

# **WORLD HAPPINESS INDEX DASHBOARD**

A project report submitted in the partial fulfillment of the requirements for  
the award of the degree of

## **BACHELOR OF TECHNOLOGY**

In

**COMPUTER SCIENCE AND ENGINEERING with COMPUTER  
NETWORKING**

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

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**VIZIANAGARAM CAMPUS**

**CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENT**

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# **ABSTRACT**

The World Happiness Index Dashboard is an innovative platform designed to provide a comprehensive view of global happiness trends. Utilizing data from the World Happiness Report, the dashboard allows users to explore the intricate factors influencing happiness across countries and regions. These factors include GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and perceptions of corruption. By offering an intuitive and interactive interface, the dashboard transforms complex datasets into actionable insights, making it accessible to policymakers, researchers, and the general public.

The dashboard features dynamic visualizations that enable users to examine happiness rankings and scores by country or region, compare trends over time, and uncover patterns in the data. Filters and analytical tools allow for a deeper exploration of how individual metrics influence happiness outcomes, shedding light on the interplay between economic, social, and governance factors. Additionally, temporal analysis highlights how global and local developments impact happiness over the years.

By providing a user-friendly platform for visualizing and analyzing the World Happiness Index, the dashboard empowers decision-makers to better understand the drivers of well-being. It aims to inspire data-driven strategies that address disparities and improve quality of life globally, fostering a deeper appreciation of the shared pursuit of happiness.

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# **CHAPTER 1**

## **INTRODUCTION**



# 1. INTRODUCTION

The **World Happiness Index Dashboard** is an advanced analytical platform aimed at uncovering the key factors that influence happiness across nations. Built on data from the World Happiness Report, it examines essential metrics such as GDP per capita, social support, healthy life expectancy, freedom to make life choices, generosity, and perceptions of corruption. These indicators provide a holistic understanding of the socioeconomic and cultural dynamics shaping happiness. By aggregating and visualizing this data, the dashboard serves as a tool for stakeholders—including policymakers, researchers, and citizens—interested in exploring global happiness trends and the underlying drivers of well-being.

The dashboard is designed as an interactive web application developed using Dash, offering users an intuitive interface to navigate complex datasets. It allows for in-depth analysis of happiness scores, comparisons between countries and regions, and temporal trends that illustrate changes in happiness over time. Users can explore how specific indicators correlate with happiness levels, analyze the impact of policy decisions on well-being, and identify best practices from high-performing countries. Dynamic visualizations such as bar charts, line graphs, scatter plots, and heatmaps provide a rich, engaging experience, making the data both accessible and actionable.

By bringing transparency and clarity to happiness-related data, the World Happiness Index Dashboard fosters a deeper understanding of global well-being and the factors that drive it. It empowers stakeholders to identify disparities, allocate resources more effectively, and design policies that enhance the quality of life for individuals and communities. The project aspires to create a knowledge-driven foundation for addressing the challenges to happiness, promoting sustainable and inclusive development that prioritizes human well-being in all its dimensions.

## 1.1 PURPOSE

The “World Happiness Index Dashboard” aims to provide a transparent and interactive tool for analyzing the factors that contribute to happiness across nations. By visualizing key metrics such as GDP per capita, social support, life expectancy, freedom, generosity, and perceptions of corruption, the dashboard enables stakeholders—including policymakers, researchers, and citizens—to explore the drivers of well-being and identify trends, disparities, and opportunities for improvement. This fosters a deeper understanding of the elements shaping happiness and informs strategies for enhancing quality of life globally.

The platform also seeks to support evidence-based decision-making by offering insights into the relationships between economic, social, and cultural factors and overall happiness. Through its interactive dashboards and dynamic visualizations, the project simplifies complex datasets, making them accessible to a broader audience. By highlighting correlations and patterns, it empowers users to design and implement targeted policies that address the specific needs of communities and regions.

## 1.2 Intended Audience

The “World Happiness Index Dashboard” is designed to cater to a wide range of users interested in understanding and improving global well-being. The primary audience includes policymakers and government agencies who can leverage the platform to assess the effectiveness of policies influencing happiness metrics such as economic performance, social support, and governance. By identifying trends and disparities, these stakeholders can design data-driven strategies to enhance quality of life within their regions. Additionally, international organizations and non-governmental organizations (NGOs) focused on sustainable development and well-being can use the dashboard to track progress toward global happiness goals, identify best practices, and address gaps in resource allocation or policy impact. Researchers and academics studying human well-being, social development, and economics form another key audience, as the platform provides comprehensive datasets and visualizations to support in-depth analysis and scholarly work.

Finally, the general public, including individuals and communities worldwide, can use the dashboard to explore happiness trends in their countries and beyond. By offering insights into the factors that influence well-being, the platform aims to foster awareness, engagement, and dialogue among citizens about the importance of prioritizing happiness in policymaking and community development.

## 1.3 SCOPE

The **World Happiness Index Dashboard** aims to analyze and visualize data related to the factors influencing happiness across nations. It encompasses a wide range of metrics, including GDP per capita, social support, life expectancy, freedom, generosity, and perceptions of corruption, spanning multiple years. The platform offers interactive visualizations to explore global, regional, and country-specific trends, enabling users to identify patterns, correlations, and disparities in happiness outcomes. Users can compare scores and rankings across nations, analyze the performance of specific metrics, and track changes over time.

## **CHAPTER 2**

### **LITERATURE SURVEY**

## 2. LITERATURE SURVEY

**Helliwell, J., Layard, R., & Sachs, J. (2020):** The authors, contributors to the *World Happiness Report*, examined the factors influencing happiness across nations, emphasizing the role of social support, economic performance, and governance. The study provided a comprehensive framework for assessing well-being and underscored the importance of measuring happiness as a key indicator of societal progress.

**Stevenson, B., & Wolfers, J. (2008):** This research explored the relationship between economic growth and happiness, challenging the notion that GDP alone correlates with well-being. It highlighted the need for multidimensional metrics, such as those in the World Happiness Index, to capture the nuances of happiness across countries.

**Clark, A. E., Fleche, S., & Senik, C. (2012):** The authors investigated the dynamics of subjective well-being and its determinants. They discussed how income, health, and social relationships interact to shape happiness and emphasized the role of policy in addressing disparities.

**Helliwell, J. F., Huang, H., & Wang, S. (2019):** This study focused on the effects of governance and institutional trust on happiness. It demonstrated that trust in government and the absence of corruption significantly influence overall happiness, providing valuable insights for policymakers.

**De Neve, J.-E., & Oswald, A. J. (2012):** The research linked psychological and economic factors with life satisfaction, highlighting the role of non-material determinants such as freedom, mental health, and community engagement in enhancing happiness.

**Frey, B. S., & Stutzer, A. (2002):** This foundational study explored the "economics of happiness," offering a detailed analysis of how subjective well-being can inform policy decisions. It argued for incorporating happiness measures into economic and social policies to promote sustainable well-being.

**Layard, R. (2005):** Layard's work, *Happiness: Lessons from a New Science*, laid the groundwork for understanding happiness through an interdisciplinary lens. It emphasized the need to shift societal priorities from economic growth to broader well-being indicators, influencing the development of the World Happiness Index.

## **CHAPTER 3**

### **ANALYSIS**

## 3. ANALYSIS

### 3.1 EXISTING SYSTEM

Currently, most systems available for monitoring global happiness trends rely on static reports and do not provide real-time, interactive data exploration. These systems often present happiness data in a way that is not easily accessible or interpretable for non-experts, making it difficult for citizens, researchers, and policymakers to fully understand or analyze the underlying factors influencing happiness. Additionally, these platforms may not offer seamless integration with other sources of data, leading to fragmented insights and a limited understanding of how different social, economic, and political factors contribute to well-being. While some organizations publish happiness reports, many lack interactive dashboards that allow for deeper exploration of happiness metrics, regional variations, and time-based trends, hindering effective decision-making and data-driven policy formulation.

#### 3.1.1 Disadvantages of Existing System

The key disadvantages of the current systems are:

- **Limited Interactivity:** Existing systems often lack interactive features, preventing users from filtering data, comparing happiness metrics across different countries or regions, or exploring trends over time in a dynamic and engaging manner.
- **Siloed Data:** Data on happiness and its contributing factors from different sources or regions is often not integrated, making it difficult to form a holistic view of global well-being and understand the correlations between various metrics.
- **Complexity for Non-Experts:** Many available platforms are not user-friendly for the general public or non-experts. This limits the accessibility and usefulness of the data for a wider audience, preventing transparency and hindering informed decision-making.
- **Limited Data Exploration Capabilities:** Existing systems may not offer sufficient tools for in-depth data exploration, making it harder for users to analyze the factors influencing happiness or compare different happiness-related indicators effectively.

### 3.2 Problem Statement

The main problem with existing systems for tracking global happiness data is the lack of an integrated, user-friendly platform that provides real-time access to comprehensive well-being metrics. Current systems are often fragmented, making it difficult to compare happiness across regions, countries, or over time. This limits the ability of stakeholders, including policymakers, researchers, and citizens, to fully understand the factors influencing happiness and to assess the effectiveness of policies aimed at improving well-being. Without such a platform, it becomes challenging to make data-driven decisions or track the impact of social, economic, and governance-related changes on happiness, which could ultimately impede progress toward improving global well-being.

### 3.3 PROPOSED SYSTEM

The proposed system is an interactive web-based platform that allows users to track and analyze various metrics from the World Happiness Index. The system integrates data from multiple sources, providing a consolidated view of happiness scores and the key factors influencing well-being, such as GDP per capita, social support, freedom, generosity, and perceptions of corruption. Users can filter the data by country, region, financial year, and other relevant variables to explore how different factors contribute to happiness worldwide. The platform features dynamic visualizations such as bar charts, line graphs, and scatter plots, enabling users to understand complex data trends and relationships. By allowing users to interact with the data, the system helps stakeholders identify patterns, track changes over time, and make informed decisions on policy and resource allocation to improve global well-being.

#### 3.3.1 Advantages of Proposed System

The proposed system offers several advantages over existing solutions:

- **Interactive Visualizations:** By allowing users to interact with the data, the system makes it easier to explore complex relationships between different financial variables.
- **Data Integration:** Unlike existing systems, the proposed solution integrates data from multiple sources, creating a unified view of social empowerment scheme performance.
- **User-Friendly Interface:** The system is designed to be accessible to both technical and non-technical users, making it an ideal tool for a broad range of stakeholders.
- **Data-Driven Decision Making:** The ability to analyze trends and compare schemes allows decision-makers to allocate resources more effectively and ensure better governance.

### 3.4 COMPARISON WITH EXISTING SYSTEMS

Existing systems for tracking financial data in social empowerment schemes are often manual and static, with limited ability to analyze data interactively or in real time. This makes it difficult for users to gain deep insights into trends and disparities. In contrast, your proposed system provides real-time tracking, data integration, and interactive visualizations, offering better accessibility and actionable insights.

- **Data Visualization:** Often rely on basic tables, bar charts, and pie charts, which are difficult to interpret when dealing with large datasets. These systems may not allow users to drill down into specific metrics, leading to limited insights about trends over time or across different regions.

- **Real-Time Data Tracking:** Typically update data manually, which means there can be significant delays between when the data is collected and when it is reflected in the system. This lag reduces the timeliness of the information and can lead to decisions being made based on outdated data.
- **Accuracy of Reporting:** Accuracy is often compromised due to human errors in data entry, inconsistencies across multiple data sources, or lack of validation checks. These errors can lead to incorrect financial reporting, which undermines the reliability of the data used to track and manage social empowerment schemes.

### **3.5 TECHNOLOGICAL CONSIDERATIONS**

To develop an effective system for tracking financial data in social empowerment schemes, key technologies include Python with Pandas for data processing. Real-time updates can be facilitated through platforms like Apache Kafka, while visualization tools like Plotly allow for interactive data exploration.

For regional analysis, geospatial tools like Google Maps can be used. The user interface should be responsive, built with frameworks like React.js or Dash, and security features like role-based access control ensure data protection. Scalable cloud infrastructure and automation tools like Apache Airflow help manage data efficiently, while compliance with reporting standards ensures regulatory alignment.

### **3.6 POTENTIAL CHALLENGES**

Potential challenges in developing a system for tracking global happiness data include ensuring the accuracy and consistency of data across multiple sources, which requires rigorous validation and reconciliation processes. Managing large volumes of data and enabling real-time updates demands a scalable and reliable infrastructure for efficient performance. User adoption may also be a challenge, so designing an intuitive and accessible interface is crucial for ensuring the platform is usable by a wide range of stakeholders. Additionally, ensuring data security and compliance with international standards is essential, particularly given the sensitive nature of some data, such as personal well-being indicators. Finally, integrating diverse datasets, such as economic, social, and health-related factors, for comprehensive analysis may present technical difficulties, especially when data from different regions or sources is incomplete or inconsistent.



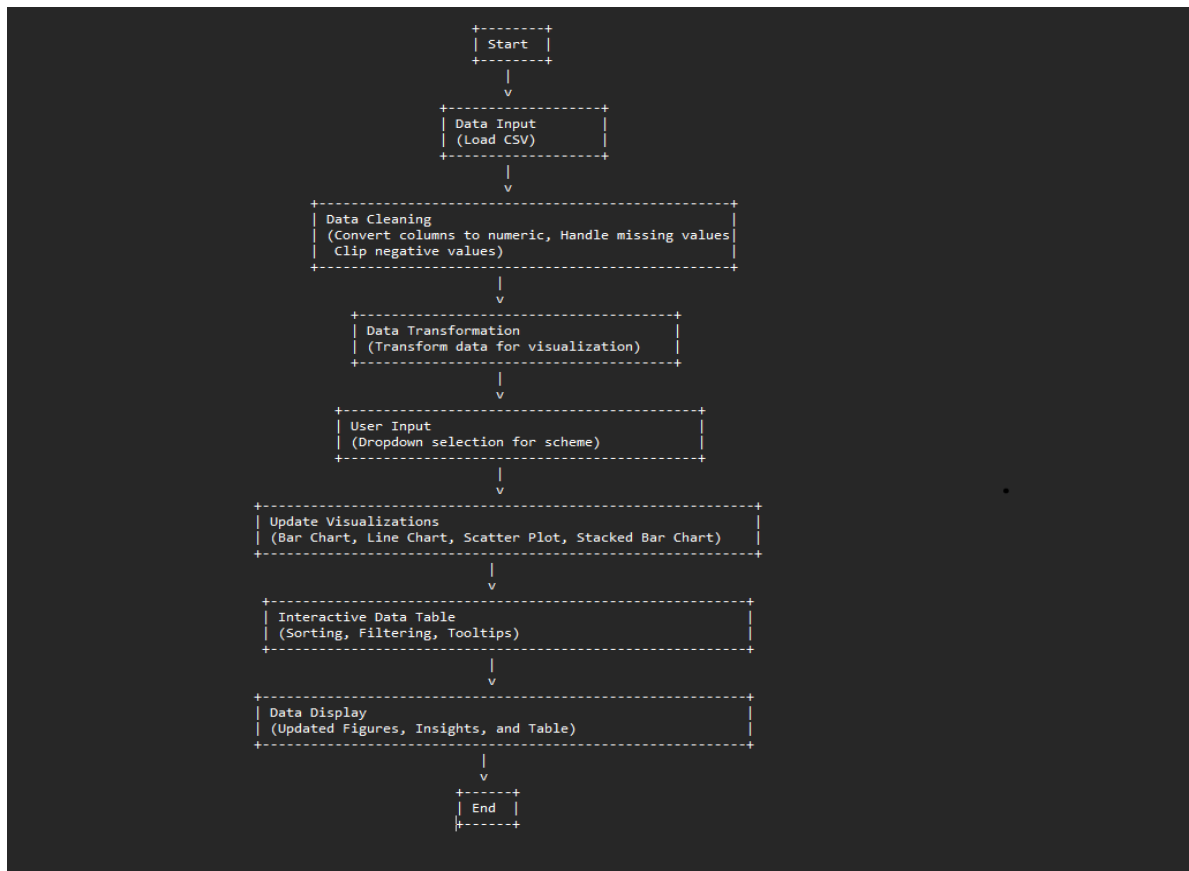
## **CHAPTER 4**

# **SYSTEM ARCHITECTURE**

## 4. SYSTEM ARCHITECTURE

The architecture of the “World Happiness Index Dashboard” project adopts a robust client-server model that ensures efficient data management and user-friendly access. At its core, the system is divided into distinct layers to facilitate seamless integration and scalability:

- **User Interface Layer:** The front-end is designed to deliver an intuitive experience through interactive dashboards and visualizations, enabling users to explore and analyze data trends effortlessly.
- **Data Processing Layer:** This layer handles the cleaning, processing, and management of large datasets, ensuring the data is accurate, reliable, and ready for analysis.
- **Database Layer:** Acts as the backbone of the system, storing financial and geospatial data in a structured format for easy retrieval and query handling.
- **Integration Layer:** This component connects the system with external APIs and real-time data sources, allowing the architecture to stay dynamic and current.
- **Cloud Infrastructure Layer:** Designed for scalability and resilience, this layer supports high-volume data processing and ensures consistent performance with resource management and backup mechanisms.



*Fig 4. 1 system Architecture*

## 4.1 SYSTEM CONFIGURATION

The project uses a web-based dashboard built with Streamlit, Plotly, and Pandas to display key metrics, trends, and insights regarding government funding for social empowerment schemes.

### Frontend Layer (User Interface)

- **Streamlit Framework:** A Python framework for building interactive web applications.
- **Plotly:** For dynamic charting (e.g., bar charts, line charts, scatter plots).
- **HTML/CSS:** Basic web design and layout. Bootstrap (via `dash_bootstrap_components`) is used for responsive design.

### Backend Layer (Server-Side)

- **Python:** Core programming language for data processing and logic handling.
- **Pandas:** Library for handling data manipulation and cleaning.

#### 4.1.1 Software Requirements

- **Python 3.x:** The primary programming language used to implement the system's functionality.
- **Streamlit:** A Python web framework used to build interactive web applications, especially for visualizing data.
- **Plotly:** A visualization library for generating interactive plots and charts.
- **Pandas:** A Python library used for data manipulation and cleaning.
- **SQL Database (Optional):** A database may be used to store and manage large datasets, allowing for efficient querying and retrieval of data.

#### 4.1.2 Hardware Requirements

- **Processor:** Intel Core i5 or equivalent (recommended for smooth operation).
- **RAM:** At least 8 GB of RAM (for handling large datasets and ensuring optimal performance).
- **Storage:** Minimum 2 GB of free space (to store the web application, dataset, and other files).
- **Network:** Stable internet connection for fetching real-time data and ensuring the web application is accessible to users.

## **CHAPTER 5**

### **IMPLEMENTATION**

## 5. IMPLEMENTATION

### 5.1 IMPLEMENTATION CODE

```
import streamlit as st
import pandas as pd
import plotly.express as px
import seaborn as sns
import matplotlib.pyplot as plt

# Load the dataset
@st.cache_data # Use st.cache_data for caching data
def load_data():
    df = pd.read_csv(r"C:\Users\yerra\OneDrive\Desktop\World Happiness\table.csv")
    return df

# Main function to create the dashboard
def main():
    st.title("World Happiness Index Dashboard")

    # Load data
    df = load_data()

    # Display basic statistics
    st.write("### Data Overview")
    st.write(df.head())

    # Sidebar for filtering countries
    st.sidebar.header("Filters")
    selected_country = st.sidebar.selectbox("Select a Country", df["Country name"].unique())
```

```

# Filter data based on selection
country_data = df[df["Country name"] == selected_country]

# Display country-specific data
st.write(f"#### {selected_country} Data")
st.write(country_data)

# Plot Happiness Score (Life Ladder) over the years for the selected country
st.write("#### Happiness Score Over Time (Life Ladder)")
country_happiness = px.line(country_data, x="year", y="Life Ladder", title=f"Happiness Score
in {selected_country} over the Years")
st.plotly_chart(country_happiness)

# Plot a scatter plot for the relationship between GDP and Happiness Score (Life Ladder)
st.write("#### GDP vs Happiness Score")
gdp_happiness = px.scatter(df, x="Log GDP per capita", y="Life Ladder", color="Country
name", title="GDP vs Happiness Score (Life Ladder)")
st.plotly_chart(gdp_happiness)

# Plot bar chart for the top 10 happiest countries based on Life Ladder
st.write("#### Top 10 Happiest Countries")
top_10_happiest = df.nlargest(10, "Life Ladder")
happiness_bar = px.bar(top_10_happiest, x="Country name", y="Life Ladder", title="Top 10
Happiest Countries")
st.plotly_chart(happiness_bar)

# Create a map showing the world happiness index (Life Ladder)
st.write("#### World Happiness Map")
world_map = px.choropleth(df, locations="Country name", color="Life Ladder",
hover_name="Country name",
color_continuous_scale=px.colors.sequential.Plasma, title="World Happiness

```

```

Index (Life Ladder)")
    st.plotly_chart(world_map)

# Correlation matrix between various factors
st.write("### Correlation between Various Factors")
correlation_matrix = df[["Life Ladder", "Log GDP per capita", "Social support", "Healthy life
expectancy at birth",
                        "Freedom to make life choices", "Generosity", "Perceptions of corruption",
                        "Positive affect", "Negative affect"]].corr()
st.write(correlation_matrix)

# Plot correlation heatmap
st.write("### Heatmap of Correlation between Factors")
fig, ax = plt.subplots(figsize=(10, 6)) # Explicitly create a figure and axis
sns.heatmap(correlation_matrix, annot=True, cmap="coolwarm", fmt=".2f", vmin=-1, vmax=1,
ax=ax)
st.pyplot(fig) # Pass the figure to st.pyplot()

if __name__ == "__main__":
    main()

```

## **CHAPTER 6**

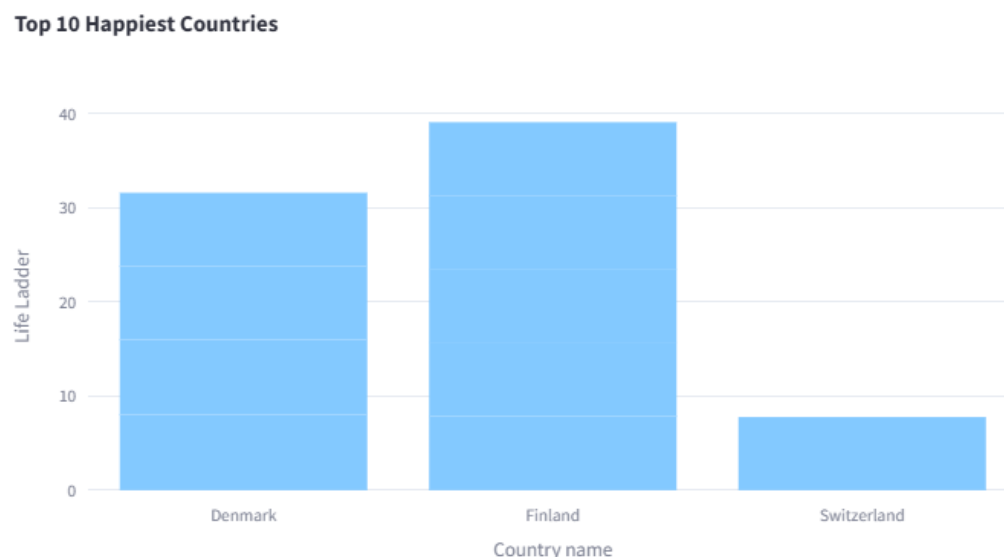
### **RESULT**



## 6.RESULT

The output of the project is an interactive web application that displays data related to the World Happiness Index. The application allows users to view key happiness metrics, such as happiness scores (Life Ladder), GDP, social support, freedom, generosity, and perceptions of corruption, and compare these across different countries and years. Users can explore the data through various visualizations, such as bar charts, line graphs, scatter plots, and maps, to uncover insights and track trends in global happiness.

- **Bar Charts:** Display the top 10 happiest countries based on the Life Ladder, allowing users to compare happiness scores across nations.
- **Line Graphs:** Present happiness scores (Life Ladder) over time for a selected country, showing how happiness has evolved over the years.
- **Scatter Plots:** Show the relationship between GDP and happiness scores (Life Ladder), helping identify correlations and trends between economic factors and well-being.
- **World Map:** Visualize global happiness scores with a choropleth map, allowing users to explore how different countries rank in terms of happiness.
- **Correlation Matrix:** Analyze the relationships between various factors such as GDP, social support, freedom, and happiness scores, providing insights into the drivers of well-being.
- **Heatmap:** Display a heatmap of correlations between different happiness-related factors, helping users understand how various aspects of life are interconnected.



*Fig 6.0 Bar chart on Happiness Index*

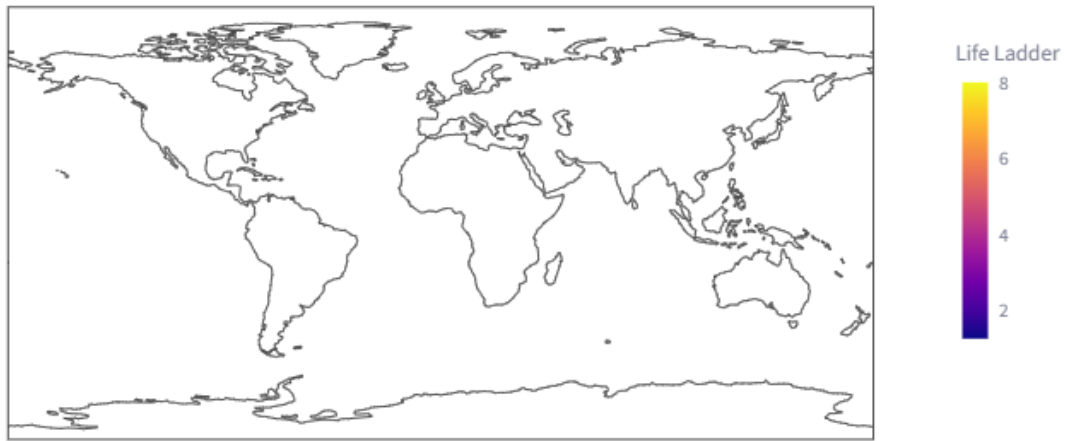


Fig 6.1 World Happiness Index Life Ladder

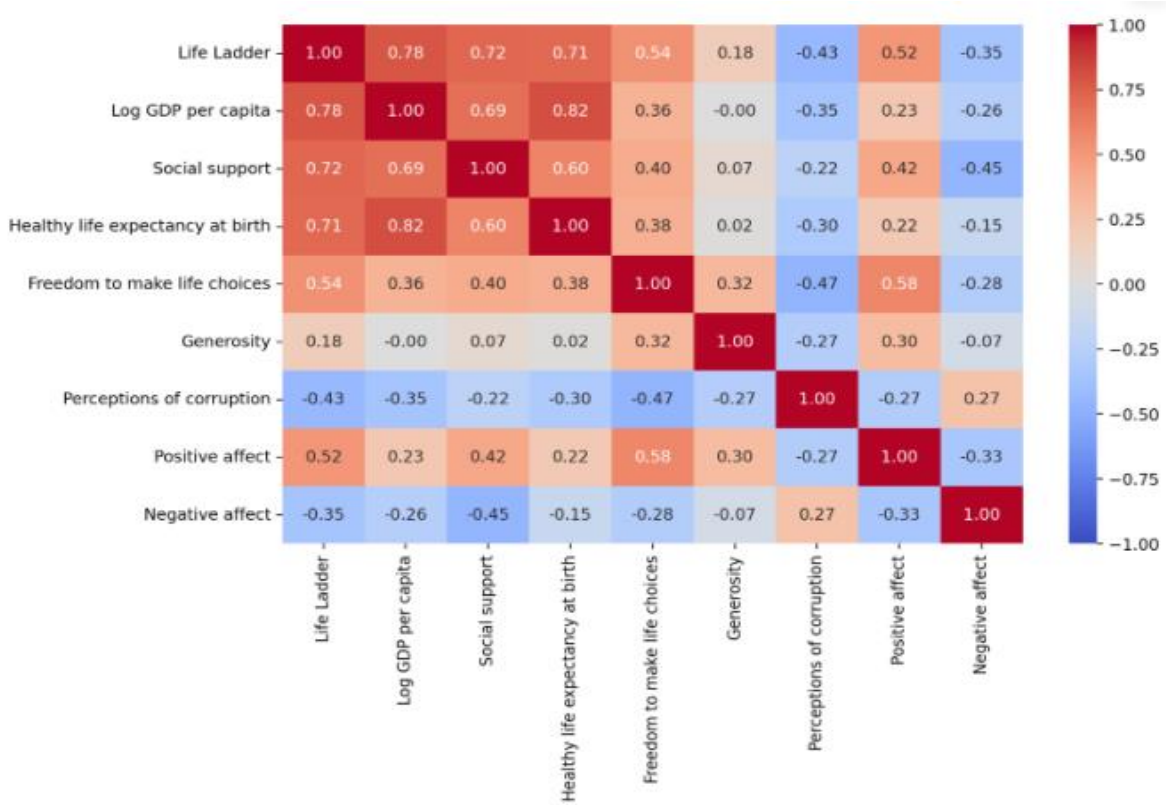


Fig 6.2 Heatmap of Correlation between factors

## **CHAPTER 7**

### **CONCLUSION AND FUTURE WORK**

## 7. CONCLUSION

The World Happiness Index Dashboard provides an interactive and user-friendly platform to visualize and analyze global happiness data. By integrating key metrics such as happiness scores (Life Ladder), GDP, social support, freedom, generosity, and perceptions of corruption, the system enables users to track trends in happiness across different countries and years. Through dynamic visualizations, such as bar charts, line graphs, scatter plots, and maps, users can gain actionable insights into the factors influencing global well-being. This tool supports data-driven decision-making, ensuring greater awareness and understanding of the drivers of happiness worldwide.

**Future of Work:** Looking ahead, there are several opportunities to expand and improve the system:

- **Enhanced Data Sources:** Integrating real-time data and additional factors like environmental indicators, health metrics, or policy changes can enrich the analysis and provide more comprehensive insights into global happiness.
- **Predictive Analytics:** Incorporating machine learning models could help forecast future happiness trends, allowing policymakers and researchers to make more proactive decisions aimed at improving well-being.
- **Mobile Accessibility:** Expanding the application to mobile platforms would increase accessibility, allowing users to interact with the data and track happiness trends on-the-go.
- **Geospatial Analysis:** Incorporating GIS (Geographic Information Systems) could provide geographic visualizations, helping to analyze regional disparities in happiness and target interventions more effectively.
- **Collaboration and Sharing:** Adding collaboration features like report generation, export options, and sharing capabilities would enhance the usability of the platform for different stakeholders, including governments, NGOs, researchers, and citizens.

## **CHAPTER 8**

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