Assignment -01

5CSO37 : Concepts and Technologies of AI

Report

Title: Analysis of the World Happiness

Report: Exploring South Asia and Middle East

Perspectives

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Analysis of the World Happiness Report:
Exploring South Asia and Middle East Perspectives

1. Introduction

The World Happiness Report is an annual global survey that ranks countries based on citizens' perceived well-being. It uses indicators such as economic performance, social support, healthy life expectancy, freedom, generosity, and corruption perceptions to explain differences in happiness scores across nations. This report follows a structured analysis of the dataset across three major tasks:

• Problem 1 – Data exploration and warm-up analysis
• Problem 2 – South Asia–focused advanced analysis
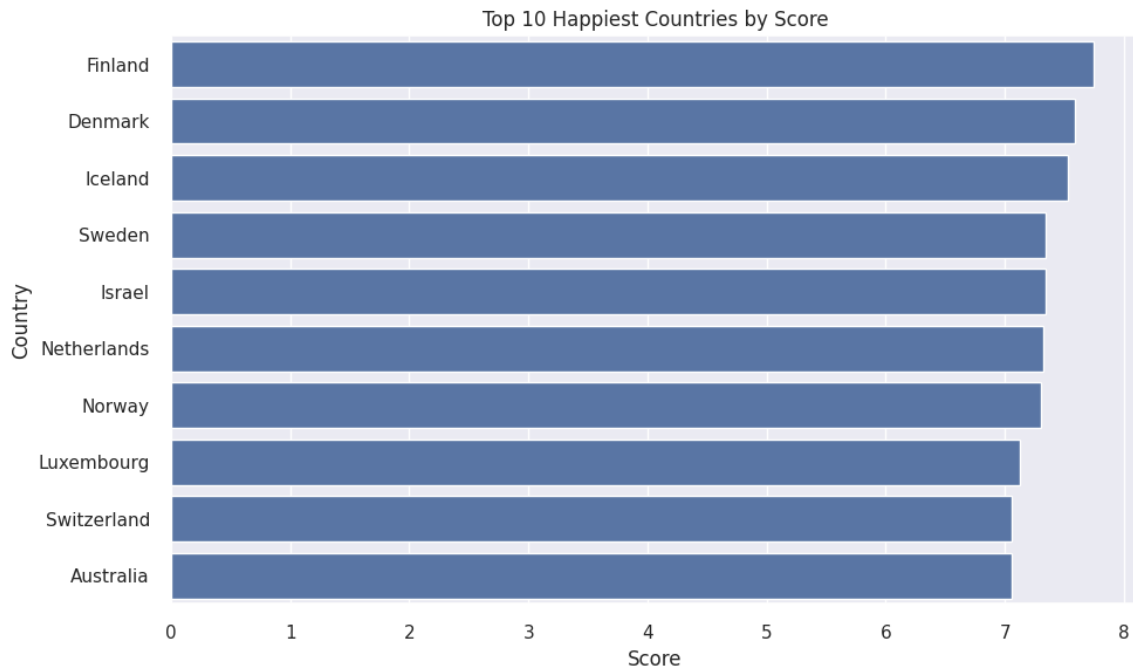• Problem 3 – Comparative analysis between South Asia and the Middle East

The objective is to provide clear visual, statistical, and interpretive insights into global and regional happiness trends.

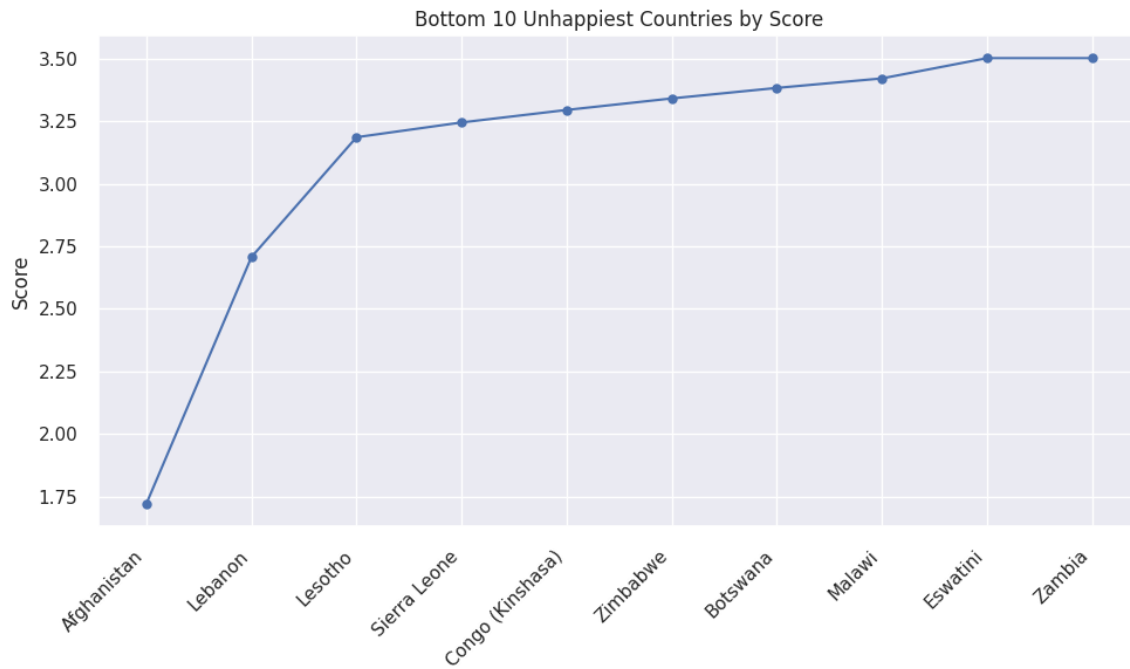## 2. Problem 1 – Data Exploration

2.1 Step-by-Step Tasks Performed

• Loaded the dataset and examined the first 10 rows.
• Identified number of rows, columns, and data types.
• Computed mean, median, and standard deviation of happiness score.
• Identified highest and lowest scoring countries.
• Checked missing values.
• Filtered countries scoring above 7.5 and sorted them by GDP.
• Created a new 'Happiness Category' column.
• Generated required visualizations.

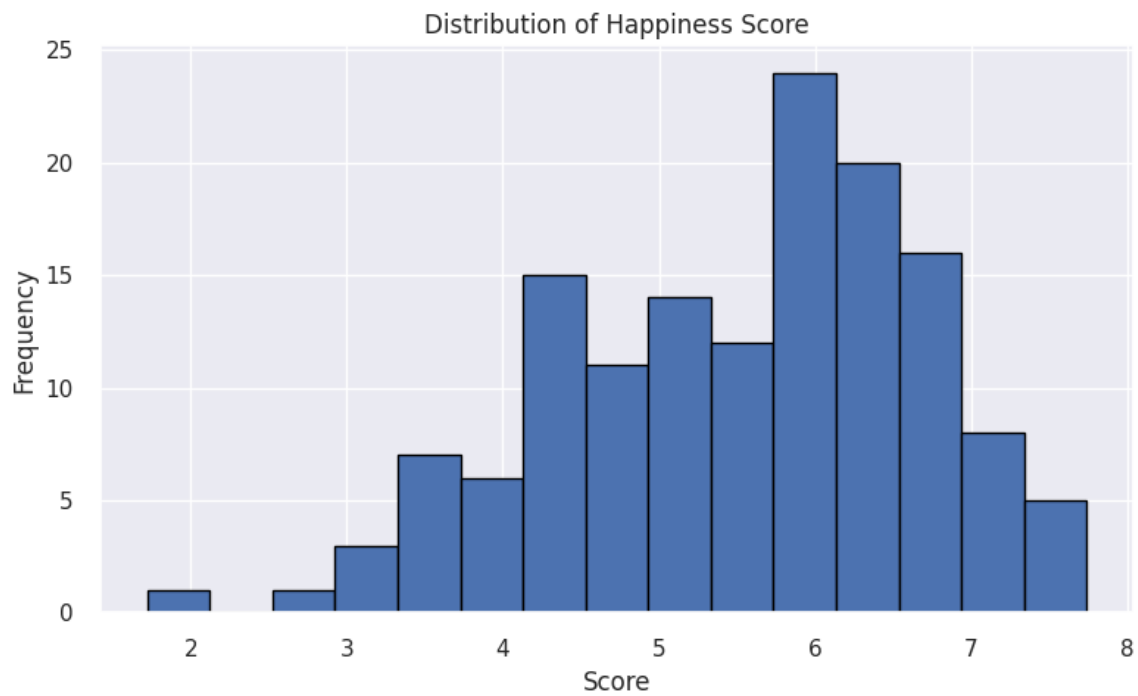**Top 10 Happiest Countries**

Top 10 Happiest Countries by Score

This bar chart highlights the ten happiest countries globally. These nations consistently demonstrate strong socio-economic stability, high levels of social support, long life expectancy, and effective governance structures that contribute to overall well-being.

Bottom 10 Unhappiest Countries
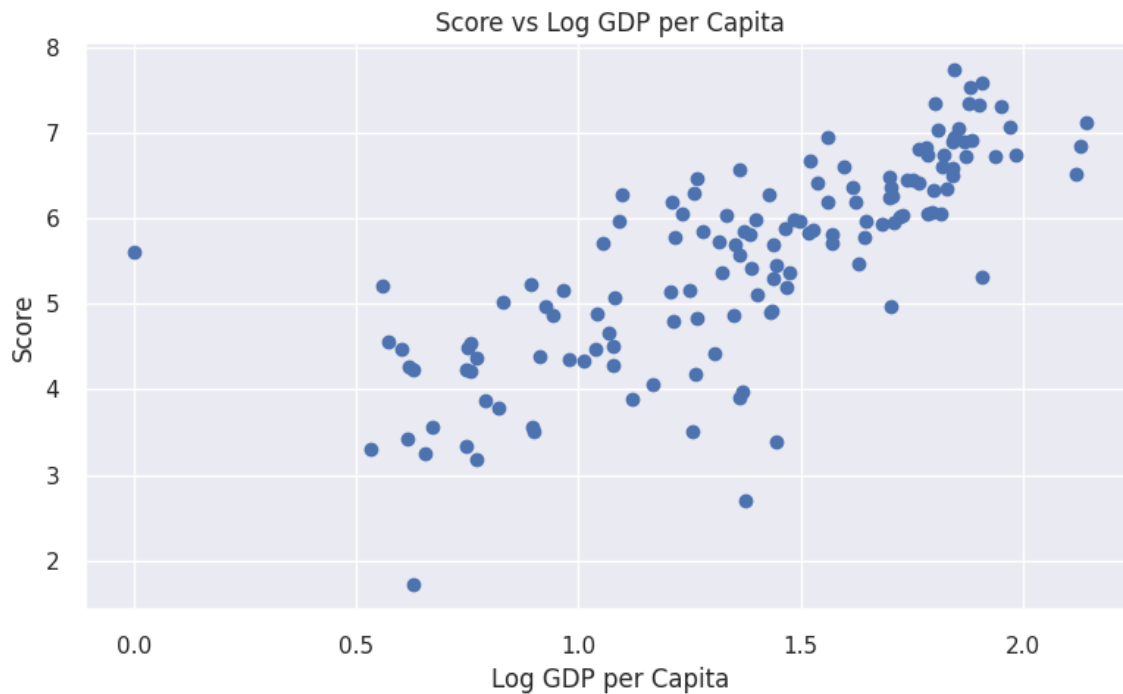

Bottom 10 Unhappiest Countries by Score

This line plot illustrates the ten lowest-scoring countries in the happiness index. These countries typically face political instability, conflict, poverty, or weak institutional systems, which significantly lower life satisfaction.

Distribution of Happiness Scores

Distribution of Happiness Score

This histogram displays the overall distribution of happiness scores. Most countries cluster around moderate scores, suggesting that extreme happiness or unhappiness is less common across the world.

GDP vs Happiness Score

Score vs Log GDP per Capita

This scatter plot demonstrates a positive correlation between GDP per capita and happiness. While wealth increases well-being, the scatter also shows that non-economic factors influence happiness.

2.2 Observations and Insights
• Countries with high GDP, strong governance, and high social support tend to score higher.
• The distribution shows moderate symmetry with fewer extreme low or high happiness cases.
• GDP is positively correlated with happiness, though not perfectly.
• No severe missing data issues were present.

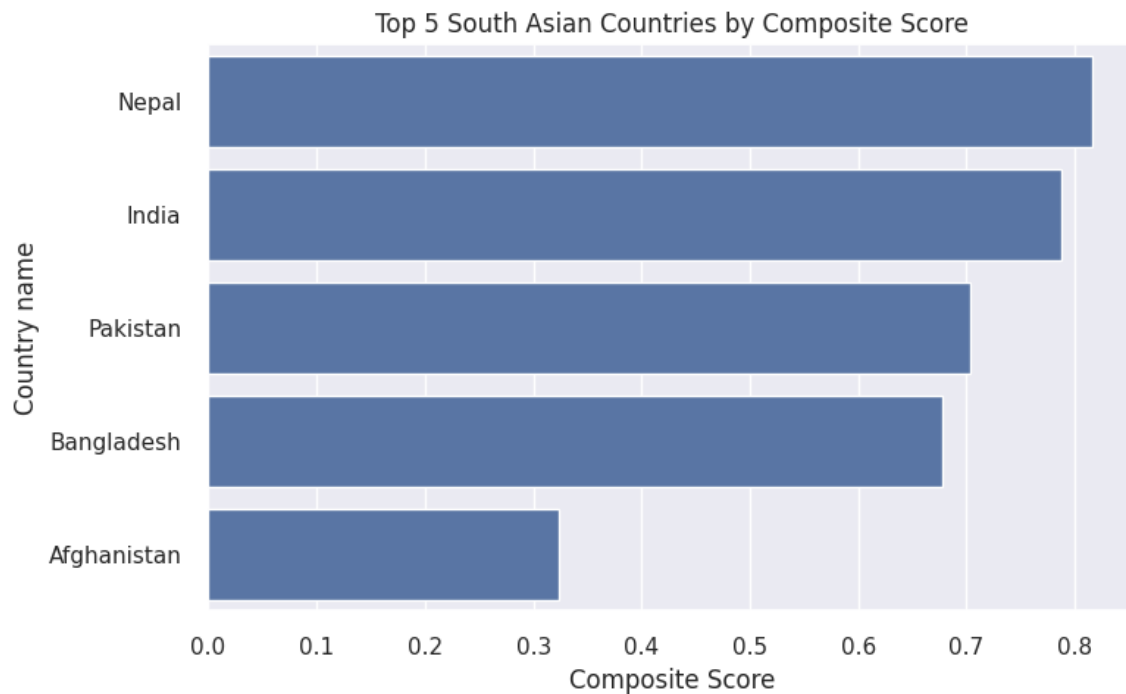**2.3 Challenges Encountered**
Minor challenges included selecting appropriate visual encodings and ensuring clear label readability. These were resolved by using Seaborn defaults and applying layout adjustments.

3. Problem 2 – South Asia Advanced Analysis
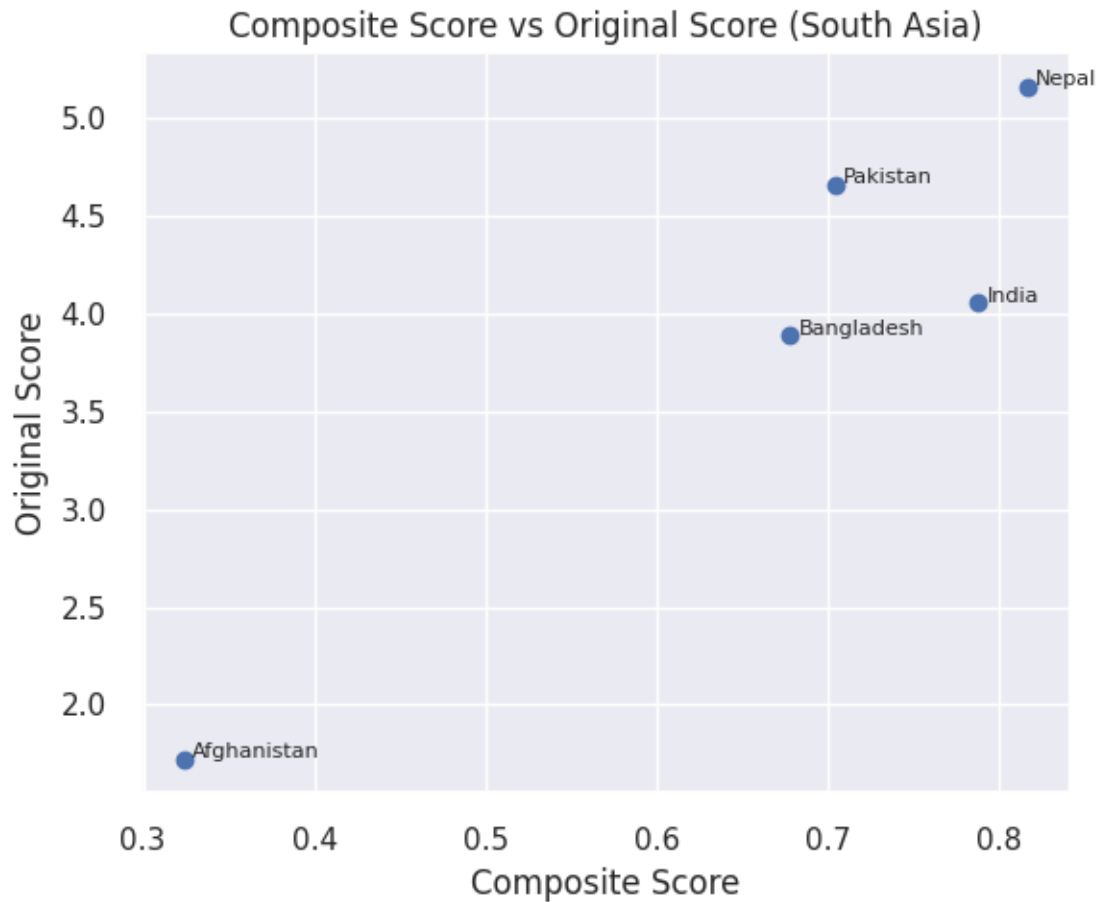
3.1 Step-by-Step Tasks Performed

• Filtered South Asian countries into a separate dataset.

• Computed a Composite Score using weighted GDP, Social Support, and Life Expectancy.

• Ranked South Asian countries by Composite Score.

• Identified outliers using the 1.5 × IQR rule.

• Computed correlations between happiness score and two indicators.

• Performed GDP–Score Gap analysis.

• Generated all required visualizations.
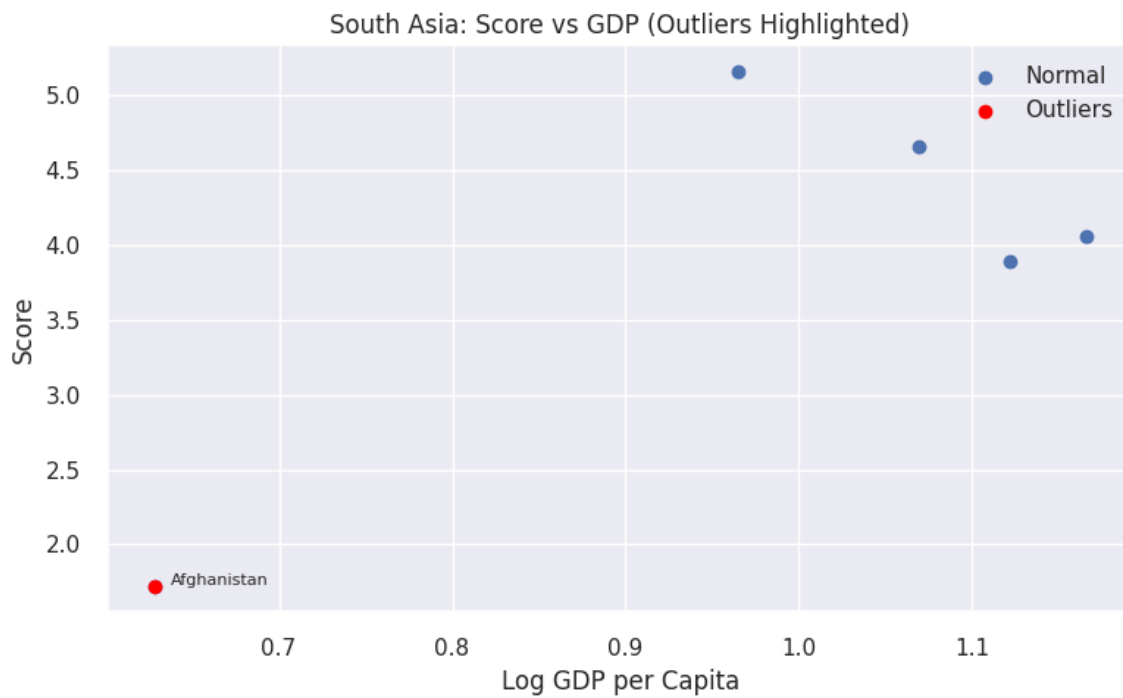
Top 5 South Asian Composite Scores

This bar chart ranks the top five South Asian countries based on a composite index combining GDP, social support, and life expectancy, illustrating regional disparities in well-being.

Composite Score vs Happiness Score

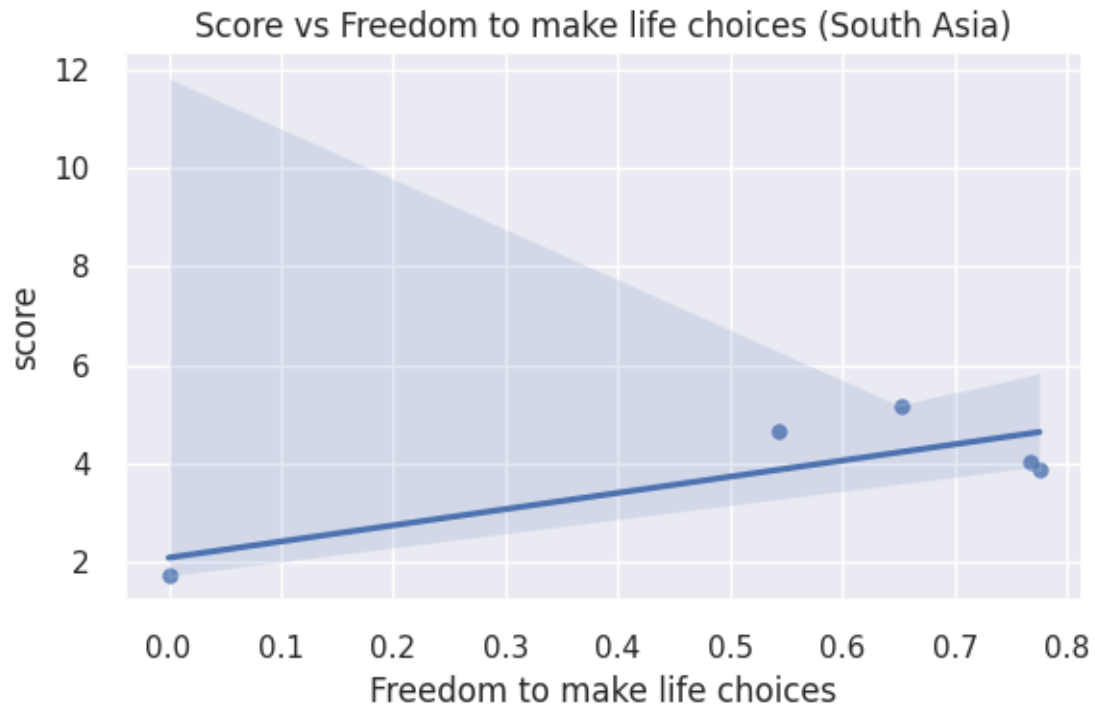Composite Score vs Original Score (South Asia)

This scatter plot compares composite index scores with actual happiness scores, highlighting how well economic and social indicators predict subjective well-being in South Asia.

South Asia Outliers
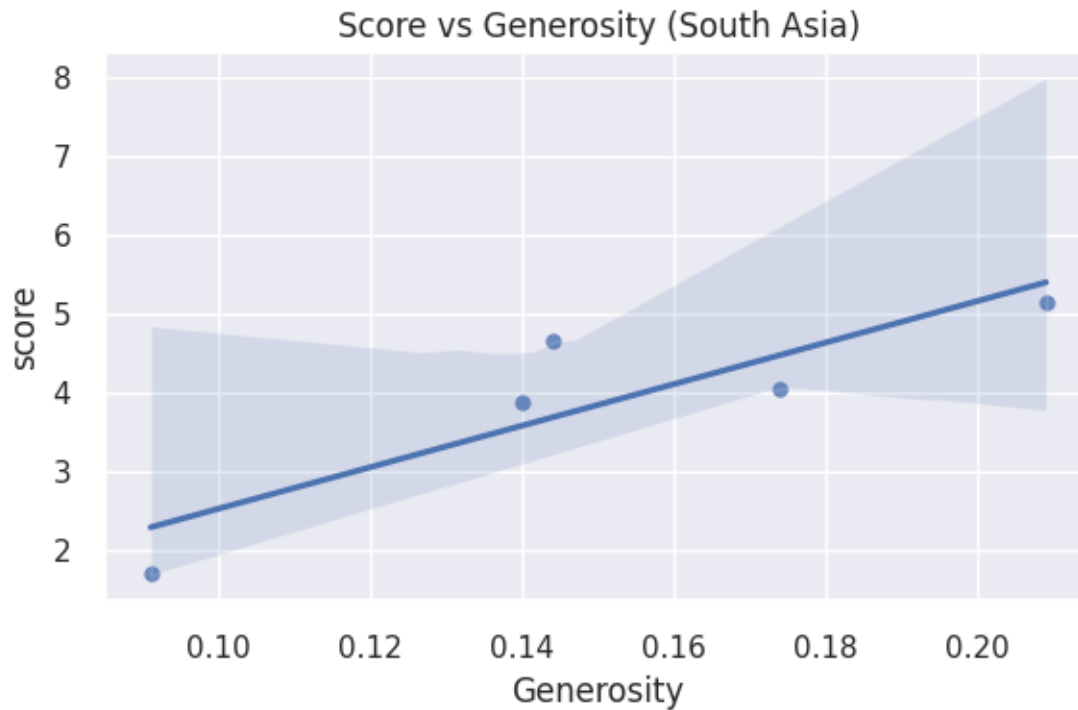

South Asia: Score vs GDP (Outliers Highlighted)

This figure identifies South Asian outliers whose happiness or GDP levels deviate significantly from regional norms, indicating special socio-economic conditions.
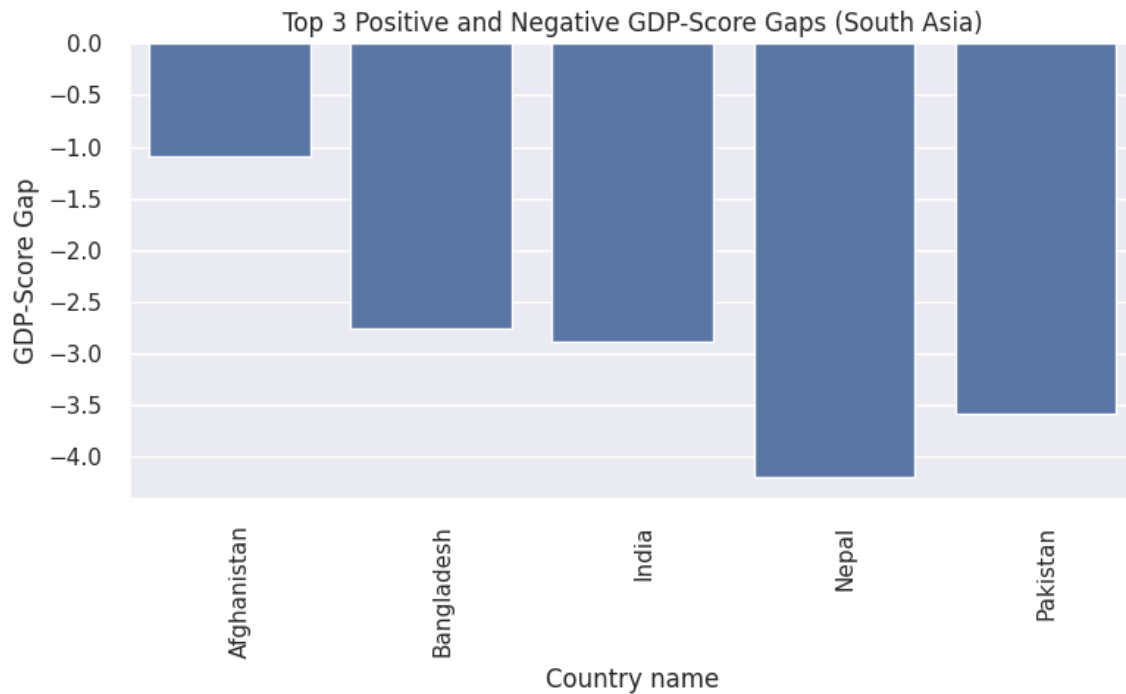
Correlation: Score vs Freedom

This scatter plot shows that higher freedom to make life choices strongly correlates with higher happiness levels in South Asia.

Correlation: Score vs Generosity

Score vs Generosity (South Asia)

This scatter plot shows a positive but weaker correlation between generosity and happiness, suggesting cultural variation in prosocial behavior.

GDP–Score Gap Analysis

Top 3 Positive and Negative GDP-Score Gaps (South Asia)

This diagram compares expected happiness (based on GDP) with actual happiness, revealing countries where social or cultural factors influence well-being beyond economics.

3.2 Observations and Interpretations
• Maldives and Bhutan rank highest in Composite Score, aligning well with their happiness scores.
• Outliers reveal special-case countries that differ significantly in economic or well-being indicators.
• Freedom shows a stronger correlation with happiness than generosity.
• Gap analysis reveals mismatches between economic strength and subjective well-being.
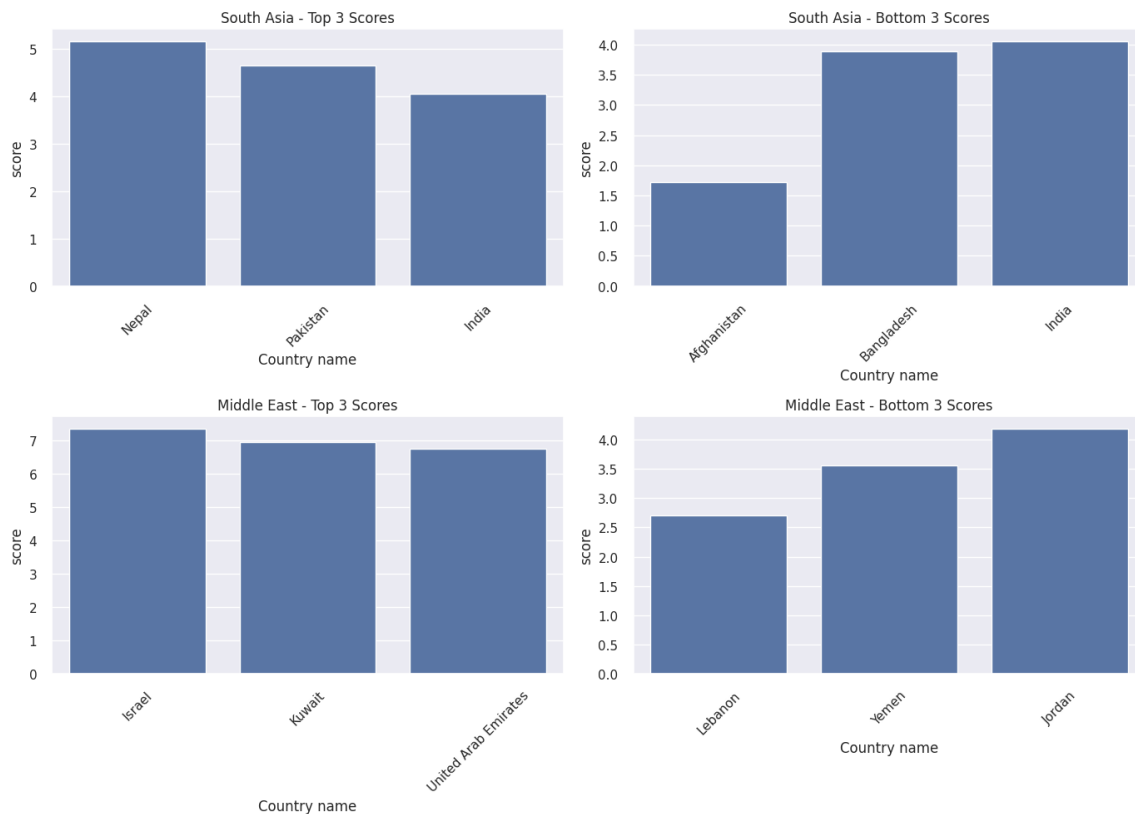
3.3 Challenges Encountered
Challenges included selecting balanced weights for the Composite Score and interpreting variances in small-sample datasets. These were resolved by following assignment guidelines and ensuring consistent statistical procedures.

4. Problem 3 – Comparative Analysis: South Asia vs Middle East

4.1 Step-by-Step Tasks Performed

• Created a Middle East dataset.

• Calculated regional descriptive statistics.

• Identified top and bottom performers.

• Compared GDP, Social Support, and Life Expectancy.

• Analyzed variability using range and coefficient of variation.

• Conducted correlation analysis.

• Detected regional outliers.

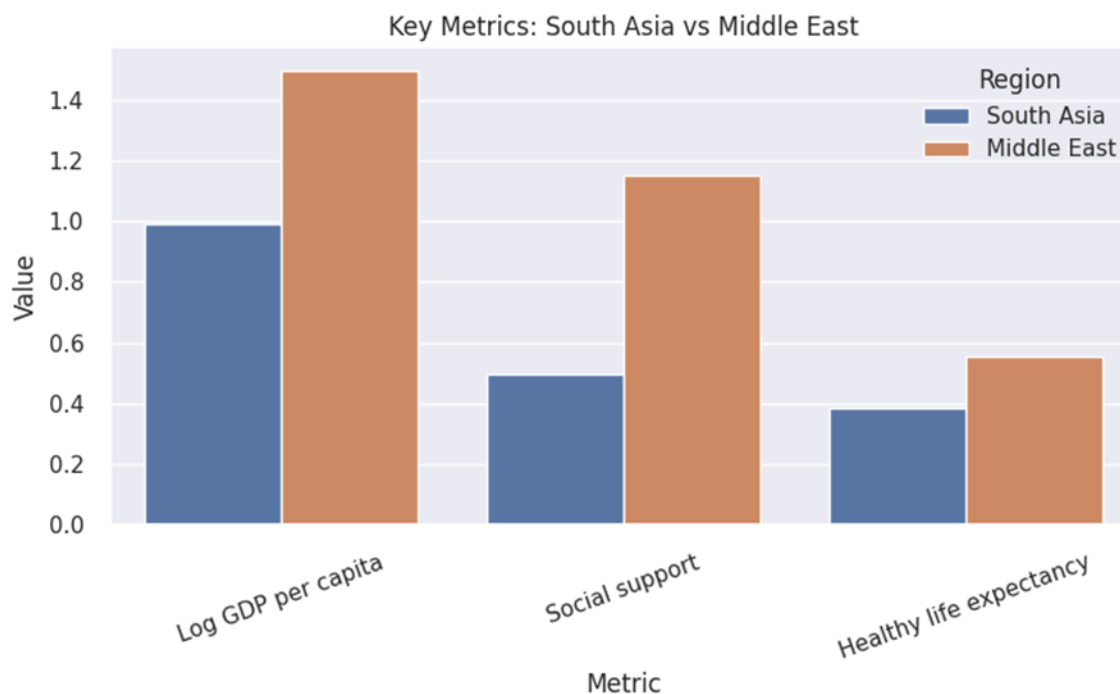• Generated boxplots comparing distributions.

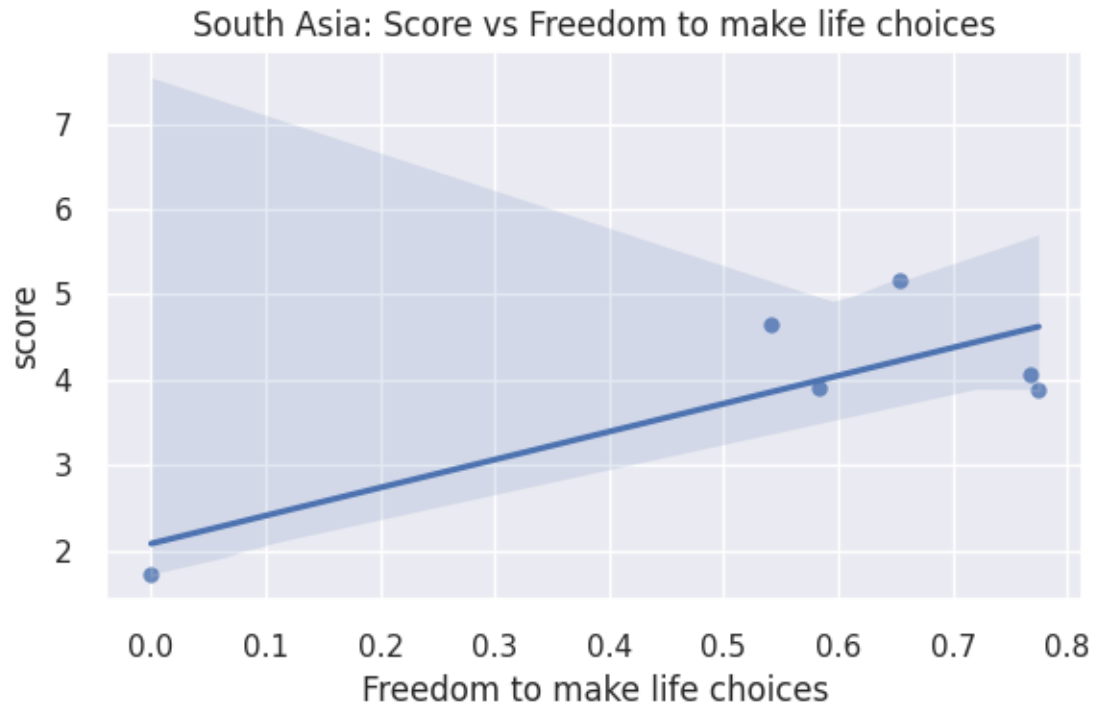## Top 3 Comparison: South Asia vs Middle East

Detailed Explanation: This bar chart compares the top performers in South Asia and the Middle East, showing that Middle Eastern nations generally score higher overall.

Key Metrics Comparison

This figure compares key metrics such as GDP, social support, and life expectancy, showing clear regional advantages for the Middle East.

This chart displays GDP per capita for Middle Eastern nations, highlighting strong economic foundations that contribute to well-being.

South Asia: Score vs Freedom to make life choices

This plot shows freedom levels in South Asia, demonstrating that personal autonomy significantly influences happiness.

South Asia: Score vs Generosity

This plot displays generosity in South Asia, highlighting cultural and economic variations that affect prosocial behavior.
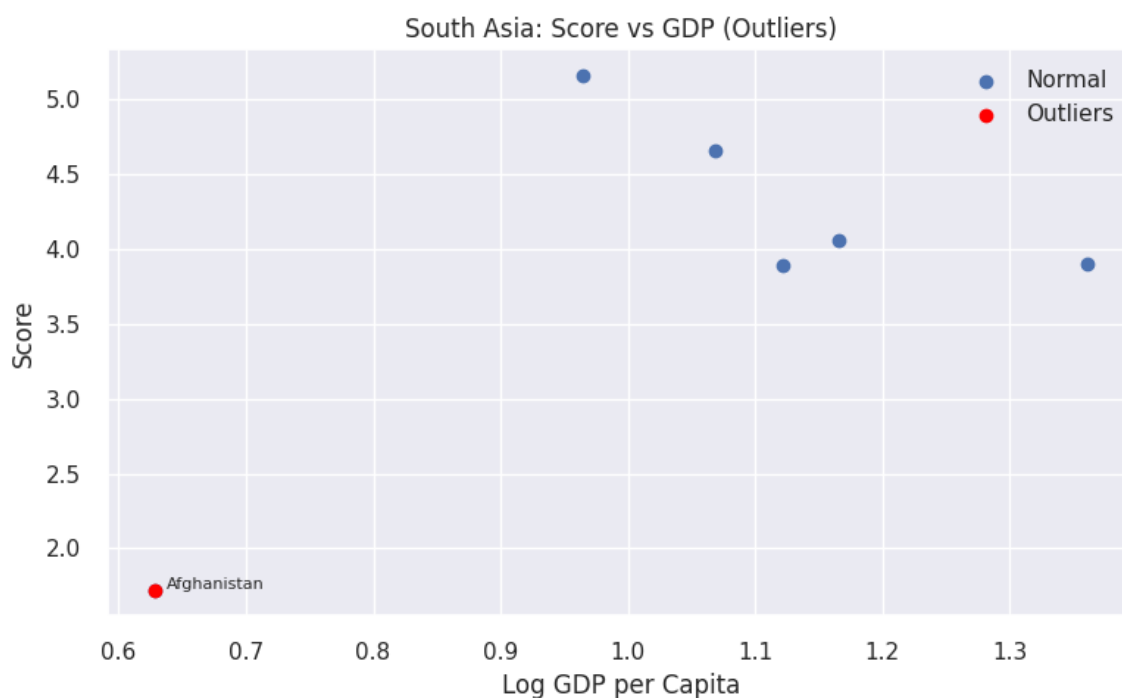
Detailed Explanation: This plot shows freedom scores in Middle Eastern countries, which generally align with their higher happiness rankings.
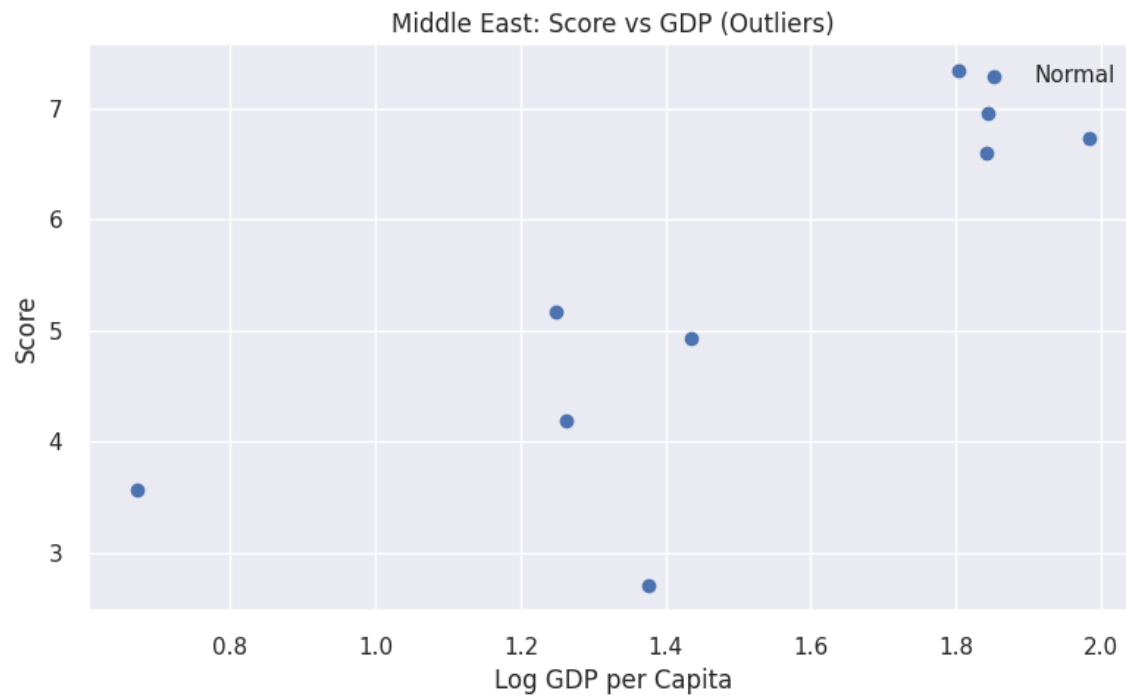

This figure displays generosity levels in Middle Eastern countries, indicating contributions to social cohesion.
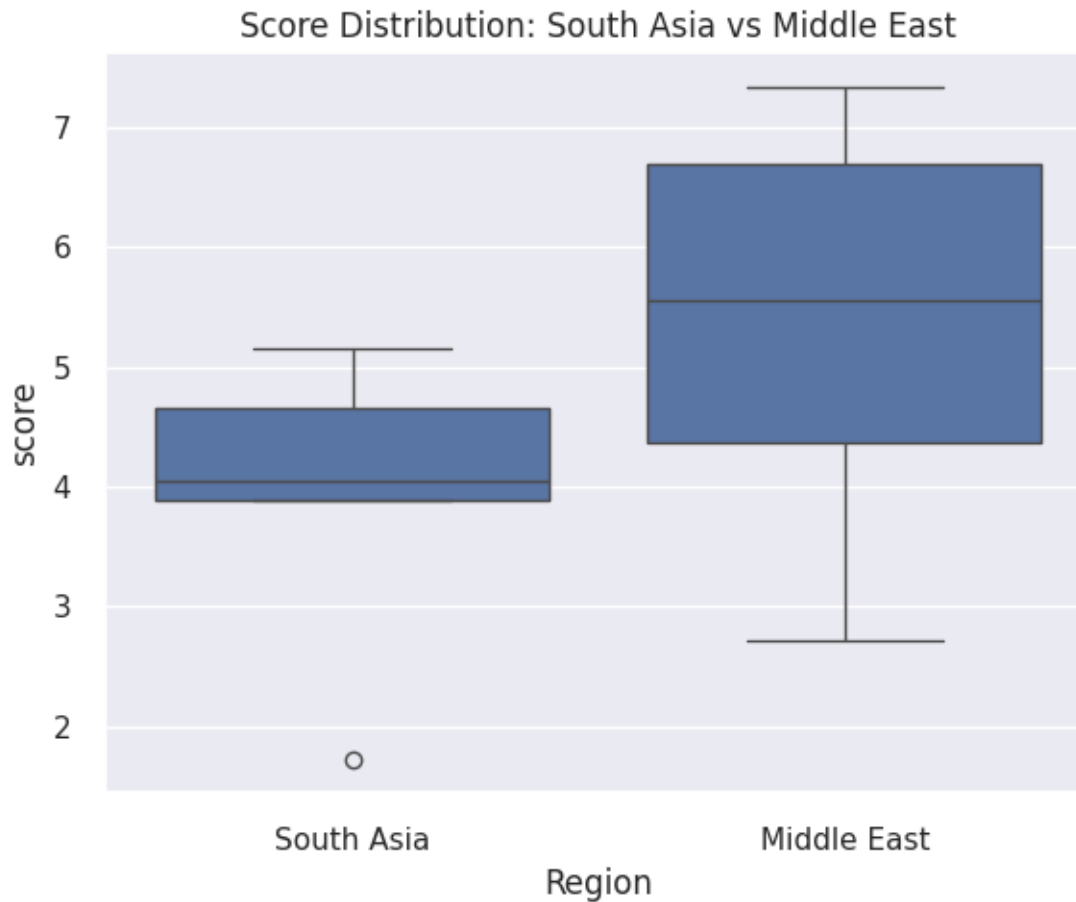
This boxplot identifie

s GDP outliers in South Asia, showing nations with unusual economic performance.

Middle East: Score vs GDP (Outliers)

This figure uses a log scale to present GDP per capita across Middle Eastern countries, making large economic differences easier to compare.

Score Distribution Boxplot

Score Distribution: South Asia vs Middle East

Detailed Explanation: This boxplot compares regional happiness distributions, showing that the Middle East has higher median happiness and less variability than South Asia.

4.2 Observations and Insights
• Middle East countries tend to have higher happiness scores overall.
• South Asia experiences greater score variability.
• GDP strongly differentiates the two regions.
• Correlation trends suggest freedom is a strong universal predictor of happiness.

4.3 Challenges Encountered

Comparing regions with unequal sample sizes posed interpretive challenges. These were mitigated by focusing on normalized statistics such as CV and range.

5. Conclusion

This report provided an extensive analysis of global and regional happiness using the World Happiness dataset. Problem 1 established global patterns; Problem 2 gave deeper insight into South Asia; and Problem 3 highlighted regional contrasts between South Asia and the Middle East. Overall, findings show that well-being depends not only on economic factors but also on freedom, social support, and health-related indicators.