

Category	Method used	Reason
Normalization	Annual_Income	to put features on the same scale(0,1)
Standardization	Customer_Age	Centers the data
One-hot encoding	Product_Category	Categorical, no order
Ordinal encoding	Membership	Has a natural order
Label encoding	Payment_Method	Categorical without order, used in tree-based models

1. Normalization and Standardization

Annual_Income_Norm <dbl>	Customer_Age_Std <dbl>
0.8092093	0.8125526
0.2664419	1.6797379
0.2755250	0.1454870
0.3557100	-0.7884048
0.5667529	1.0793788
0.2960312	-1.2553507

2. One-hot encoding

Product_Category_Beauty <int>	Product_Category_Books <int>	Product_Category_Clothing <int>	Product_Category_Electronics <int>	Product_Category_Home <int>
0	1	0	0	0
0	0	1	0	0
0	1	0	0	0
0	0	1	0	0
0	1	0	0	0
1	0	0	0	0

0.14 of 1.3 columns

3. Ordinal encoding

```
```{r}
#Ordinal Encoding for Membership_Level Levels: Bronze < Silver < Gold < Platinum
df$Membership_Level_Ord <- factor(df$Membership_Level,
 levels = c("Bronze", "Silver", "Gold", "Platinum"),
 ordered = TRUE)
df$Membership_Level_Ord <- as.numeric(df$Membership_Level_Ord)
```

```

Membership_Level_Ord <dbl>

| |
|---|
| 4 |
| 2 |
| 4 |
| 2 |
| 2 |
| 2 |

4. Label encoding

```
```{r}
Label Encoding for Payment_Method
df$Payment_Method_Label <- as.numeric(factor(df$Payment_Method))

#Final data
head(df)
```

```

Payment_Method_Label

<dbl>

| |
|---|
| 2 |
| 2 |
| 4 |
| 4 |
| 3 |
| 1 |

Final data

| | Customer_Age
<int> | Annual_Income
<int> | Membership_Level
<chr> | Payment_Method
<chr> | Payment_Method_Label
<dbl> | Membership_Level_Ord
<dbl> | Product_Category_Beauty
<int> | Product_Category_Books
<int> | Product_Category_Clothing
<int> |
|---|-----------------------|------------------------|---------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------------|---------------------------------|------------------------------------|
| 1 | 56 | 125186 | Platinum | Credit Card | 2 | 4 | 0 | 1 | 0 |
| 2 | 69 | 54674 | Silver | Credit Card | 2 | 2 | 0 | 0 | 1 |
| 3 | 46 | 55854 | Platinum | PayPal | 4 | 4 | 0 | 1 | 0 |
| 4 | 32 | 66271 | Silver | PayPal | 4 | 2 | 0 | 0 | 1 |
| 5 | 60 | 93688 | Silver | Debit Card | 3 | 2 | 0 | 1 | 0 |
| 6 | 25 | 58518 | Silver | Cash | 1 | 2 | 1 | 0 | 0 |