Final Report of Traineeship Program 2023

On

"Analyze Death Age Difference of Right Handers with Left Handers"

MEDTOUREASY

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ABSTRACT

This project investigates the potential variance in the age of death between right-handed and left-handed individuals. The study aims to explore whether there exists a statistically significant difference in life expectancy or age of mortality based on hand preference.

Using a dataset encompassing demographic and hand-preference information, this research employs statistical analysis and data visualization techniques to discern any correlations or disparities in the lifespan between right-handed and left-handed subjects. Factors such as gender, geographic location, and socio-economic backgrounds may also be considered in the analysis.

The findings from this investigation seek to contribute insights into the potential relationship between hand preference and lifespan, shedding light on potential implications for healthcare and understanding human longevity.

Keywords: Hand Preference, Mortality, Life Expectancy, Statistical Analysis, Demographic Factors, Data Visualization

1.1 About the Company

MedTourEasy, a global healthcare company, provides you the informational resources needed to evaluate your global options. MedTourEasy provides analytical solutions to our partner healthcare providers globally.

1.2 About the Project

This project aims to delve into the intriguing relationship between hand preference and lifespan, particularly focusing on the purported claim of early mortality among left-handed individuals. Leveraging age distribution data, this investigation seeks to explore whether observed differences in the average age at death can be attributed solely to varying rates of left-handedness over time.

Utilizing Python's pandas library and employing Bayesian statistics, the analysis centers on assessing the likelihood of mortality at specific ages based on an individual's handedness. By employing statistical modeling techniques, this study aims to reveal insights into the potential correlation between hand preference and life expectancy.

The notebook developed for this project will facilitate the examination of age-related mortality patterns, aiming to discern any discernible disparities in life expectancy between right-handed and left-handed individuals. Through comprehensive data analysis and statistical inference, the objective is to substantiate or refute claims regarding differential mortality rates based on hand preference.

This investigation not only seeks to contribute to the ongoing discourse on handedness and longevity but also underscores the utilization of advanced statistical methodologies to explore and potentially refute long-standing assumptions regarding the mortality rates associated with left-handedness.

1.3   Objectives:

1. **Investigate Handedness and Mortality:** Analyze age distribution data to explore if there's a substantial difference in the average age at death between right-handed and left-handed individuals.
2. **Assess Impact of Changing Left-Handedness Rates:** Determine if variations in mortality rates could be attributed solely to fluctuations in left-handedness rates across different time periods.
3. **Utilize Bayesian Statistics:** Employ Bayesian statistical methods to assess the probability of mortality at specific ages based on an individual's handedness, enabling a nuanced understanding of potential correlations.
4. **Refute Misconceptions:** Aim to challenge or substantiate claims suggesting an early death trend among left-handed individuals by providing empirical evidence derived from robust statistical analysis.

Deliverables:

1. **Data Analysis Notebook:** A comprehensive Python notebook utilizing pandas and Bayesian statistics to perform detailed analysis and visualization of age distribution data for right-handed and left-handed individuals.
2. **Statistical Findings Report:** A detailed report summarizing the key findings, statistical insights, and conclusions drawn from the analysis, aiming to address the correlation between handedness and mortality rates.
3. **Visual Representations:** Visual aids such as graphs, charts, and diagrams to illustrate age-related mortality patterns and disparities between right-handed and left-handed groups.
4. **Documentation of Methodology:** Clear documentation outlining the methodologies, statistical models, and data preprocessing techniques employed in the analysis.
5. **Insights for Discussion:** Key insights and implications derived from the analysis, providing a basis for discussions on debunking or supporting prevailing beliefs regarding handedness and longevity.

These deliverables aim to encapsulate the thorough analysis conducted using Bayesian statistics to explore the relationship between handedness and mortality, with the objective of providing concrete evidence to either validate or challenge existing notions.
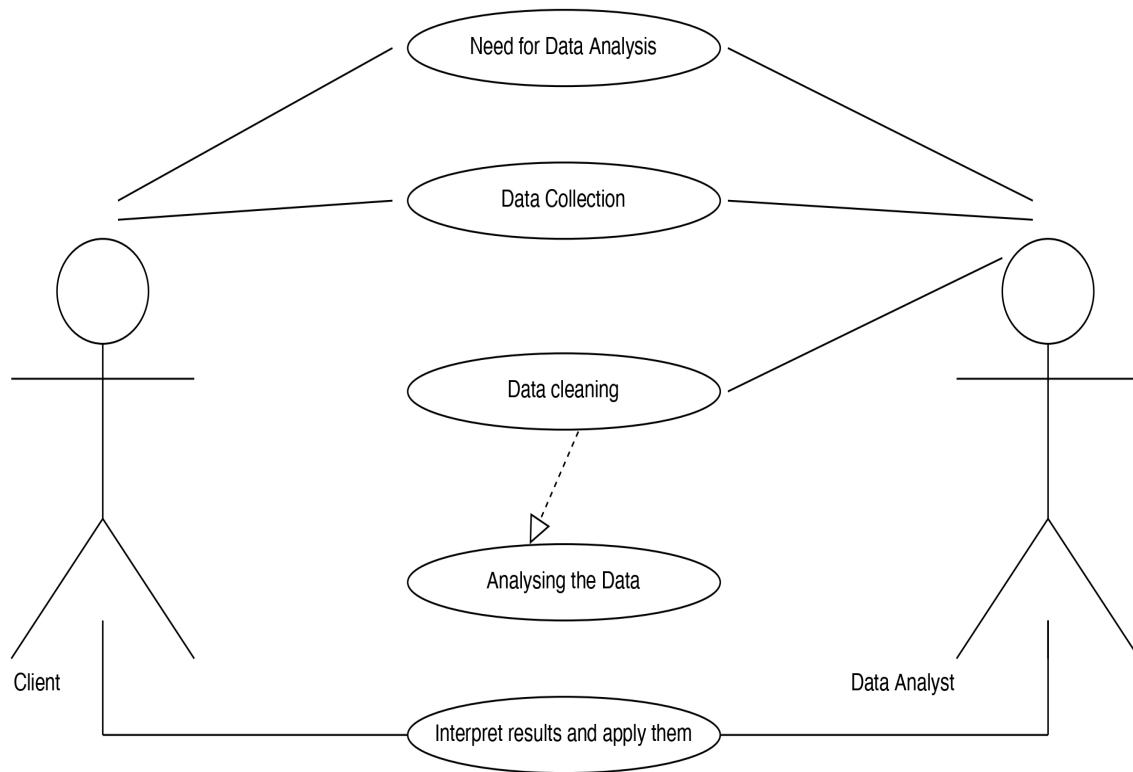
I. METHODOLOGY

2.1 Flow of the Project

The project followed the following steps to accomplish the desired objectives and deliverables. Each step has been explained in detail in the following section.

2.2 Use Case:

In this data analysis project, the analyst aims to investigate the alleged early mortality among left-handed individuals by examining age distribution data. Using Python's pandas library and Bayesian statistics, the project involves retrieving, cleaning, and analyzing age-related datasets to discern differences in average age at death between right-handed and left-handed individuals. The analyst seeks to explore correlations between handedness and life expectancy, intending to substantiate or refute claims of differential mortality rates. Ultimately, this project contributes to understanding the relationship between hand preference and longevity while employing advanced statistical methodologies to challenge prevailing assumptions about mortality rates associated with left-handedness.

2.3 Language and platform used:

The project involves data analysis, specifically exploring age distribution data to investigate the relationship between left-handedness and average age at death using Bayesian statistics. The technologies mentioned in the context suggest the use of a Jupyter Notebook, utilizing the Python programming language along with the Pandas library for data manipulation and Bayesian statistics for analysis.

Key components involved:

1. **Python**: A popular programming language used for data analysis, machine learning, and scientific computing.

2. **Jupyter Notebook**: An interactive web-based computational environment that allows for the creation and sharing of documents containing live code, equations, visualizations, and explanatory text.

3. **Pandas**: A powerful Python library for data manipulation and analysis, particularly offering data structures and operations for manipulating numerical tables and time series data.

4. **Bayesian Statistics**: A branch of statistics that deals with probability inference where probabilities express degrees of belief.

II. IMPLEMENTATION

Here's the comprehensive implementation plan:

1. **Define Project Objective:**
   - Investigate alleged early mortality among left-handed individuals using age distribution data.

2. **Data Gathering and Preparation:**
   - **Data Collection:** Retrieve datasets containing age distribution data and handedness information.
   - **Data Cleaning:** Use Pandas to clean datasets, handling missing values, duplicates, and ensuring consistency.
   - **Data Integration:** Merge or concatenate datasets to align them for analysis.

3. **Exploratory Data Analysis (EDA):**
   - **Descriptive Statistics:** Compute basic statistics (mean, median, std. deviation) for left-handed and right-handed groups.
   - **Visualization:** Utilize histograms, box plots, etc., to explore age distributions and identify patterns.

4. **Bayesian Statistical Analysis:**
   - **Model Building:** Construct Bayesian models for probability distributions of age at death for both groups.
   - **Hypothesis Testing:** Use Bayesian methods to test differences in average age at death between left-handed and right-handed groups.

5. **Correlation Investigation:**
   - **Correlation Analysis:** Assess relationships between handedness and life expectancy using statistical techniques.
   - **Inferential Analysis:** Draw inferences about mortality rates associated with left-handedness.

6. **Conclusion and Insights:**
   - **Summarize Findings:** Detail results, highlighting significant observations and differences.
   - **Insights and Recommendations:** Offer insights into hand preference and longevity, suggesting further research areas.

7. **Documentation and Reporting:**
   - **Report Generation:** Create a detailed report outlining methodology, findings, conclusions, and visualizations.
   - **Presentation:** Prepare a presentation summarizing key insights and discoveries for communication.

8. **Reflection and Iteration:**
   - **Feedback and Improvement:** Gather feedback, review the analysis process, and consider necessary improvements or additional investigations.

This detailed plan facilitates a thorough exploration of the relationship between handedness and mortality rates, employing advanced statistical methodologies to challenge and redefine existing assumptions.

III. SAMPLE SCREENSHOTS AND OBSERVATIONS