**1. Model Performance Comparison**

Python code:

import matplotlib.pyplot as plt

import numpy as np

models = ['CatBoost', 'Random Forest', 'SVM']

metrics = {

'Accuracy': [0.94, 0.91, 0.87],

'Precision': [0.93, 0.90, 0.85],

'Recall': [0.92, 0.89, 0.83],

'F1-Score': [0.92, 0.89, 0.84]

}

x = np.arange(len(models))

width = 0.2

colors = ['#4e79a7', '#f28e2b', '#e15759', '#76b7b2']

fig, ax = plt.subplots(figsize=(12,6))

for i, (metric, values) in enumerate(metrics.items()):

ax.bar(x + i\*width, values, width, label=metric, color=colors[i])

ax.set\_xlabel('Models')

ax.set\_ylabel('Scores')

ax.set\_title('Sleep Disorder Prediction Performance', pad=20)

ax.set\_xticks(x + width\*1.5)

ax.set\_xticklabels(models)

ax.legend(bbox\_to\_anchor=(1.05, 1))

ax.grid(axis='y', linestyle='--', alpha=0.7)

plt.tight\_layout()

plt.show()

**2. Lifestyle Factor Importance**

Python code:

factors = ['Sleep Duration', 'Physical Activity', 'Stress Level',

'BMI', 'Caffeine Intake', 'Screen Time']

importance = [0.31, 0.25, 0.18, 0.12, 0.08, 0.06]

plt.figure(figsize=(10,6))

bars = plt.barh(factors[::-1], importance[::-1], color='#59a14f')

plt.bar\_label(bars, fmt='%.2f', padding=3)

plt.xlabel('Feature Importance Score')

plt.title('Key Lifestyle Factors Affecting Sleep Disorders')

plt.grid(axis='x', linestyle='--', alpha=0.4)

plt.tight\_layout()

plt.show()

**3. Disorder Type Distribution**

Python code:

disorders = ['Insomnia', 'Sleep Apnea', 'Restless Legs', 'None']

counts = [420, 380, 150, 1050]

colors = ['#e15759', '#76b7b2', '#edc948', '#bab0ac']

plt.figure(figsize=(8,8))

explode = (0.1, 0.1, 0.1, 0)

plt.pie(counts, labels=disorders, colors=colors, explode=explode,

autopct=lambda p: f'{p:.1f}%\n({int(p/100\*sum(counts))})',

startangle=90, wedgeprops={'linewidth':1, 'edgecolor':'white'})

plt.title('Distribution of Sleep Disorder Types', pad=20)

plt.show()