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import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
file_path = 'greendestination (1) (1).csv'
df = pd.read_csv(file_path)

# Calculate the attrition rate
total_employees = df.shape[0]
attrition_count = df[df['Attrition'] == 'Yes'].shape[0]
attrition_rate = (attrition_count / total_employees) * 100
print(f"Attrition Rate: {attrition_rate:.2f}%")

# Visualize the distribution of Age, Years at Company, and Monthly Income based on Attrition
fig, axes = plt.subplots(3, 1, figsize=(10, 18))

# Age distribution
sns.histplot(data=df, x='Age', hue='Attrition', multiple='stack', ax=axes[0])
axes[0].set_title('Age Distribution by Attrition')
axes[0].set_xlabel('Age')
axes[0].set_ylabel('Count')

# Years at Company distribution
sns.histplot(data=df, x='YearsAtCompany', hue='Attrition', multiple='stack', ax=axes[1])
axes[1].set_title('Years at Company Distribution by Attrition')
axes[1].set_xlabel('Years at Company')
axes[1].set_ylabel('Count')

# Monthly Income distribution
sns.histplot(data=df, x='MonthlyIncome', hue='Attrition', multiple='stack', ax=axes[2])
axes[2].set_title('Monthly Income Distribution by Attrition')
axes[2].set_xlabel('Monthly Income')
axes[2].set_ylabel('Count')

plt.tight_layout()
plt.show()

# Analyze the relationship between Age, Years at Company, Monthly Income and Attrition using boxplots
fig, axes = plt.subplots(3, 1, figsize=(10, 18))

# Age vs Attrition
sns.boxplot(data=df, x='Attrition', y='Age', ax=axes[0])
axes[0].set_title('Age vs Attrition')
axes[0].set_xlabel('Attrition')
axes[0].set_ylabel('Age')

# Years at Company vs Attrition
sns.boxplot(data=df, x='Attrition', y='YearsAtCompany', ax=axes[1])
axes[1].set_title('Years at Company vs Attrition')
axes[1].set_xlabel('Attrition')
axes[1].set_ylabel('Years at Company')

# Monthly Income vs Attrition

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sns.boxplot(data=df, x='Attrition', y='MonthlyIncome', ax=axes[2])
axes[2].set_title('Monthly Income vs Attrition')
axes[2].set_xlabel('Attrition')
axes[2].set_ylabel('Monthly Income')

plt.tight_layout()
plt.show()

# Further analysis using correlation heatmap
correlation = df[['Age', 'YearsAtCompany', 'MonthlyIncome', 'Attrition']].copy()
correlation['Attrition'] = correlation['Attrition'].apply(lambda x: 1 if x == 'Yes'
else 0)

plt.figure(figsize=(10, 8))
sns.heatmap(correlation.corr(), annot=True, cmap='coolwarm', vmin=-1, vmax=1)
plt.title('Correlation Heatmap')
plt.show()
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