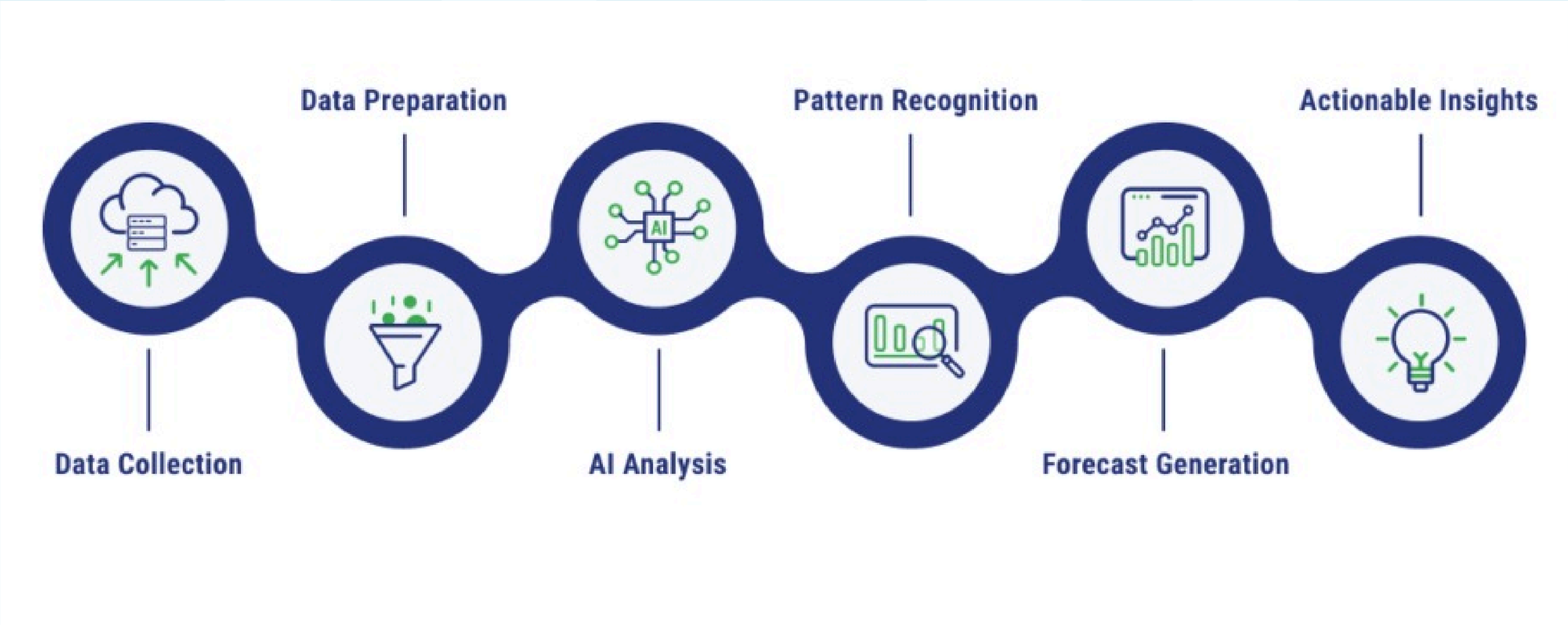
Filters
Data
Page 1

ARCHITECTURE/FLOWDIAGRAM



TASK 2

TELECOM CUSTOMERS CHURN PREDICTION SYSTEM

TECHONOLOGIES

Programming & Libraries

- **Python** – core language
- **Pandas & NumPy** – data preprocessing
- **Scikit-learn** – encoding, splitting, evaluation metrics
- **XGBoost** – classification algorithm
- **Matplotlib / Seaborn** – visual exploration and charts

Tools & Platforms

- **Jupyter Notebook / Google Colab** – model development
- **Power BI or Matplotlib** – visualization of model outputs and insights

Machine Learning Concepts Applied

- Classification modeling
- Train-test split
- Overfitting/underfitting awareness
- Churn probability calculation
- Feature importance interpretation

Key Features of the Customer Churn Prediction System (Task 2)

1. Customer Churn Classification Model (XGBoost):

- Predicts whether a customer is likely to churn based on historical patterns.
- Generates churn probability scores for each customer, enabling early intervention.

2. Feature Importance Visualization:

- Identifies the most influential factors driving churn (e.g., tenure, contract type, payment method).
- Helps businesses understand why customers are leaving.

3. Churn Distribution Insights:

- Visual breakdown of churn vs non-churn customers.
- Shows the proportion of customers at risk.

4. Contract Type & Payment Method Analysis:

- Highlights segments with highest churn (e.g., month-to-month contracts, electronic check users).
- Assists in designing targeted retention offers.

5. Monthly Charges and Tenure Pattern Analysis:

• Shows how billing amount and length of service influence churn.

• Useful for pricing strategy and customer support improvements.

6. Actual vs Predicted Churn Comparison:

• Evaluates model accuracy by comparing true customer labels with model predictions.

• Helps validate performance of the XGBoost model.

7. KPI Summary Cards:

• Total Customers

• Total Churners

• Churn Rate (%)

• High-Risk Customers

Provides quick, at-a-glance business metrics.

8. Churn Probability-Based Segmentation:

• Groups customers into Low, Medium, and High churn-risk categories.

• Guides retention teams to prioritize top-risk users.

9. Interactive Filters:

• Filters by contract, tenure, payment method, senior citizen, and more

• Allows personalized and segment-wise churn exploration.

DASHBOARD

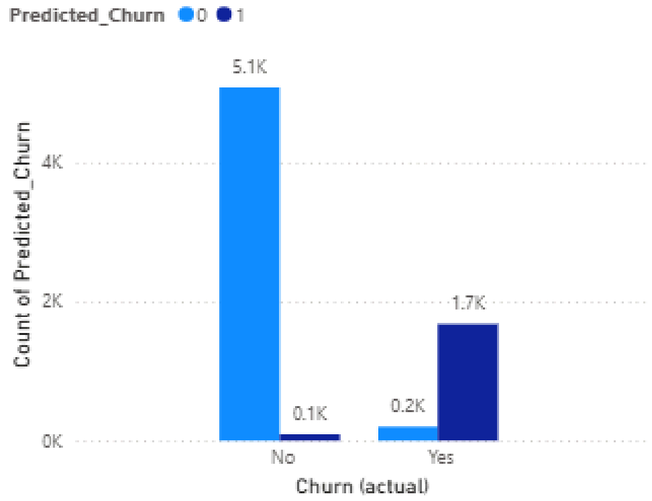
TOTAL CHURNERS

1869

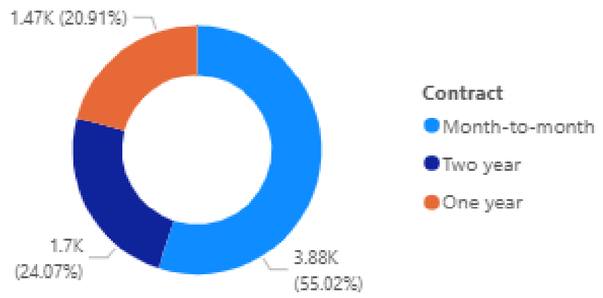
TOTAL CUSTOMERS

7043

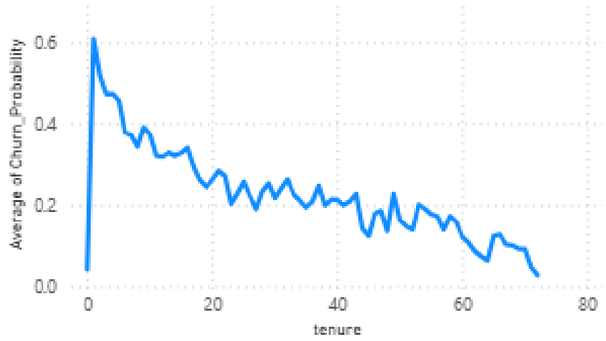
ACTUAL VS PREDICTED CHURN COMPA



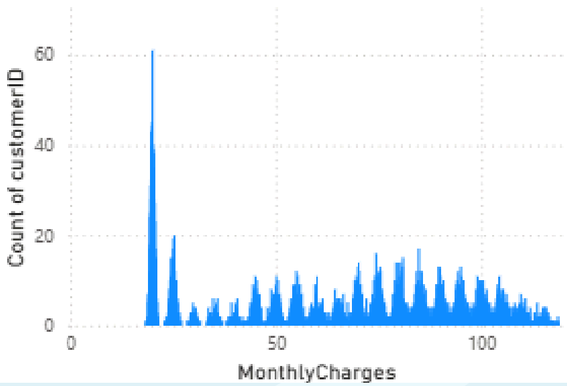
CHURN DISTRIBUTION BY CONTRACT TYPE



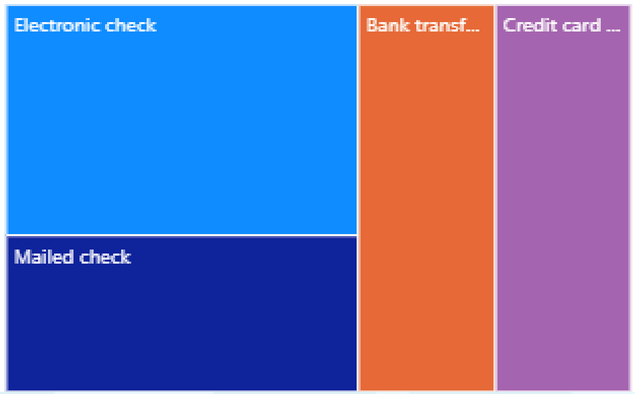
CHURN PROBABILITY TREND BY TENURE



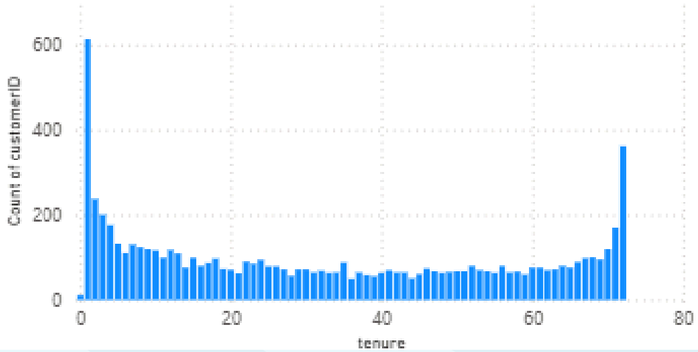
MONTHLY CHARGES DISTRIBUTION



DISTRIBUTION OF PAYMENT METHODS



CUSTOMER TENURE DISTRIBUTION



OUTCOMES OF THE INTERNSHIP

- Developed practical skills in building real-world machine learning models for forecasting sales and predicting customer churn.
- Gained hands-on experience in data cleaning, preprocessing, feature engineering, and model evaluation using Python and advanced ML libraries.
- Created interactive analytical dashboards in Power BI to communicate insights effectively through visual storytelling.
- Improved understanding of business analytics, including trend analysis, customer behavior interpretation, and data-driven decision-making.
- Strengthened technical reporting and presentation skills by documenting workflows, explaining insights, and presenting outcomes in a structured format

CONCLUSION

- The internship provided valuable hands-on experience in applying machine learning techniques to real business problems, enhancing both technical and analytical skills.
- Building the sales forecasting and churn prediction systems improved understanding of end-to-end ML workflows—from data preparation to model deployment and visualization.
- Working with real datasets strengthened the ability to interpret patterns, generate insights, and transform raw data into actionable business recommendations.
- Developing Power BI dashboards enhanced skills in visual storytelling, helping bridge the gap between technical model outputs and managerial decision-making.
- Overall, the internship contributed significantly to professional growth, preparing for future roles in data science, analytics, and AI-driven problem solving.

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  https://learn.microsoft.com/power-bi/
- Kaggle Datasets – Public datasets for forecasting and churn prediction.