5CS037 - Concepts and Technologies of AI

Individual coursework

Assessment – 1Statisitical Interpretation and Exploratory Data Analysis

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

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Abstract

The report highlights happiness trends worldwide, with detailed analyses on South Asia and Mideast. The happiness scores are investigated based on GDP per capita, social support, and life expectancy at birth. The analyses delve into outliers and regional variations through measures of central tendency and visualization. The results bring to light some main economic and social determinants of happiness in these regions. Such information could assist policymakers to tackle regional inequalities and design interventions with an eye towards well-being.

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Introduction

1.1Overview

- Global ranking of countries in happiness scores of the 82nd report is done using several indicators.

- These comprise GDP per capita, social support, healthy life expectancy, freedom, generosity, and perceived corruption.

- This analysis aims to explore the dataset with a specific look into South Asia and the Middle East to discover developing patterns, differences between countries and regions, and their regional interpretations.

1.2Objectives

1. Data exploratory to analyze global trends should be performed.

2. South Asian countries to analyze, composite scores to be computed, and outliers to be detected..

3. Comparison of happiness metrics between South Asia and the Middle East to demonstrate disparities and correlations.

1.3Report Sections

Problem 1: Data Exploration

Tasks Performed

1. **Dataset Overview**

- Loaded the dataset and displayed the first 10 rows.

  Identified the dataset dimensions, column names, and data types.

2. **Basic Statistics**

- Calculated mean, median, and standard deviation of the Score column.
- Identified countries with the highest and lowest happiness scores.

3. **Missing Values**

- Checked for missing data and summarized findings.

4. **Filtering and Sorting**

- Filtered countries with Score > 7.5 and sorted by GDP per capita.

5. **Data Visualization**

- Visualized key trends using the creation of bar, line, histogram, and scatter plots.

1.4Key Insights

• A nation having high GDP per capita shows obviously high happy score.

•More countries were observed to have lower scores, and thus the histogram was slightly right- skewed.

•Scatter plots illustrated a strong relation between GDP per capita and happiness scores.

Problem 2: South Asia Analysis

2.1Tasks Performed

1. **Data Preparation**

- Filtered the dataset for South Asian countries.

2. **Composite Score Calculation**

- Obtained composite scoring using weighted measures: GDP per capita 40%, social support 30%, and healthy life expectancy 30% respectively. o Based on the composite scores, they rank the countries.

3. **Outlier Detection**

- Then apply an outlier detection on Score and GDP per capita using the IQR rule. o They necessarily visualize these outliers across scatter plots.

4. **Correlation Analysis**

- Calculated Pearson correlation of Freedom to Make Life Choices and Generosity with Score.
- Visualized the relationships through scatter plots along with trendlines.

5. **Gap Analysis**

- Analyzed GDP-Score Gap to identify countries that have significant disparities.

2.1Key Insights

• Composite scores closely approximate original happiness scores for most countries.

•Outliers such as [specific countries] are due to special regional factors.

•Positive correlations were observed for both metrics with happiness scores.

Problem 3: Comparative Analysis

3.1Tasks Performed

1. **Dataset Preparation**

- Filter the dataset for Middle Eastern countries.

2. **Descriptive Statistics**

- Compute the mean and standard deviation for both regions.

3. **Metric Comparisons**

- Compare the GDP per capita, social support, and healthy life expectancy for both regions using grouped bar charts.

4. **Happiness Disparity**

- Calculate the range and coefficient of variation for the happiness scores of both regions.

5. **Outlier Detection**

- Compute outliers for Score and GDP per capita.

6. **Visualization**

- Boxplots comparing the score distribution between the two regions.

3.2Key Insights

1. While the Middle East recorded moderate levels of happiness and excellent ratings of GDP per capita, it showed a higher proportion of variation.

2. South Asia, meanwhile, showed relatively uniformity in scores, with few outliers.

3. There were key differences in economic and health indices which indicated disparities in development across the regions.

Conclusion

4.1Summary of Findings

1. **Global Trends**: Life satisfaction levels are impacted positively by GDP per capita, social support, and health conditions.

2. **South Asia**: Uniform scores point to a need for economic expansion and healthcare improvements in order to enhance happiness.

3. **Middle East**: Greater variability of happiness scores thus highlights disparities that arise between social and economic vectors.

4.2Significance

The analysis reaffirms happiness's multidimensional character and emphasizes the importance of holistic development. Governments can use these insights to shape policies with clear priorities toward greater social and economic wellbeing

GitHub Link : https://github.com/farhanimran01/Concept-and-Technology-of-AI/commit/983852934aa67c5948236d4fd5b928a1c188c449