Churn Prediction

Customer Churn Prediction – Data Preparation Report

1. Introduction

The goal of this project is to prepare data for **customer churn prediction**. We checked the data, did EDA (Exploratory Data Analysis), and suggested preprocessing steps.

Dataset description:

- **1000 rows**
- **5 columns:**
  - **CustomerID** – unique ID for each customer
  - **Age** – customer age (18–65)
  - **Gender** – M or F
  - **MaritalStatus** – Single, Married, Divorced, Widowed
  - **IncomeLevel** – Low, Medium, High

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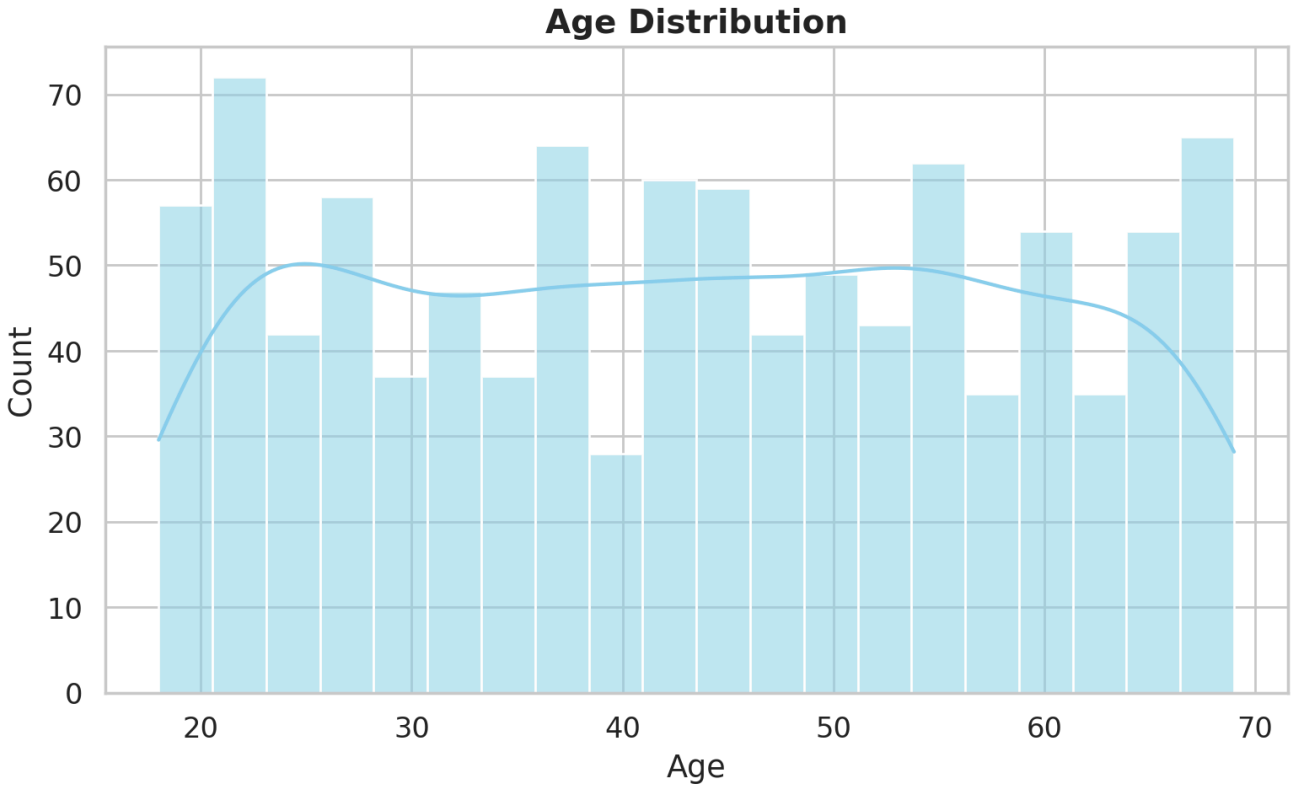
2. Exploratory Data Analysis (EDA)

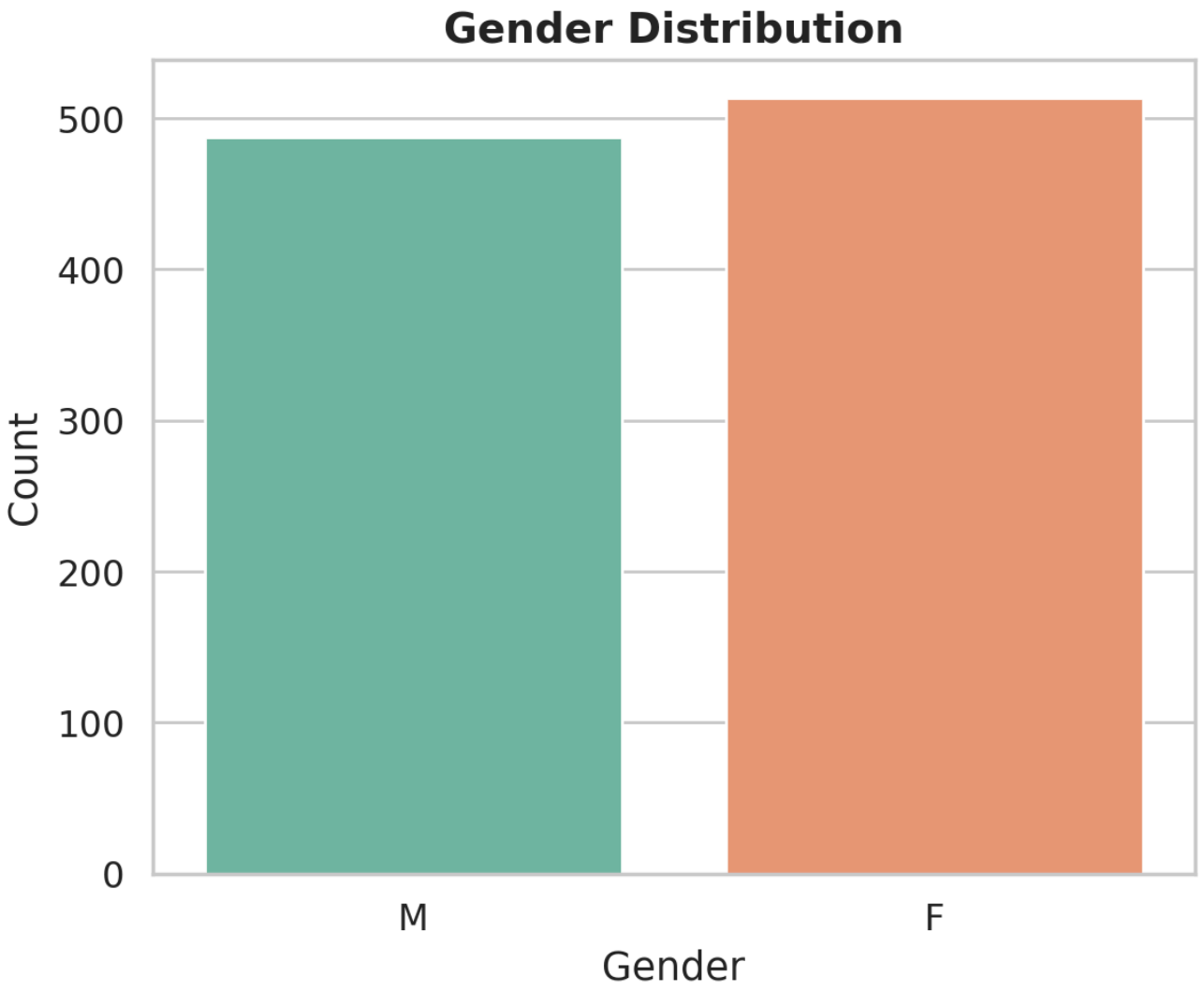
2.1 Age Distribution

- Customer ages are mainly between 18 and 65.
- The age distribution is quite even, but some ages look too frequent (synthetic data sign).



2.2 Gender Distribution

- Gender is almost equal (balanced).



2.3 MaritalStatus vs IncomeLevel

IncomeLevel	Divorced	Married	Single	Widowed
High	82	98	75	94
Low	87	86	62	90
Medium	79	77	78	92

Observation:

- High and Medium income are evenly spread in all marital groups.
- Low income is similar but Single customers are fewer.

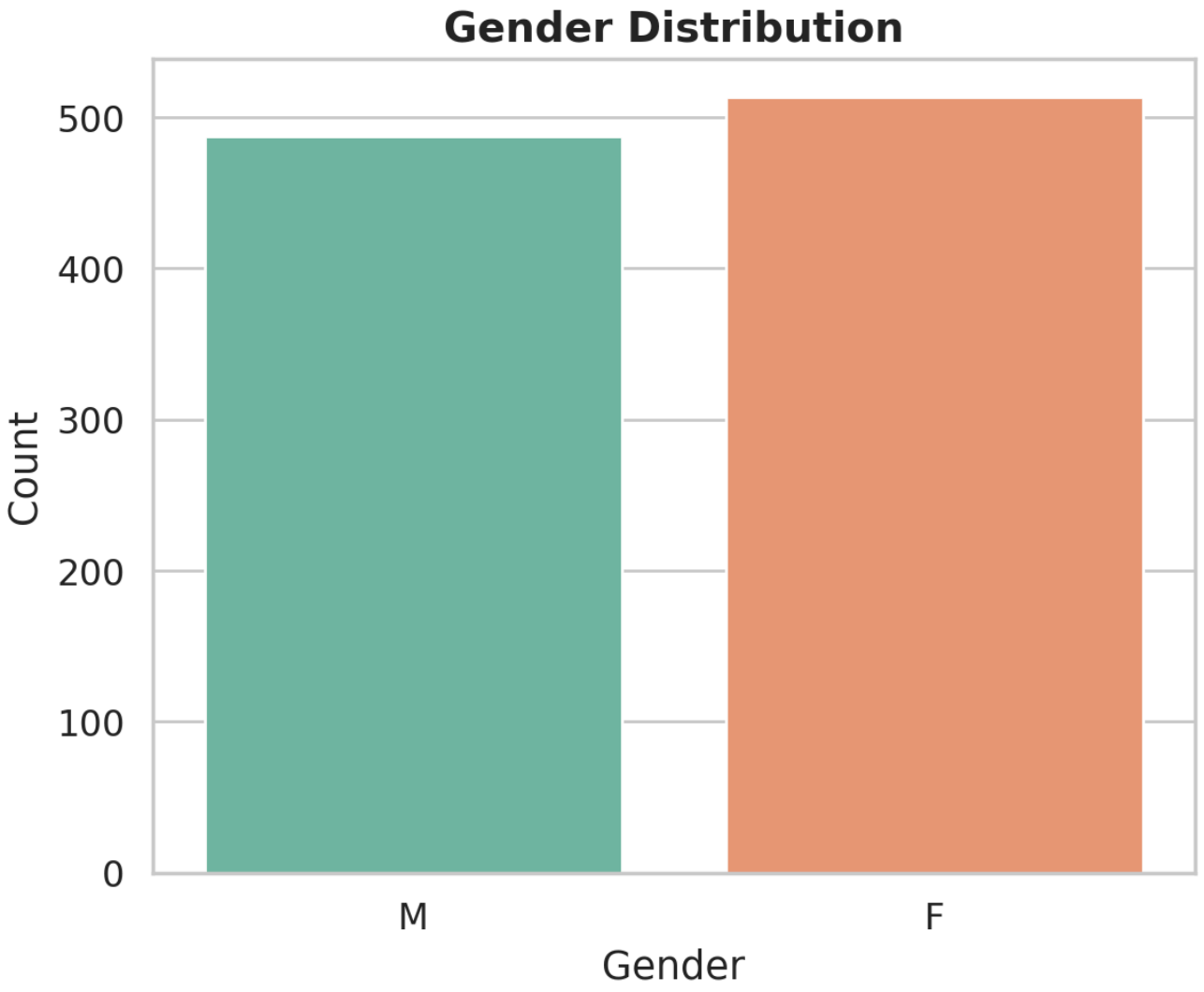
2.4 MaritalStatus vs AgeGroup

AgeGroup	Divorced	Married	Single	Widowed
<18	4	8	7	5
18–35	80	84	69	93

AgeGroup	Divorced	Married	Single	Widowed
36–50	67	76	63	77
51–65	76	67	64	76
65+	21	26	12	25

Observation:

- Age group 18–35 is the largest in all marital groups.
- Widowed is more common in young people (synthetic data).
- Age 65+ has mostly Married and Widowed.



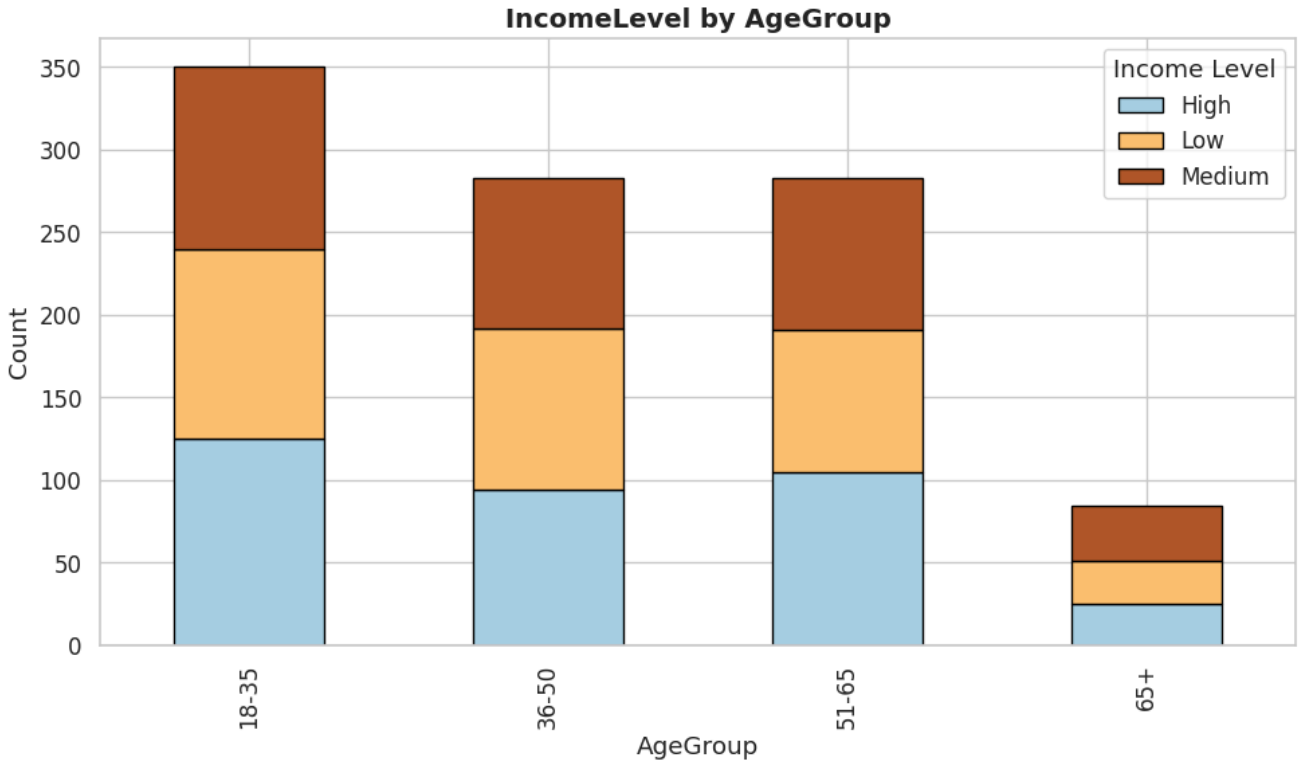
2.5 IncomeLevel vs AgeGroup

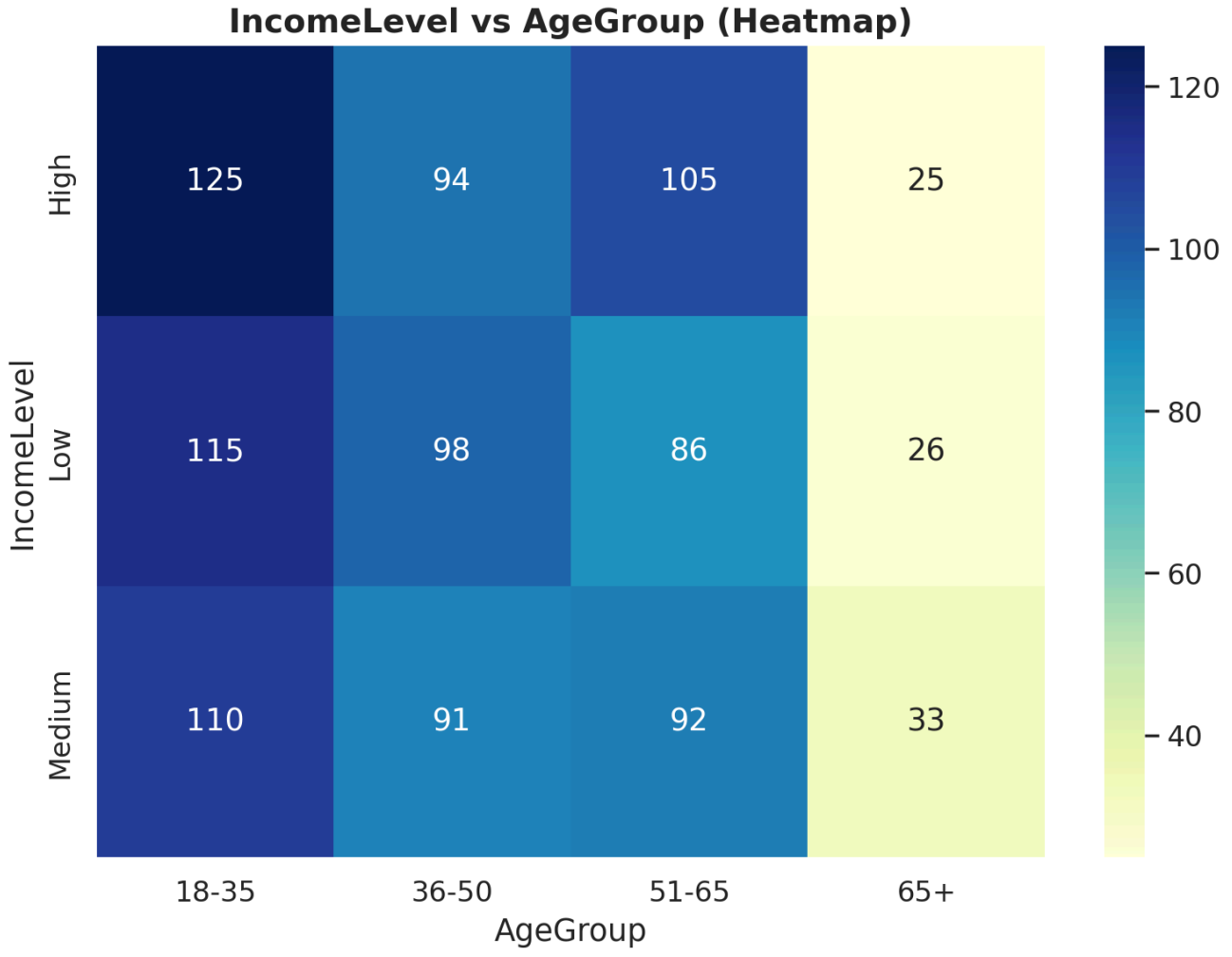
AgeGroup	High	Low	Medium
<18	4	10	10
18–35	121	105	100
36–50	94	98	91

AgeGroup	High	Low	Medium
51–65	105	86	92
65+	25	26	33

Observation:

- High income is mainly 18–35 (121 people).
- Low and Medium incomes are balanced across ages.
- Age 65+ mostly has Medium income.





3. Data Cleaning and Preprocessing

- **Missing values:** None.
- **Outliers:** Age has no extreme values (range 18–65).
- **Feature Engineering:** Added `AgeGroup` (<18, 18–35, 36–50, 51–65, 65+).
- **Encoding:**
  - Gender → Binary (M=1, F=0)
  - MaritalStatus, IncomeLevel, AgeGroup → One-hot encoding
- **Normalization:** Age can be scaled using StandardScaler or MinMaxScaler.
- **Redundant Columns:** CustomerID is not needed for the model.

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4. Findings (Main observations)

- Age is strongly related to IncomeLevel and MaritalStatus.
- Age 18–35 dominates both marital status and high income groups.
- Widowed in young people and many young high-income customers are signs of synthetic data.
- Dataset does not fully match real-world patterns but is useful for model preparation.

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5. Deliverables

- **Report:** PDF
- **Cleaned dataset:** CSV format with columns: Age, Gender (encoded), MaritalStatus (encoded), IncomeLevel (encoded), AgeGroup (encoded).