Binary Classification of Insurance Cross Selling 💼🔍

💡 About The data Columns :

😀We're studying to predict which customers respond positively to an automobile insurance offer.

👫 **Gender**: Categorical variable indicating the gender of the customer.

🦴 **Age**: Numeric variable indicating the age of the customer.

🪪 **Driving_License**: Binary variable indicating if the customer has a driving license (1 if yes, 0 if no).

🚜 **Region_Code**: Numeric variable indicating the region code of the customer.

🏚️ **Previously_Insured**: Binary variable indicating if the customer was previously insured (1 if yes, 0 if no).

🖼️ **Vehicle_Age**: Categorical variable indicating the age of the vehicle.

🕸️ **Vehicle_Damage**: Categorical variable indicating if the vehicle was damaged in the past.

Annual_Premium: Numeric variable indicating the annual premium amount.

🎡 **Policy_Sales_Channel**: Numeric variable indicating the sales channel of the policy.

📶 **Vintage**: Numeric variable indicating the number of days the customer has been associated with the company.

📼 **Response**: Binary target variable indicating if the customer responded positively to the automobile insurance offer (1 if yes, 0 if no).

💡 About The Competition :

Task: The objective of this competition is to predict which customers respond positively to an automobile insurance offer..

Dataset: The dataset for this competition (both train and test) was generated from a deep learning model trained on the Health Insurance Cross Sell Prediction Data dataset. Feature distributions are close to, but not exactly the same, as the original. Feel free to use the original dataset as part of this competition, both to explore differences as well as to see whether incorporating the original in training improves model performance.

Evaluation: Submissions are evaluated using area under the ROC curve.

Submission: train.csv - the training dataset; Response is the binary target test.csv - the test dataset; your objective is to predict the probability of Response for each row sample_submission.csv - a sample submission file in the correct format

In [ ]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:
```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.preprocessing import StandardScaler, LabelEncoder, OneHotEncoder
from sklearn.metrics import roc_curve, roc_auc_score
```

In [ ]:
```
from lightgbm import LGBMRegressor
from xgboost import XGBRegressor

import warnings
warnings.filterwarnings("ignore")
pd.set_option('display.max_columns', None)
```

In [ ]:
```
df_train=pd.read_csv("/kaggle/input/despacitoinsur/trainreduced.csv")
df_test=pd.read_csv("/kaggle/input/despacitoinsur/testreduced.csv")
sample_submission = pd.read_csv('/kaggle/input//playground-series-s4e7/sample_submission.csv')
```

In [ ]:
```
df_train.head()
```

Out[ ]:

	Gender	Age	Driving_License	Region_Code	Previously_Insured	Vehicle_Age	Vehicle_Damage	Annual_Prem
0	1	21	1	35	0	1	1	651
1	1	43	1	28	0	2	1	589
2	0	25	1	14	1	0	0	380
3	0	35	1	1	0	1	1	26
4	0	36	1	15	1	1	0	319

In [ ]:
```
df_test.head()
```

Out[ ]:

	Gender	Age	Driving_License	Region_Code	Previously_Insured	Vehicle_Age	Vehicle_Damage	Annual_Prem
0	0	20	1	47	0	0	0	26
1	1	47	1	28	0	1	1	374
2	1	47	1	43	0	1	1	26
3	0	22	1	47	1	0	0	245
4	1	51	1	19	0	1	0	341

In [ ]:
```
def NullValues(data):
    null_values = data.isnull().sum()
    duplicate_values = data.duplicated().sum()
    print(f"Null Values: \n{null_values}\n\nDuplicate Values: {duplicate_values}")
```

In [ ]:
```
NullValues(df_train)
```

```
Null Values:
Gender                  0
Age                     0
Driving_License         0
Region_Code             0
Previously_Insured      0
Vehicle_Age             0
Vehicle_Damage          0
Annual_Premium          0
Policy_Sales_Channel    0
Vintage                 0
Response                0
dtype: int64

Duplicate Values: 0
```

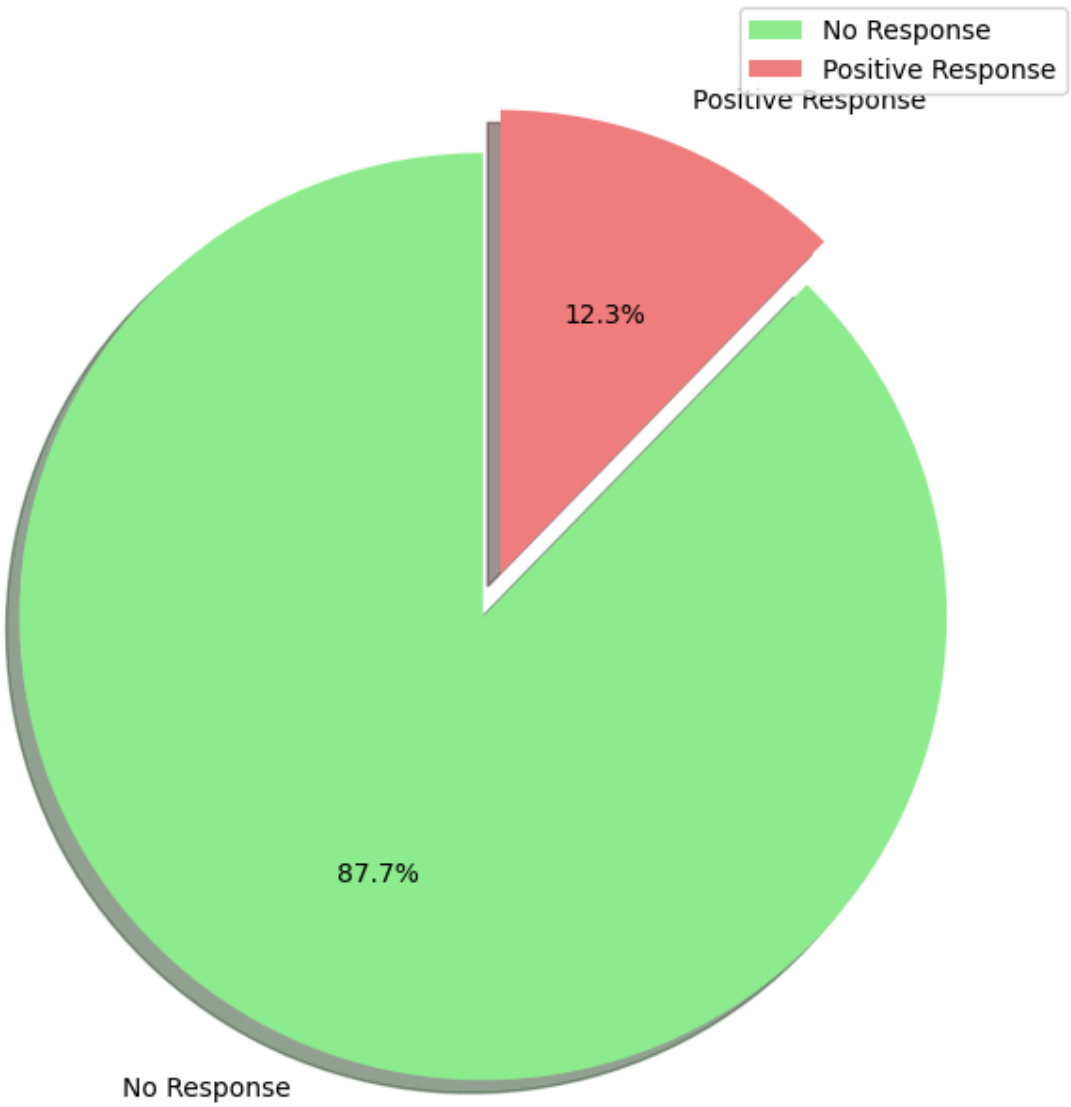
In [ ]:
```
df_train.describe()
```

Out[ ]:

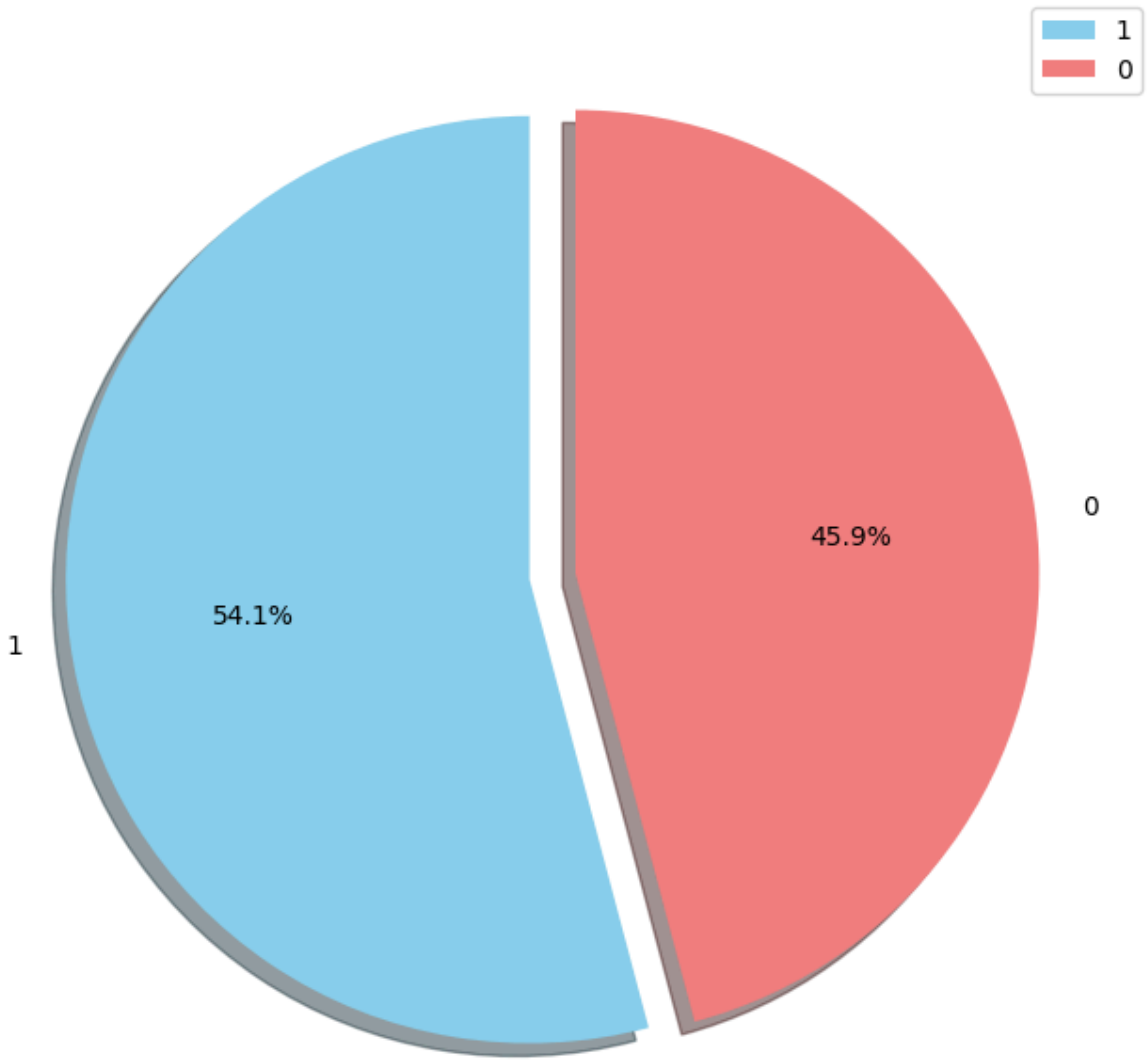
	Gender	Age	Driving_License	Region_Code	Previously_Insured	Vehicle_Age	Vehicle_D
count	1.150480e+07	1.150480e+07	1.150480e+07	1.150480e+07	1.150480e+07	1.150480e+07	1.15048
mean	5.413510e-01	3.838356e+01	9.980220e-01	2.641869e+01	4.629966e-01	6.031073e-01	5.0267
std	4.982872e-01	1.499346e+01	4.443120e-02	1.299159e+01	4.986289e-01	5.678559e-01	4.9999
min	0.000000e+00	2.000000e+01	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00	0.00000
25%	0.000000e+00	2.400000e+01	1.000000e+00	1.500000e+01	0.000000e+00	0.000000e+00	0.00000
50%	1.000000e+00	3.600000e+01	1.000000e+00	2.800000e+01	0.000000e+00	1.000000e+00	1.00000
75%	1.000000e+00	4.900000e+01	1.000000e+00	3.500000e+01	1.000000e+00	1.000000e+00	1.00000
max	1.000000e+00	8.500000e+01	1.000000e+00	5.200000e+01	1.000000e+00	2.000000e+00	1.00000

📉 Exploratory Data Analysis 📊

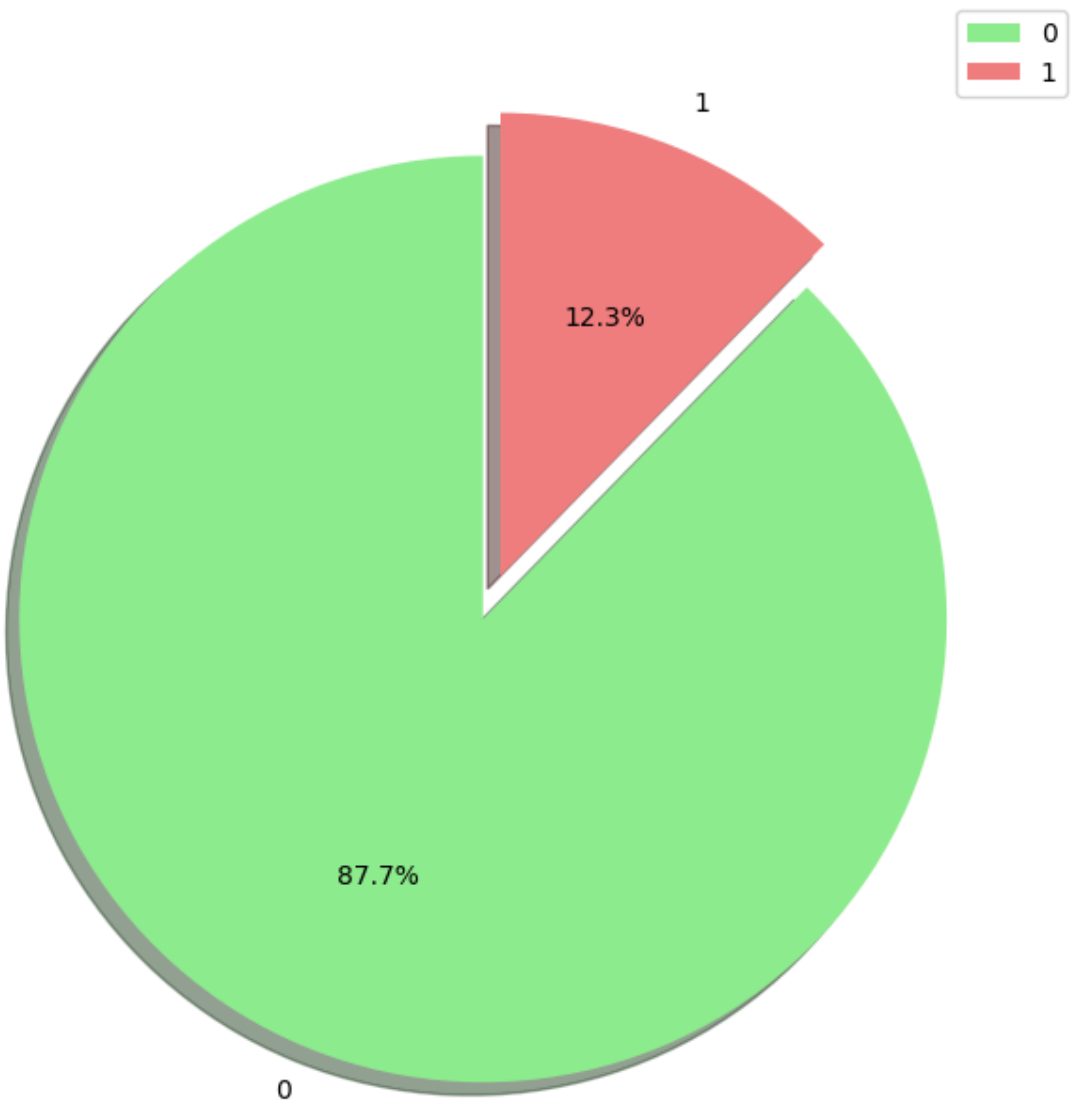
In [ ]:
```
if 'Response' in df_train.columns and df_train['Response'].nunique() > 1:
    response_counts = df_train['Response'].value_counts()

    plt.figure(figsize=(8, 8))
    explode = (0.1, 0)

    plt.pie(response_counts, labels=['No Response', 'Positive Response'], autopct='%1.1f%%',
            colors=['lightgreen', 'lightcoral'], startangle=90, shadow=True, explode=explode)

    plt.title('Response Proportions', fontsize=14)
    plt.legend(loc="best")
    plt.show()
else:
    print("The 'Response' column is missing or does not have enough categories to plot.")
```



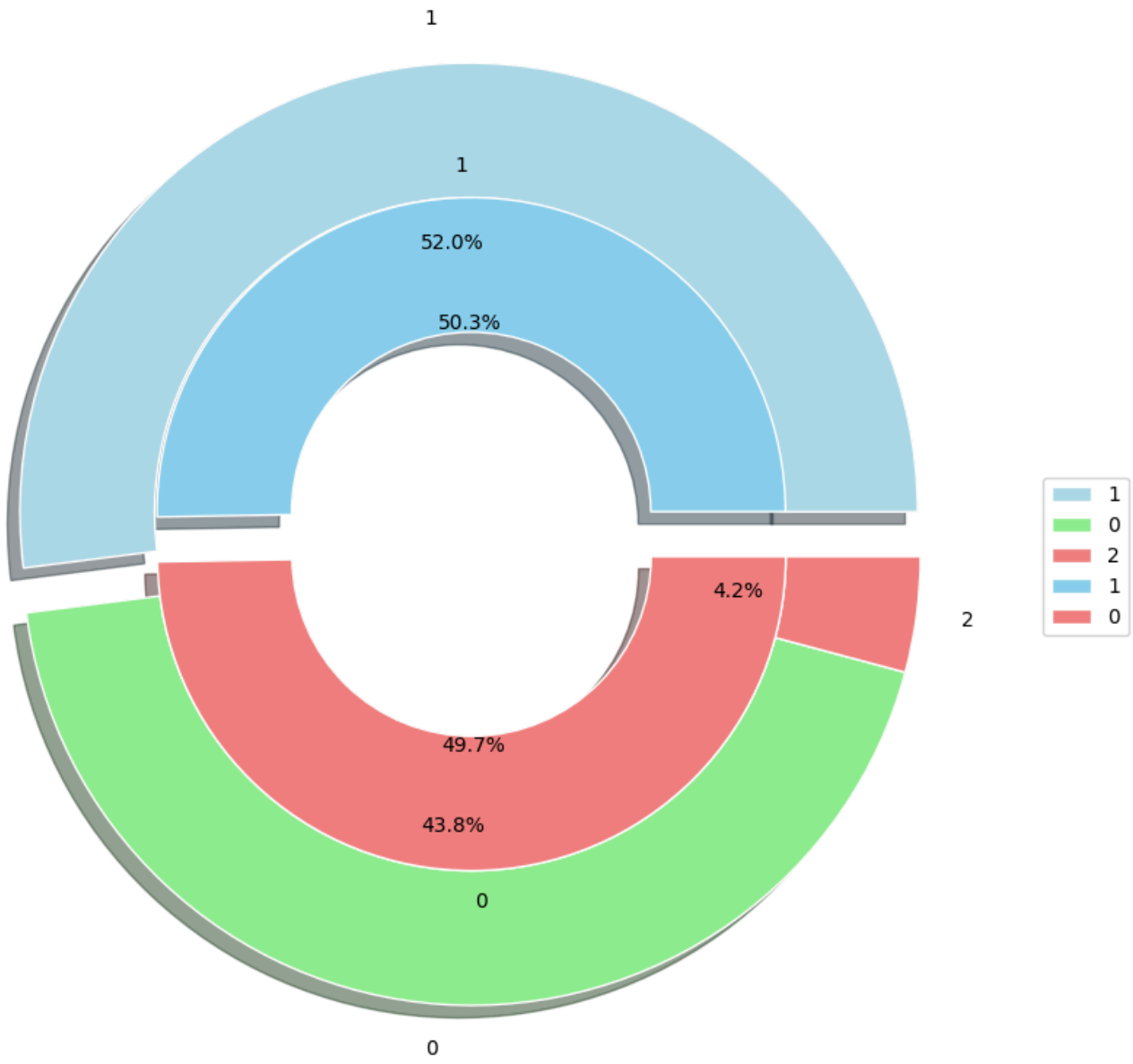
In [ ]:
```
if 'Gender' in df_train.columns and df_train['Gender'].nunique() > 1:
        gender_counts = df_train['Gender'].value_counts()

        plt.figure(figsize=(8, 8))
        explode = (0.1, 0)
        plt.pie(gender_counts, labels=gender_counts.index, autopct='%1.1f%%',
                        colors=['skyblue', 'lightcoral'], startangle=90, shadow=True, explode=explode

        plt.title('Gender Distribution', fontsize=14)
        plt.legend(loc='best')
        plt.show()
else:
        print("The 'Gender' column is missing or does not have enough categories to plot.")
```



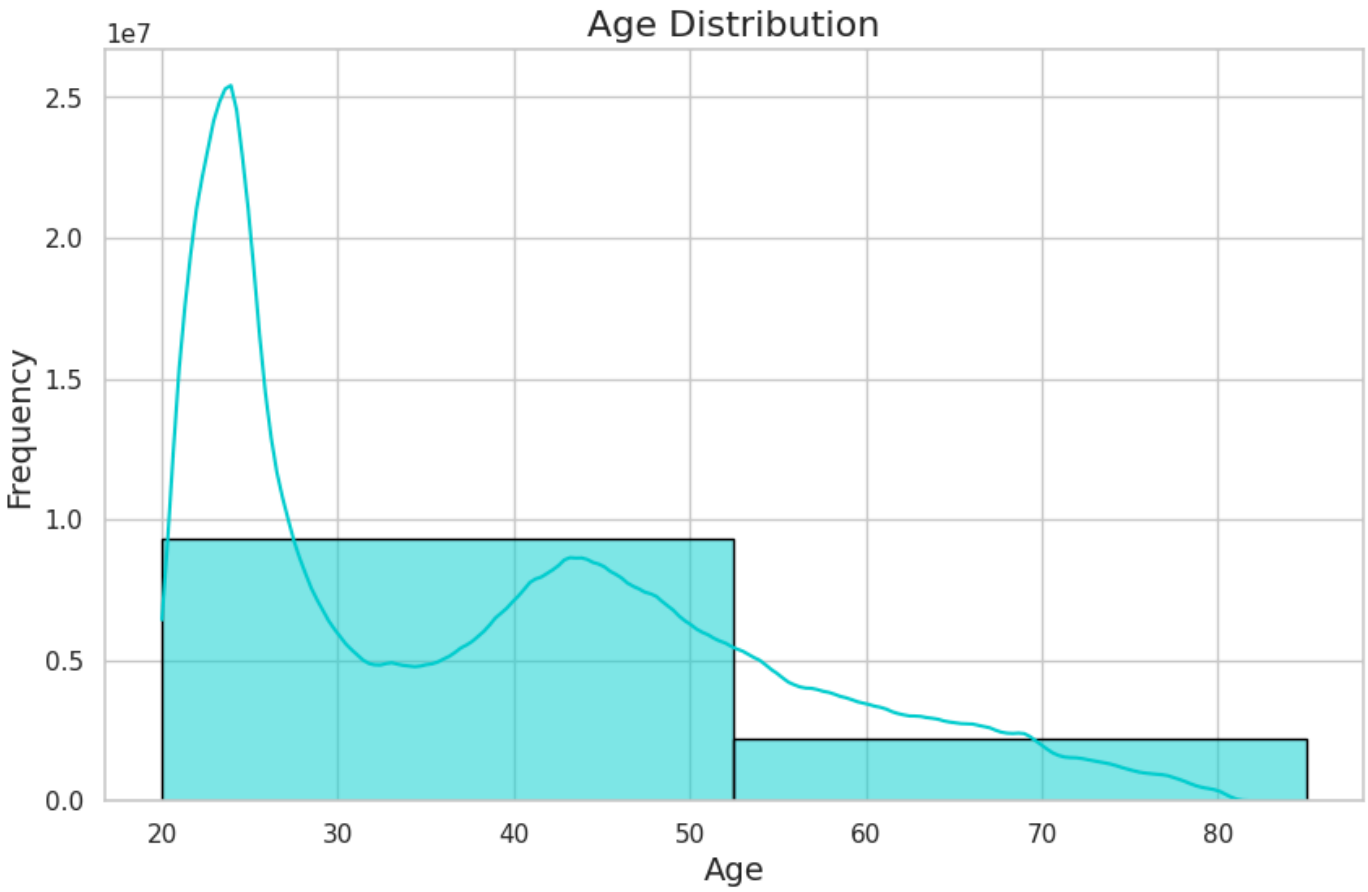
In [ ]:
```
if 'Response' in df_train.columns and df_train['Response'].nunique() > 1:
    response_counts = df_train['Response'].value_counts()

    plt.figure(figsize=(8, 8))
    explode = (0.1, 0)

    plt.pie(response_counts, labels=response_counts.index, autopct='%1.1f%%',
            colors=['lightgreen', 'lightcoral'], startangle=90, shadow=True, explode=explode)

    plt.title('Response Proportions', fontsize=14)
    plt.legend(loc="best")
    plt.show()
else:
    print("The 'Response' column is missing or does not have enough categories to plot.")
```



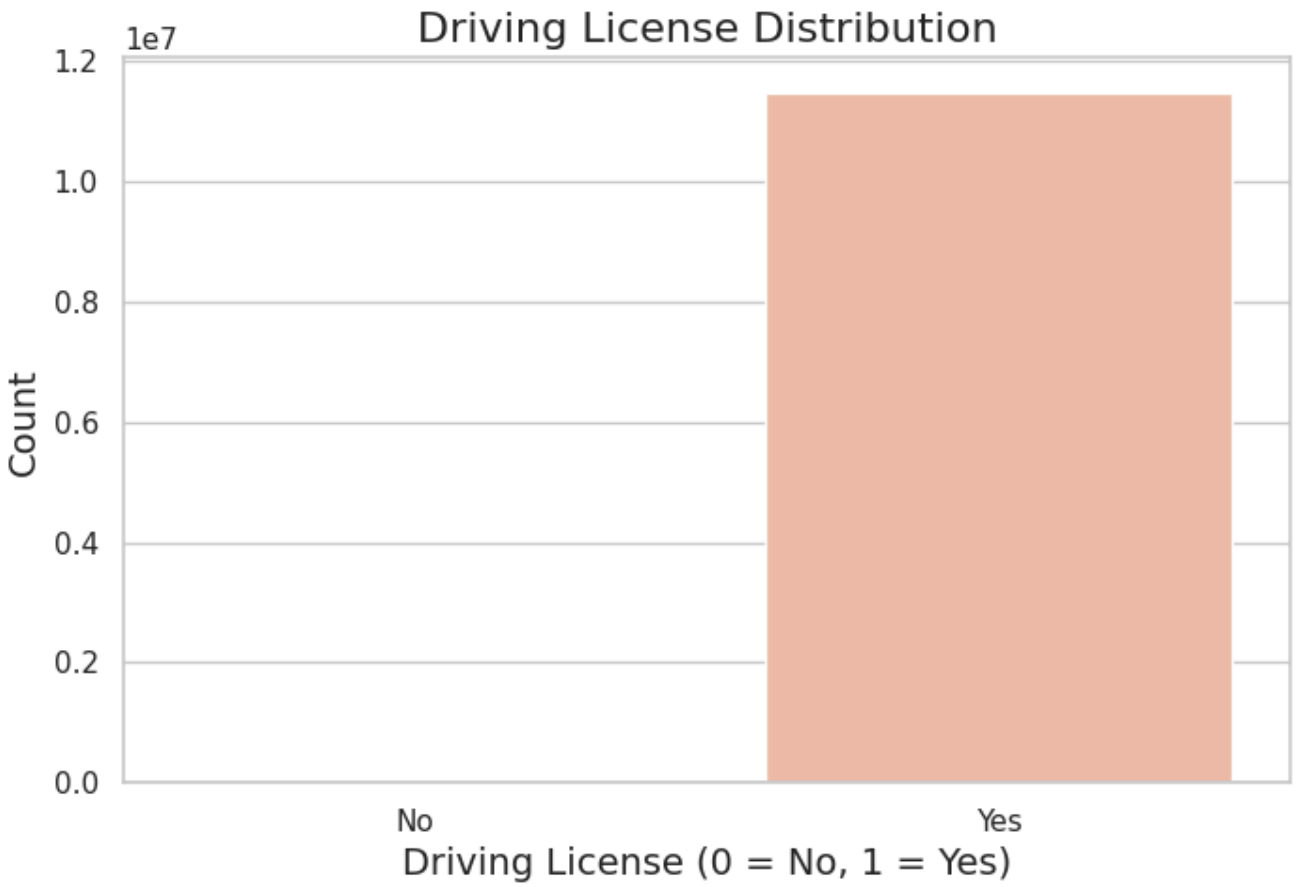
In [ ]:
```
if all(column in df_train.columns and df_train[column].nunique() > 1 for column in ['Vehicle_Age', 'V
    vehicle_age_counts = df_train['Vehicle_Age'].value_counts()
    vehicle_damage_counts = df_train['Vehicle_Damage'].value_counts()

    fig, ax = plt.subplots(figsize=(10, 10))

    explode_outer = (0.1, 0, 0)
    ax.pie(vehicle_age_counts, labels=vehicle_age_counts.index, autopct='%1.1f%%',
           colors=['lightblue', 'lightgreen', 'lightcoral'], radius=1, shadow=True, explode=explode_o
           wedgeprops=dict(width=0.3, edgecolor='w'))

    explode_inner = (0.1, 0)
    ax.pie(vehicle_damage_counts, labels=vehicle_damage_counts.index, autopct='%1.1f%%',
           colors=['skyblue', 'lightcoral'], radius=0.7, shadow=True, explode=explode_inner,
           wedgeprops=dict(width=0.3, edgecolor='w'))

    ax.set(aspect="equal", title='Nested Pie Plot of Vehicle Age and Vehicle Damage')
    plt.legend(loc="center left", bbox_to_anchor=(1, 0, 0.5, 1))
    plt.show()
else:
    print("One or both of the 'Vehicle_Age' or 'Vehicle_Damage' columns are missing or do not have en
```



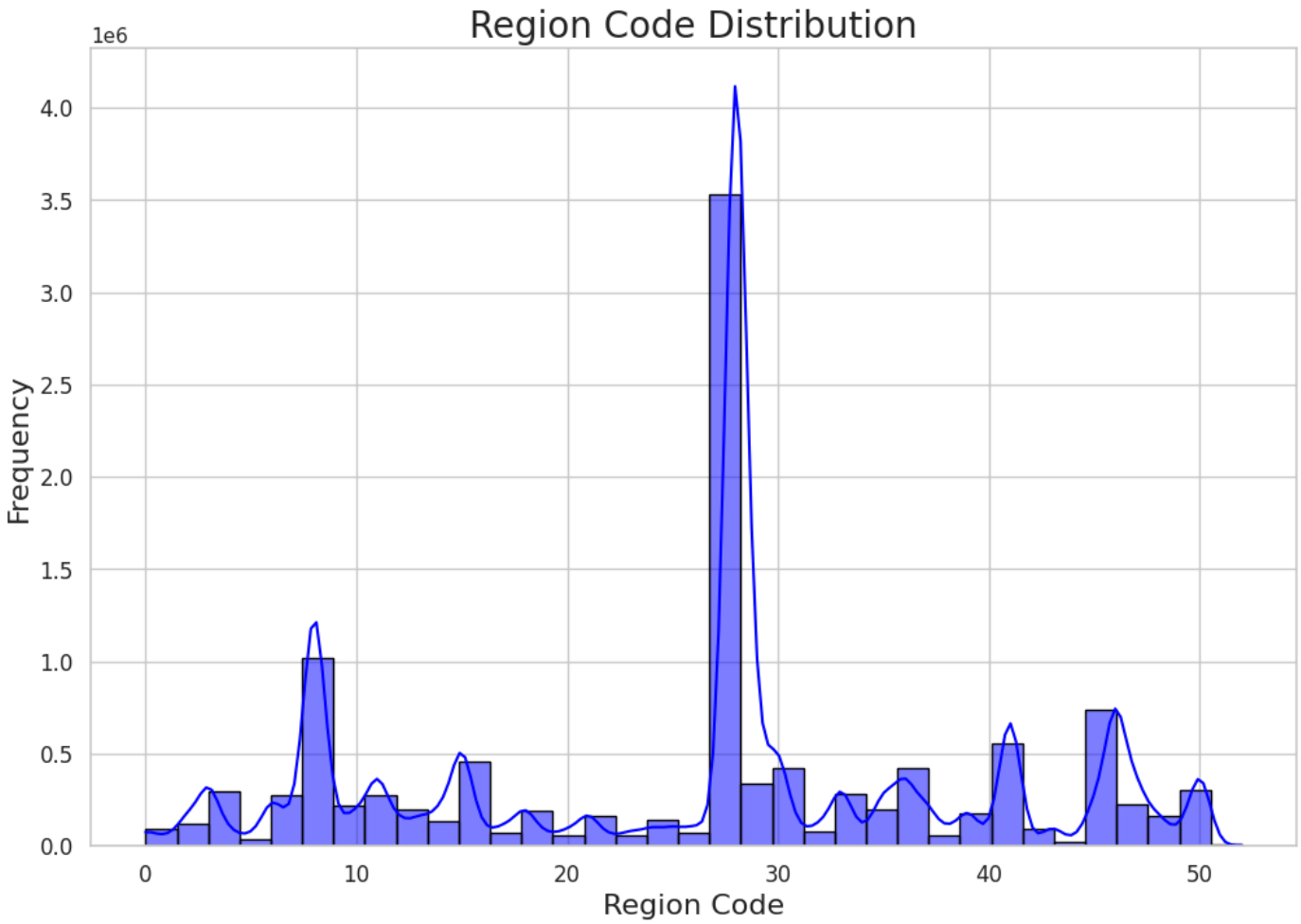
In [ ]:
```
sns.set(style="whitegrid")
plt.figure(figsize=(10, 6))
bin_size = int((df_train['Age'].max() - df_train['Age'].min()) / 30)

sns.histplot(df_train['Age'], bins=bin_size, kde=True, edgecolor='black', color='darkturquoise')

plt.title('Age Distribution', fontsize=16)
plt.xlabel('Age', fontsize=14)
plt.ylabel('Frequency', fontsize=14)
plt.show()
```



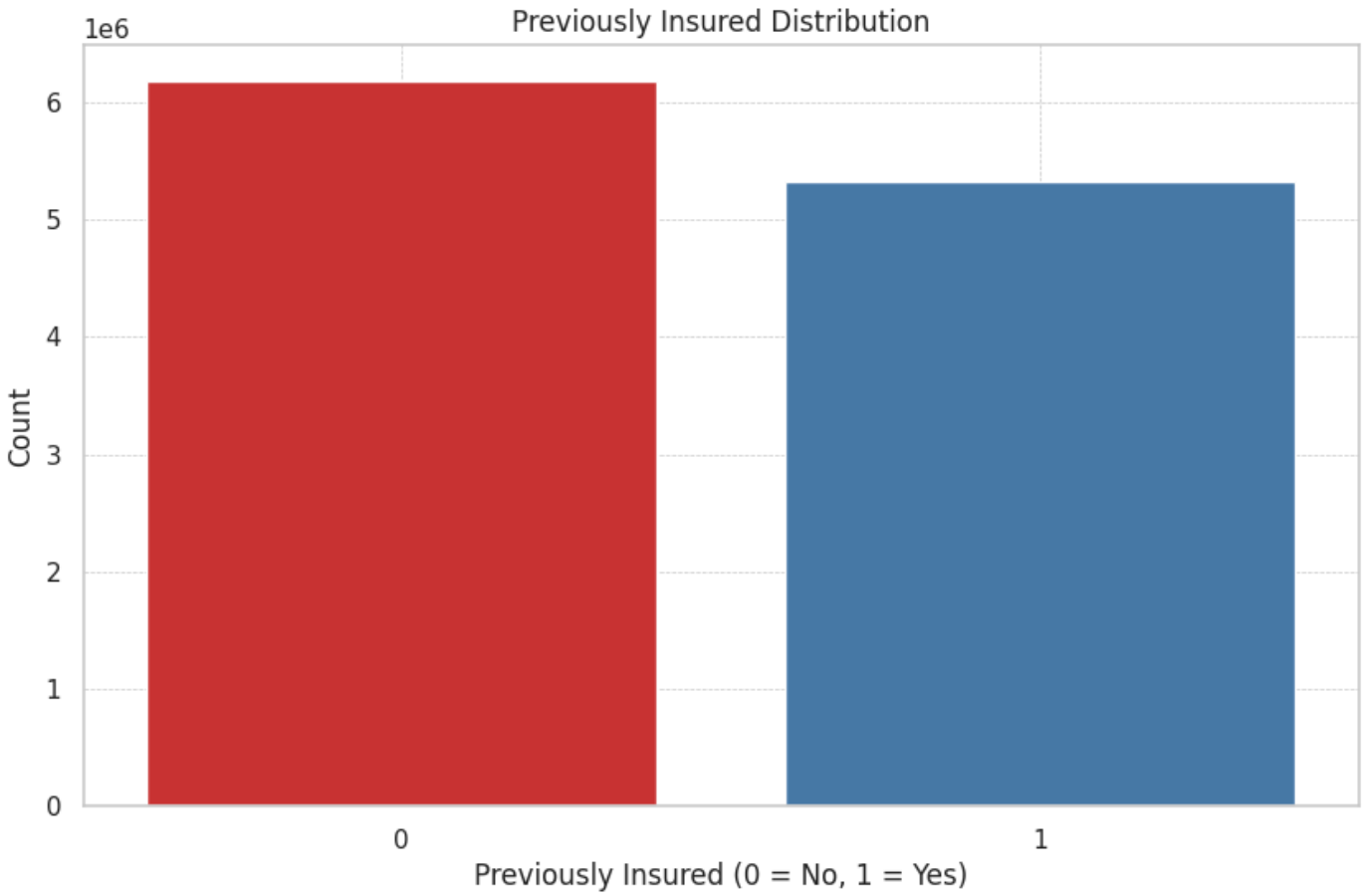
In [ ]:
```
plt.figure(figsize=(8, 5))
sns.countplot(x='Driving_License', data=df_train, palette='coolwarm')
plt.title('Driving License Distribution', fontsize=16)
plt.xlabel('Driving License (0 = No, 1 = Yes)', fontsize=14)
plt.ylabel('Count', fontsize=14)
plt.xticks([0, 1], ['No', 'Yes'])
plt.show()
```



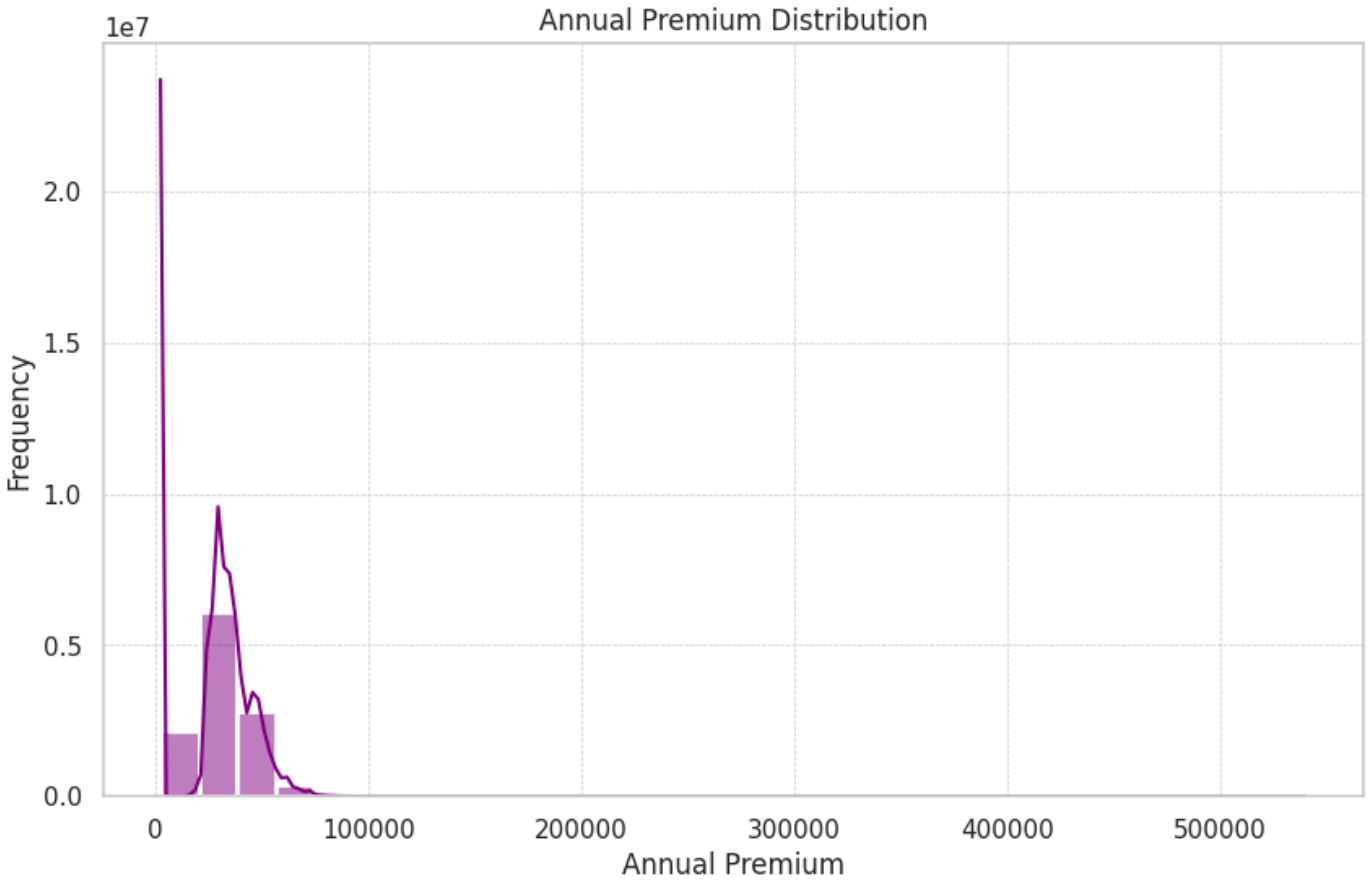
In [ ]:
```
plt.figure(figsize=(12, 8))
sns.histplot(df_train['Region_Code'], bins=35, kde=True, color='blue', edgecolor='black')
plt.title('Region Code Distribution', fontsize=20)
plt.xlabel('Region Code', fontsize=16)
plt.ylabel('Frequency', fontsize=16)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.grid(True)
plt.show()
```



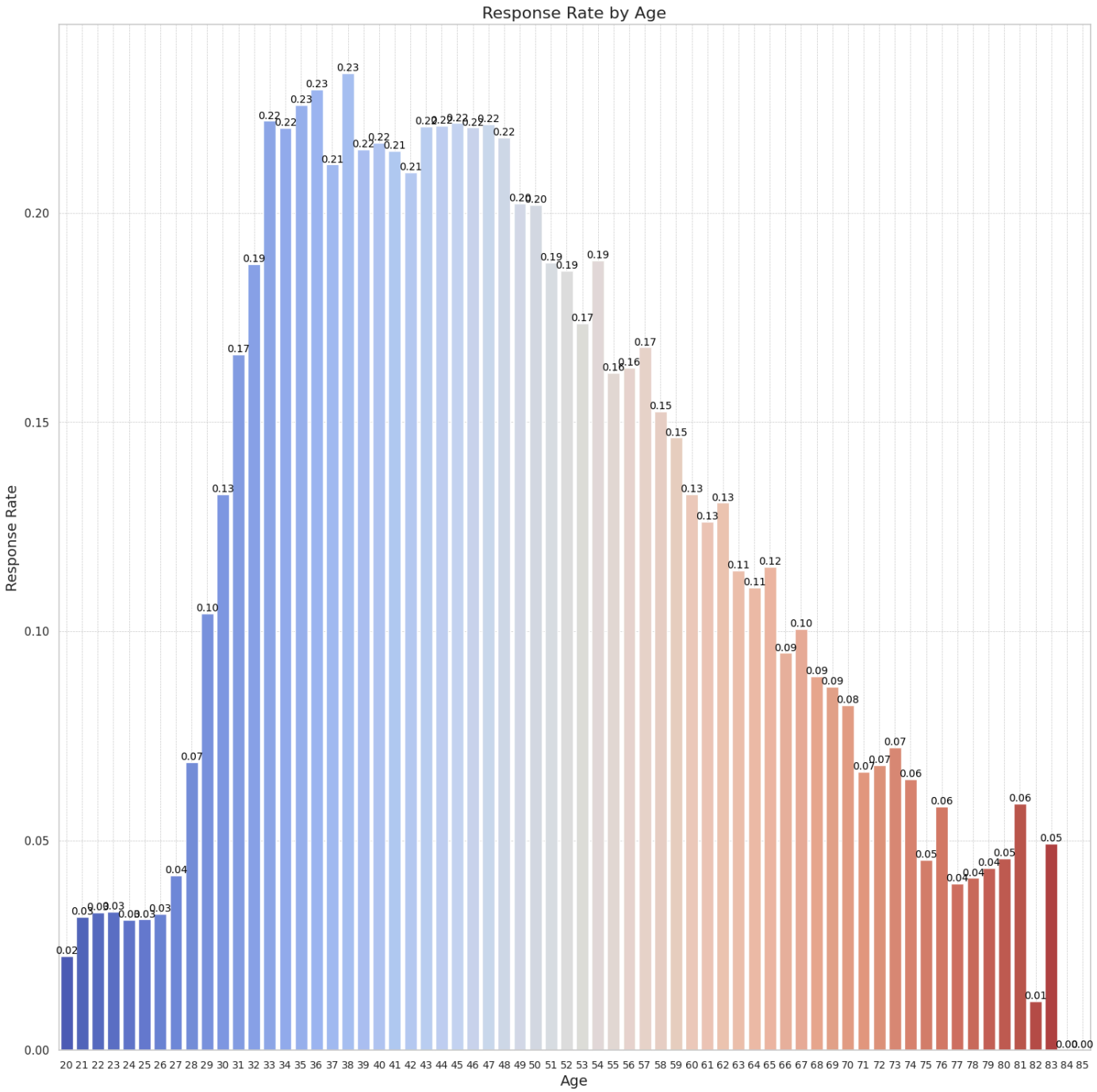
In [ ]:
```
plt.figure(figsize=(10, 6))
sns.countplot(x='Previously_Insured', data=df_train, palette='Set1')
plt.title('Previously Insured Distribution')
plt.xlabel('Previously Insured (0 = No, 1 = Yes)')
plt.ylabel('Count')
plt.grid(True, which='both', linestyle='--', linewidth=0.5)
plt.show()
```



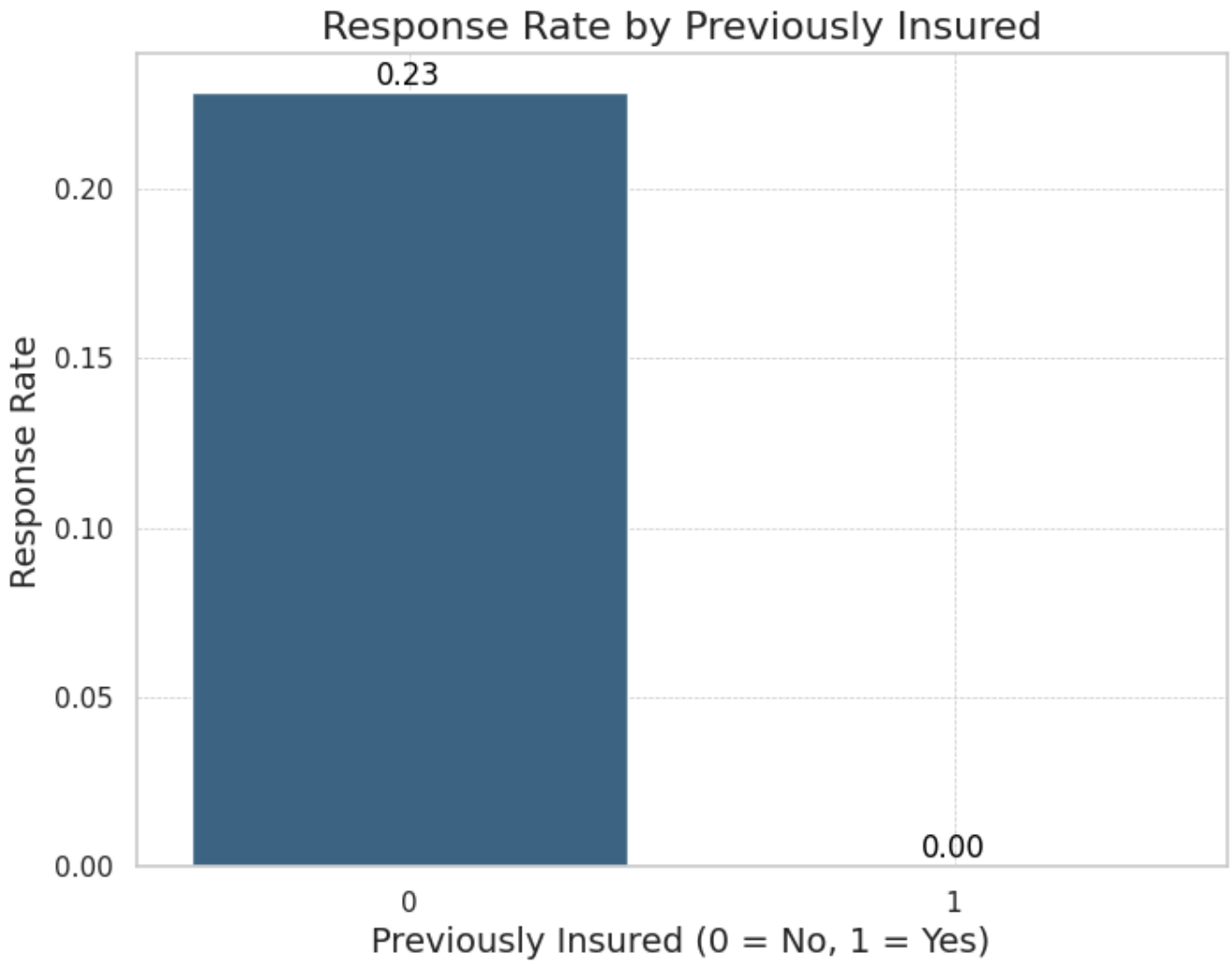
In [ ]:
```
sns.set_style("whitegrid")
plt.figure(figsize=(10, 6))
sns.histplot(df_train['Annual_Premium'], bins=30, kde=True, color='purple', linewidth=2)
plt.title('Annual Premium Distribution')
plt.xlabel('Annual Premium')
plt.ylabel('Frequency')
plt.grid(True, which='both', linestyle='--', linewidth=0.5)
plt.show()
```



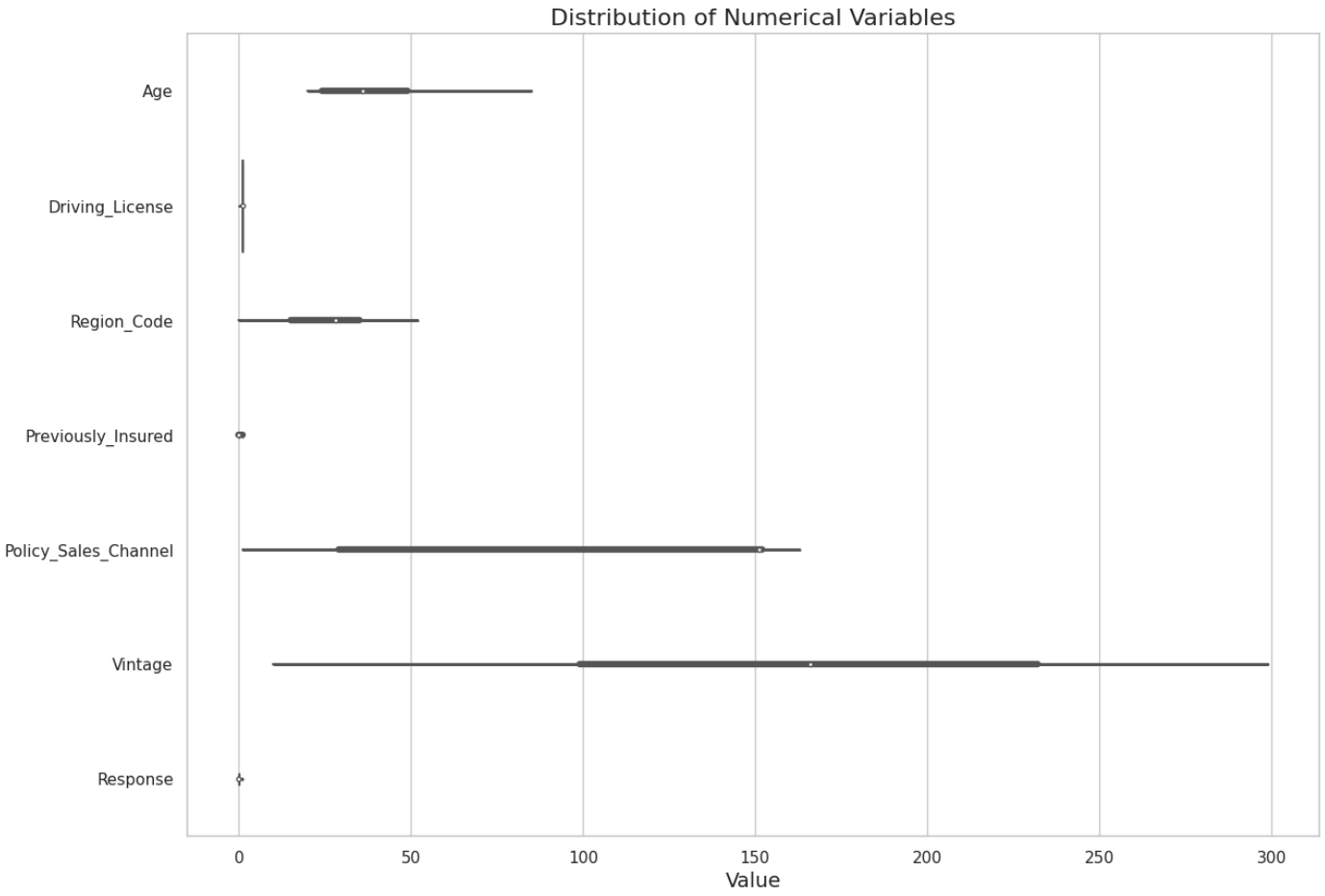
In [ ]:
```
sns.set_style("whitegrid")
plt.figure(figsize=(18, 18))
age_response = df_train.groupby('Age')['Response'].mean().reset_index()
sns.barplot(x='Age', y='Response', data=age_response, palette='coolwarm')
plt.title('Response Rate by Age', fontsize=16)
plt.xlabel('Age', fontsize=14)
plt.ylabel('Response Rate', fontsize=14)
plt.xticks(rotation=0, fontsize=10)
for index, row in age_response.iterrows():
    plt.text(row.name, row.Response, f'{row.Response:.2f}', color='black', ha="center", va="bottom",
plt.grid(True, which='both', linestyle='--', linewidth=0.5)
plt.show()
```



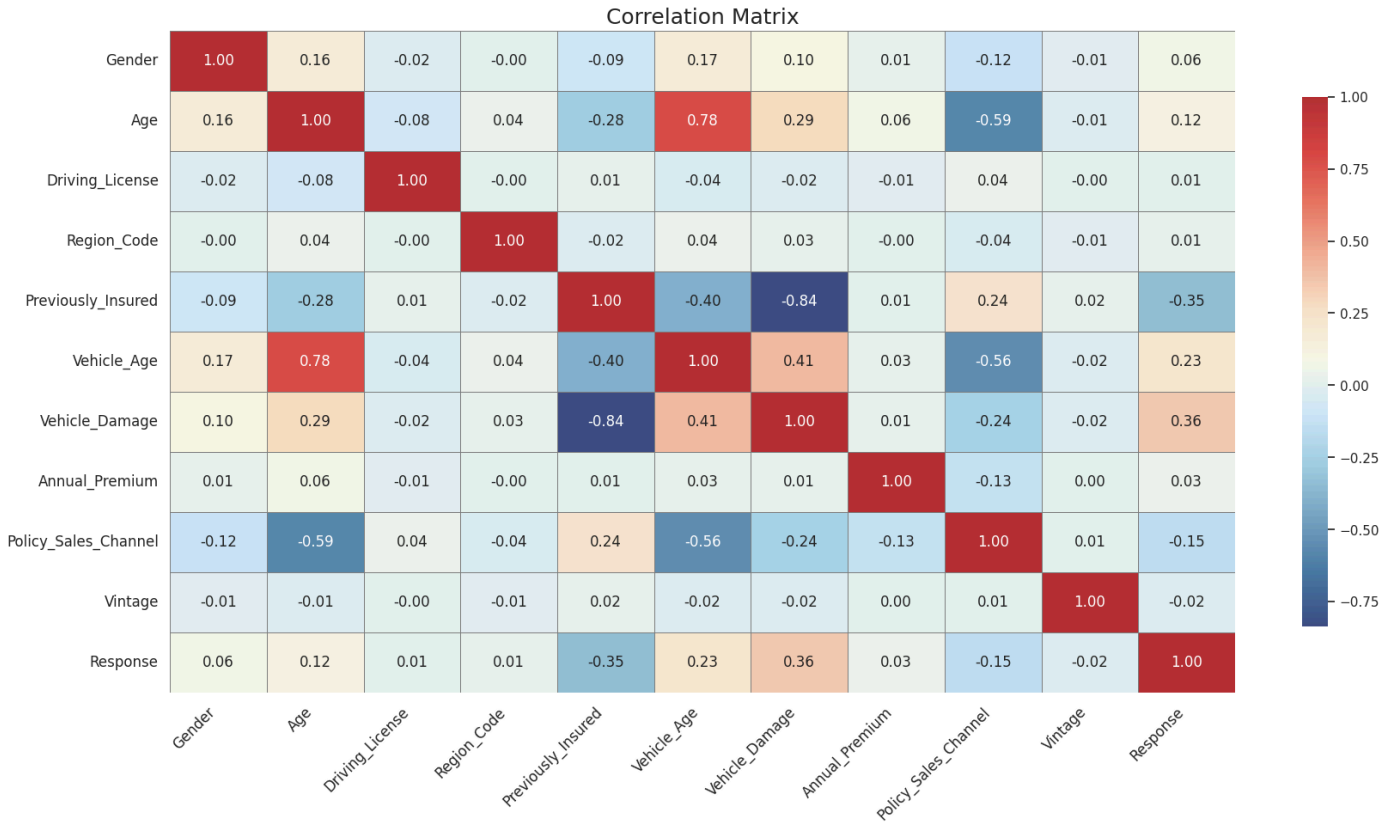
In [ ]:
```
sns.set_style("whitegrid")
plt.figure(figsize=(8, 6))
insured_response = df_train.groupby('Previously_Insured')['Response'].mean().reset_index()
sns.barplot(x='Previously_Insured', y='Response', data=insured_response, palette='viridis')
plt.title('Response Rate by Previously Insured', fontsize=16)
plt.xlabel('Previously Insured (0 = No, 1 = Yes)', fontsize=14)
plt.ylabel('Response Rate', fontsize=14)
for index, row in insured_response.iterrows():
    plt.text(row.name, row.Response, f'{row.Response:.2f}', color='black', ha="center", va="bottom",
plt.grid(True, which='both', linestyle='--', linewidth=0.5)
plt.show()
```



In [ ]:
```
sns.set_style("whitegrid")
numerical_cols = ['Age', 'Driving_License', 'Region_Code', 'Previously_Insured',
                  'Policy_Sales_Channel', 'Vintage', 'Response']
plt.figure(figsize=(14, 10))
sns.violinplot(data=df_train[numerical_cols], orient='h', palette='Set2', cut=0)
plt.title('Distribution of Numerical Variables', fontsize=16)
plt.xlabel('Value', fontsize=14)
plt.show()
```



In [ ]:
```
custom_palette = ["#3C4E85", "#4979A3", "#75A2C1", "#9FCCE1", "#CDE6F8", "#F5F8E8", "#F8E2C8", "#F1AF
from matplotlib.colors import LinearSegmentedColormap
cmap = LinearSegmentedColormap.from_list("custom_cmap", custom_palette, N=256)
correlation_matrix = df_train.corr()
plt.figure(figsize=(20, 10))
sns.heatmap(correlation_matrix, annot=True, cmap=cmap, fmt=".2f", linewidths=0.5, linecolor='gray', c
plt.title('Correlation Matrix', fontsize=18)
plt.xticks(rotation=45, ha='right', fontsize=12)
plt.yticks(rotation=0, fontsize=12)
plt.show()
```



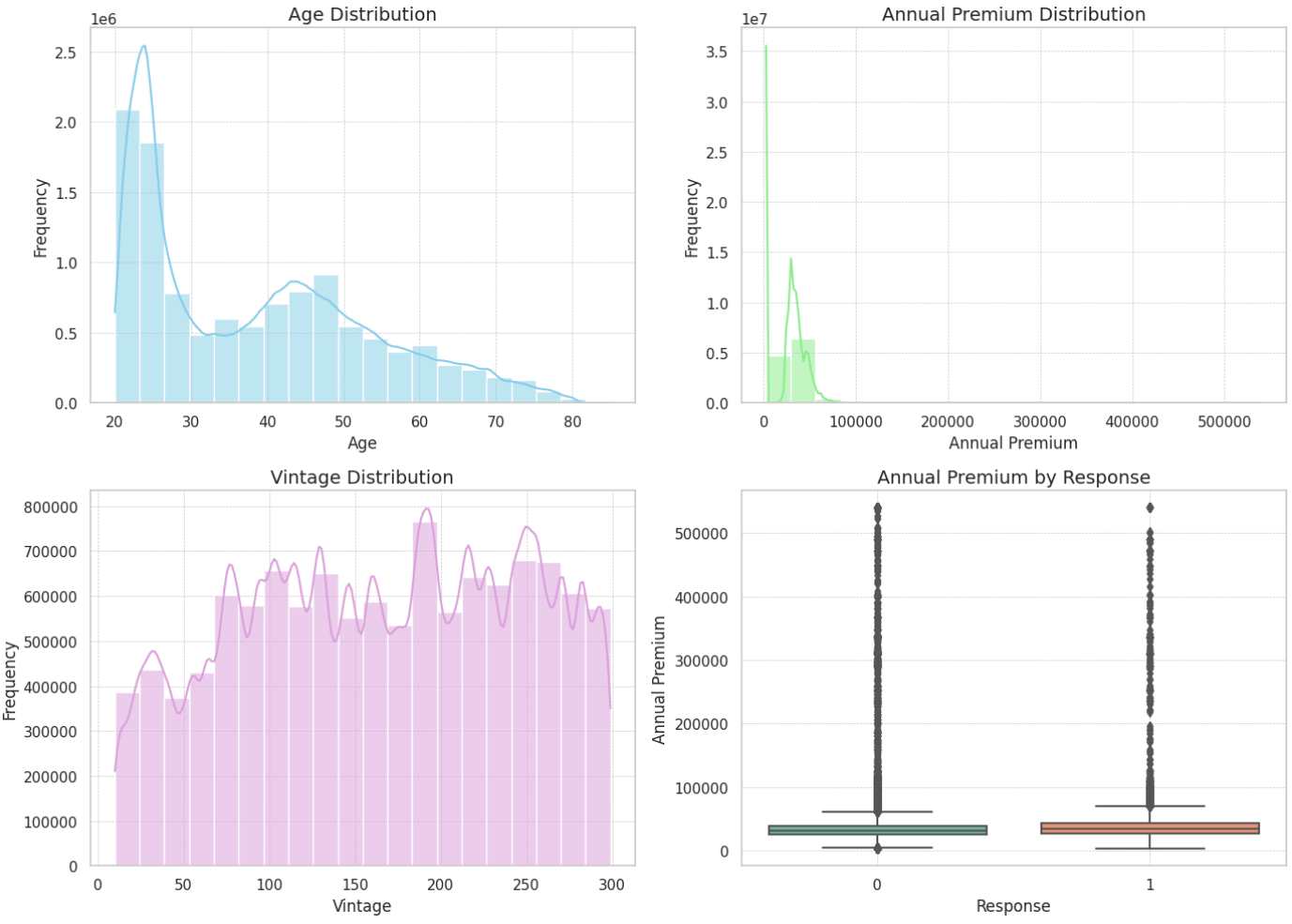
In [ ]:
```
correlation_matrix
```

Out[ ]:

	Gender	Age	Driving_License	Region_Code	Previously_Insured	Vehicle_Age	Vehi
Gender	1.000000	0.157663	-0.018702	-0.000106	-0.087614	0.167354	
Age	0.157663	1.000000	-0.078519	0.037041	-0.276248	0.779041	
Driving_License	-0.018702	-0.078519	1.000000	-0.001329	0.013733	-0.036511	
Region_Code	-0.000106	0.037041	-0.001329	1.000000	-0.022367	0.039242	
Previously_Insured	-0.087614	-0.276248	0.013733	-0.022367	1.000000	-0.396752	
Vehicle_Age	0.167354	0.779041	-0.036511	0.039242	-0.396752	1.000000	
Vehicle_Damage	0.096989	0.287952	-0.015563	0.026468	-0.836214	0.410515	
Annual_Premium	0.010652	0.056327	-0.007300	-0.001741	0.007665	0.028007	
Policy_Sales_Channel	-0.116058	-0.591443	0.042941	-0.037606	0.236838	-0.558992	
Vintage	-0.009535	-0.013293	-0.000697	-0.005537	0.019431	-0.018022	
Response	0.055212	0.122134	0.009197	0.012816	-0.345930	0.231029	

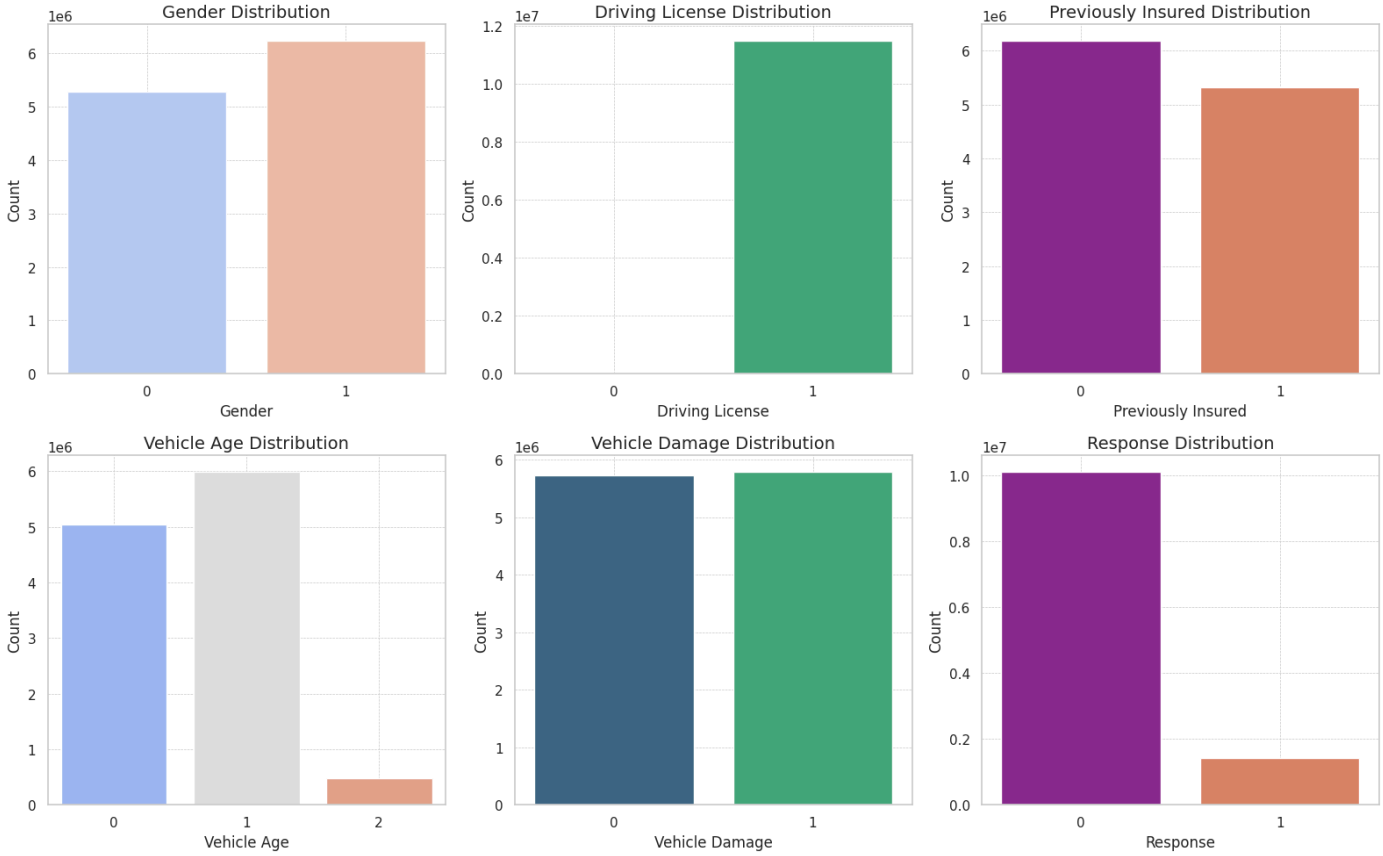
In [ ]:
```
sns.set(style="whitegrid")
plt.figure(figsize=(14, 10))

# Subplot 1: Age Distribution
plt.subplot(2, 2, 1)
sns.histplot(df_train['Age'], bins=20, kde=True, color='skyblue')
plt.title('Age Distribution', fontsize=14)
plt.xlabel('Age', fontsize=12)
plt.ylabel('Frequency', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)
```

```
# Subplot 2: Annual Premium Distribution
plt.subplot(2, 2, 2)
sns.histplot(df_train['Annual_Premium'], bins=20, kde=True, color='lightgreen')
plt.title('Annual Premium Distribution', fontsize=14)
plt.xlabel('Annual Premium', fontsize=12)
plt.ylabel('Frequency', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 3: Vintage Distribution
plt.subplot(2, 2, 3)
sns.histplot(df_train['Vintage'], bins=20, kde=True, color='plum')
plt.title('Vintage Distribution', fontsize=14)
plt.xlabel('Vintage', fontsize=12)
plt.ylabel('Frequency', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 4: Annual Premium by Response
plt.subplot(2, 2, 4)
sns.boxplot(x='Response', y='Annual_Premium', data=df_train, palette='Set2')
plt.title('Annual Premium by Response', fontsize=14)
plt.xlabel('Response', fontsize=12)
plt.ylabel('Annual Premium', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Adjusting the layout to prevent overlap
plt.tight_layout()
plt.show()
```

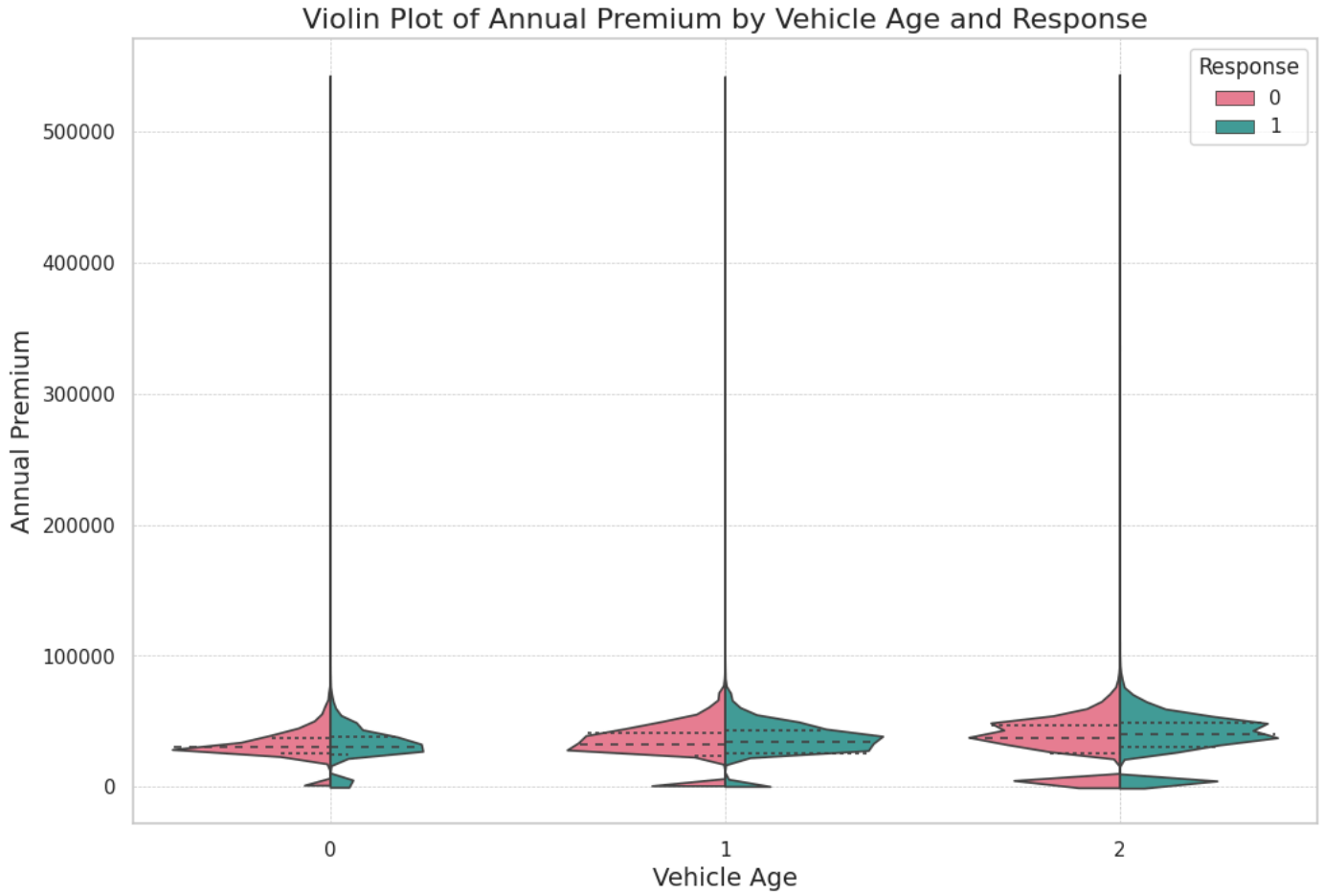


In [ ]:
```
sns.set(style="whitegrid")
plt.figure(figsize=(16, 10))
```

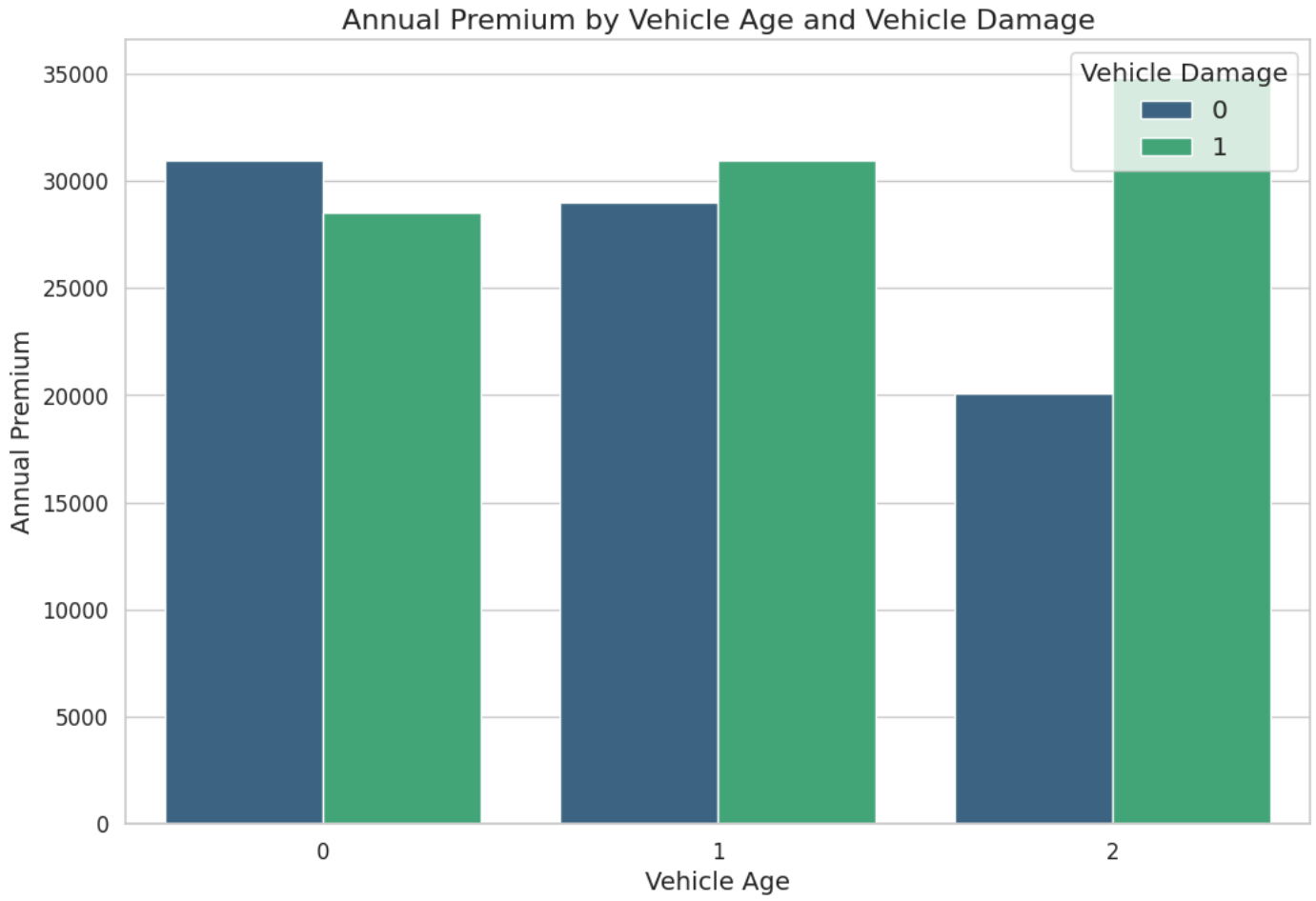
```
# Subplot 1: Gender Distribution
plt.subplot(2, 3, 1)
sns.countplot(x='Gender', data=df_train, palette='coolwarm')
plt.title('Gender Distribution', fontsize=14)
plt.xlabel('Gender', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 2: Driving License Distribution
plt.subplot(2, 3, 2)
sns.countplot(x='Driving_License', data=df_train, palette='viridis')
plt.title('Driving License Distribution', fontsize=14)
plt.xlabel('Driving License', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 3: Previously Insured Distribution
plt.subplot(2, 3, 3)
sns.countplot(x='Previously_Insured', data=df_train, palette='plasma')
plt.title('Previously Insured Distribution', fontsize=14)
plt.xlabel('Previously Insured', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 4: Vehicle Age Distribution
plt.subplot(2, 3, 4)
sns.countplot(x='Vehicle_Age', data=df_train, palette='coolwarm')
plt.title('Vehicle Age Distribution', fontsize=14)
plt.xlabel('Vehicle Age', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 5: Vehicle Damage Distribution
plt.subplot(2, 3, 5)
sns.countplot(x='Vehicle_Damage', data=df_train, palette='viridis')
plt.title('Vehicle Damage Distribution', fontsize=14)
plt.xlabel('Vehicle Damage', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

# Subplot 6: Response Distribution
plt.subplot(2, 3, 6)
sns.countplot(x='Response', data=df_train, palette='plasma')
plt.title('Response Distribution', fontsize=14)
plt.xlabel('Response', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)

plt.tight_layout()
plt.show()
```



In [ ]:
```
sns.set(style="whitegrid")
plt.figure(figsize=(12, 8))
sns.violinplot(x='Vehicle_Age', y='Annual_Premium', data=df_train, hue='Response', split=True,
               palette='husl', inner='quartile', linewidth=1.2)
plt.title('Violin Plot of Annual Premium by Vehicle Age and Response', fontsize=16)
plt.xlabel('Vehicle Age', fontsize=14)
plt.ylabel('Annual Premium', fontsize=14)
plt.grid(True, linestyle='--', linewidth=0.5)
plt.show()
```



In [ ]:
```
sns.set(style="whitegrid")
plt.figure(figsize=(12, 8))
sns.barplot(x='Vehicle_Age', y='Annual_Premium', hue='Vehicle_Damage', data=df_train, palette='viridi
plt.title('Annual Premium by Vehicle Age and Vehicle Damage', fontsize=16)
plt.xlabel('Vehicle Age', fontsize=14)
plt.ylabel('Annual Premium', fontsize=14)
plt.xticks(fontsize=12)
plt.yticks(fontsize=12)
plt.legend(title='Vehicle Damage', title_fontsize='large', fontsize='large')
plt.show()
```



In [ ]:
```
df_train.head()
```

Out[ ]:

	Gender	Age	Driving_License	Region_Code	Previously_Insured	Vehicle_Age	Vehicle_Damage	Annual_Prem
0	1	21	1	35	0	1	1	651
1	1	43	1	28	0	2	1	589
2	0	25	1	14	1	0	0	380
3	0	35	1	1	0	1	1	26
4	0	36	1	15	1	1	0	319

In [ ]:
```
def feature_engineering(df):

    df['Age_Vehicle_Age'] = df['Age'] * df['Vehicle_Age']
    df['Age_Previously_Insured'] = df['Age'] * df['Previously_Insured']
    df['Vehicle_Age_Damage'] = df['Vehicle_Age'] * df['Vehicle_Damage']
    df['Previously_Insured_Damage'] = df['Previously_Insured'] * df['Vehicle_Damage']
    df['Age_squared'] = df['Age'] ** 2
    df['Vehicle_Age_squared'] = df['Vehicle_Age'] ** 2
    df['Annual_Premium_per_Age'] = df['Annual_Premium'] / (df['Age'] + 1)
    return df
```

In [ ]:
```
df_train = feature_engineering(df_train)
df_test = feature_engineering(df_test)
```

In [ ]:
```
df_train.dtypes
```

Out[ ]:
```
Gender                          int64
Age                             int64
Driving_License                 int64
Region_Code                     int64
Previously_Insured              int64
Vehicle_Age                     int64
Vehicle_Damage                  int64
Annual_Premium                float64
Policy_Sales_Channel            int64
Vintage                         int64
Response                        int64
Age_Vehicle_Age                 int64
Age_Previously_Insured          int64
Vehicle_Age_Damage              int64
Previously_Insured_Damage       int64
Age_squared                     int64
Vehicle_Age_squared             int64
Annual_Premium_per_Age        float64
dtype: object
```

In [ ]:
```
df_train.shape
```

Out[ ]:
```
(11504798, 18)
```

In [ ]:
```
df_test.shape
```

Out[ ]:
```
(7669866, 17)
```

In [ ]:
```
y = df_train['Response']
X = df_train.drop(['Response'],axis=1)
```

Model Building | Model Evaluation *Training* | Classification

In [ ]:
```
train_X, test_X, train_y, test_y = train_test_split(X, y,test_size = 0.2, random_state =41)
```

🎆 🌭 Regression Analysis ♒ 🌊

In [ ]:
```
xgb_params = {
    'colsample_bytree': 0.48,
    'learning_rate': 0.01567,
```

```
    'max_depth': 10,
    'min_child_weight': 6,
    'max_bin': 3500,
    'n_estimators': 3000,
    'eval_metric': 'auc'
    }
```

In [ ]:
```
model=XGBRegressor(**xgb_params)
XGB=model.fit(train_X,train_y)
prediction=XGB.predict(test_X)
```

In [ ]:
```
test_pred = XGB.predict(df_test)
```

In [ ]:
```
sample_submission
```

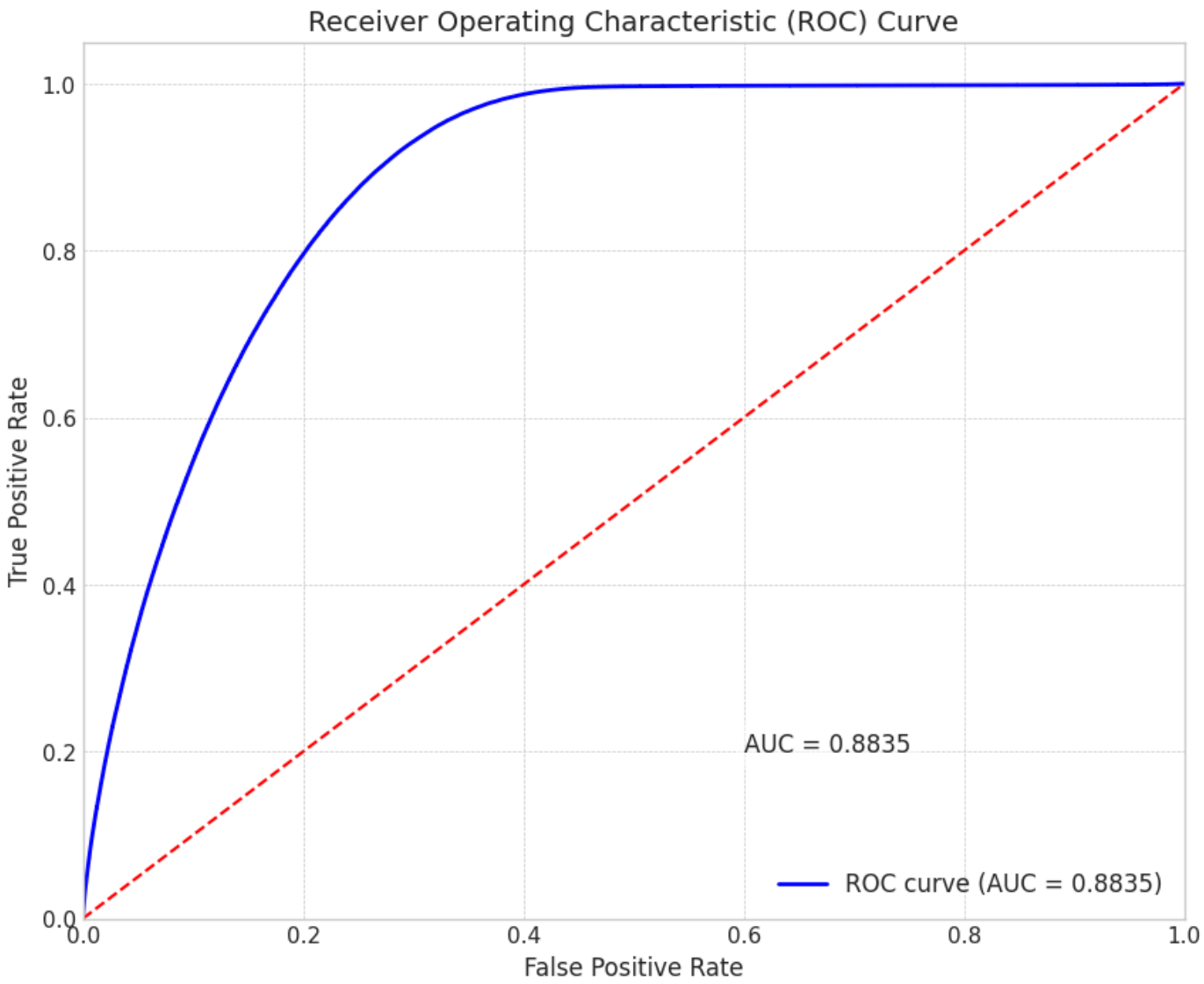
Out[ ]:

	id	Response
0	11504798	0.5
1	11504799	0.5
2	11504800	0.5
3	11504801	0.5
4	11504802	0.5
...	...	...
7669861	19174659	0.5
7669862	19174660	0.5
7669863	19174661	0.5
7669864	19174662	0.5
7669865	19174663	0.5

7669866 rows × 2 columns

In [ ]:
```
sample_submission.Response= test_pred
```

In [ ]:
```
test_pred = XGB.predict(test_X)
fpr, tpr, thresholds = roc_curve(test_y, test_pred)
auc = roc_auc_score(test_y, test_pred)

plt.figure(figsize=(10, 8))
plt.style.use('seaborn-whitegrid')
plt.plot(fpr, tpr, color='blue', lw=2, label='ROC curve (AUC = %0.4f)' % auc)
plt.plot([0, 1], [0, 1], color='red', linestyle='--')
plt.xlim([0.0, 1.0])
plt.ylim([0.0, 1.05])
plt.xlabel('False Positive Rate', fontsize=12)
plt.ylabel('True Positive Rate', fontsize=12)
plt.title('Receiver Operating Characteristic (ROC) Curve', fontsize=14)
plt.text(0.6, 0.2, f'AUC = {auc:.4f}', fontsize=12, bbox=dict(facecolor='white', alpha=0.5))
plt.legend(loc='lower right', fontsize=12)
plt.grid(True, linestyle='--', linewidth=0.5)
plt.show()
```



In [ ]:
```
sample_submission.to_csv('XGB_submission.csv', index = False)
pd.read_csv('XGB_submission.csv')
```

Out[ ]:

	id	Response
0	11504798	-0.010802
1	11504799	0.472721
2	11504800	0.245270
3	11504801	0.003398
4	11504802	0.118081
...	...	...
7669861	19174659	0.187156
7669862	19174660	-0.001677
7669863	19174661	0.001568
7669864	19174662	0.622429
7669865	19174663	-0.000309

7669866 rows × 2 columns

In [ ]: