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Introduction

Dr. Semmelweis and the Discovery of Handwashing

Dr. Ignaz Semmelweis: Investigating the impact of handwashing on childbed fever mortality rates at Vienna General Hospital in the 1840s.

About Me

- **Name:** Biyawala Viral Deven
- **Education:** Indian Institute of Information Technology ,
Surat - 3rd Year
- **Learning:** Machine Learning Learner from DataCamp
- **Skills For Project:** Language: Python
Data Analysis and Manipulation(Pandas)
Data Visualization using Matplotlib
Data Importing and Cleaning
Statistical Analysis
Hypothesis Testing

Project Overview

- **Objective:** The objective of this project is to demonstrate the impact of handwashing on reducing mortality rates among women giving birth, based on the historical data from the Vienna General Hospital.
- **Components:**
 - Meet Dr. Ignaz Semmelweis: Introduction to Dr. Ignaz Semmelweis and Childbed Fever
 - The Alarming Number of Deaths
 - The Effect of Handwashing
 - The Effect of Handwashing Highlighted
- **Data Source:** Kaggle (Apps and User's review dataset)

Data Analysis Approach

- Import data and libraries.
- Explore yearly death records, focusing on the proportion of deaths at Clinic 1.
- Visualize proportions of deaths at both clinics to identify differences.
- Develop hypothesis based on differences between clinics and the handling of corpses.
- Analyze monthly data from Clinic 1 to observe the effect of handwashing over time.

Data Analysis Approach

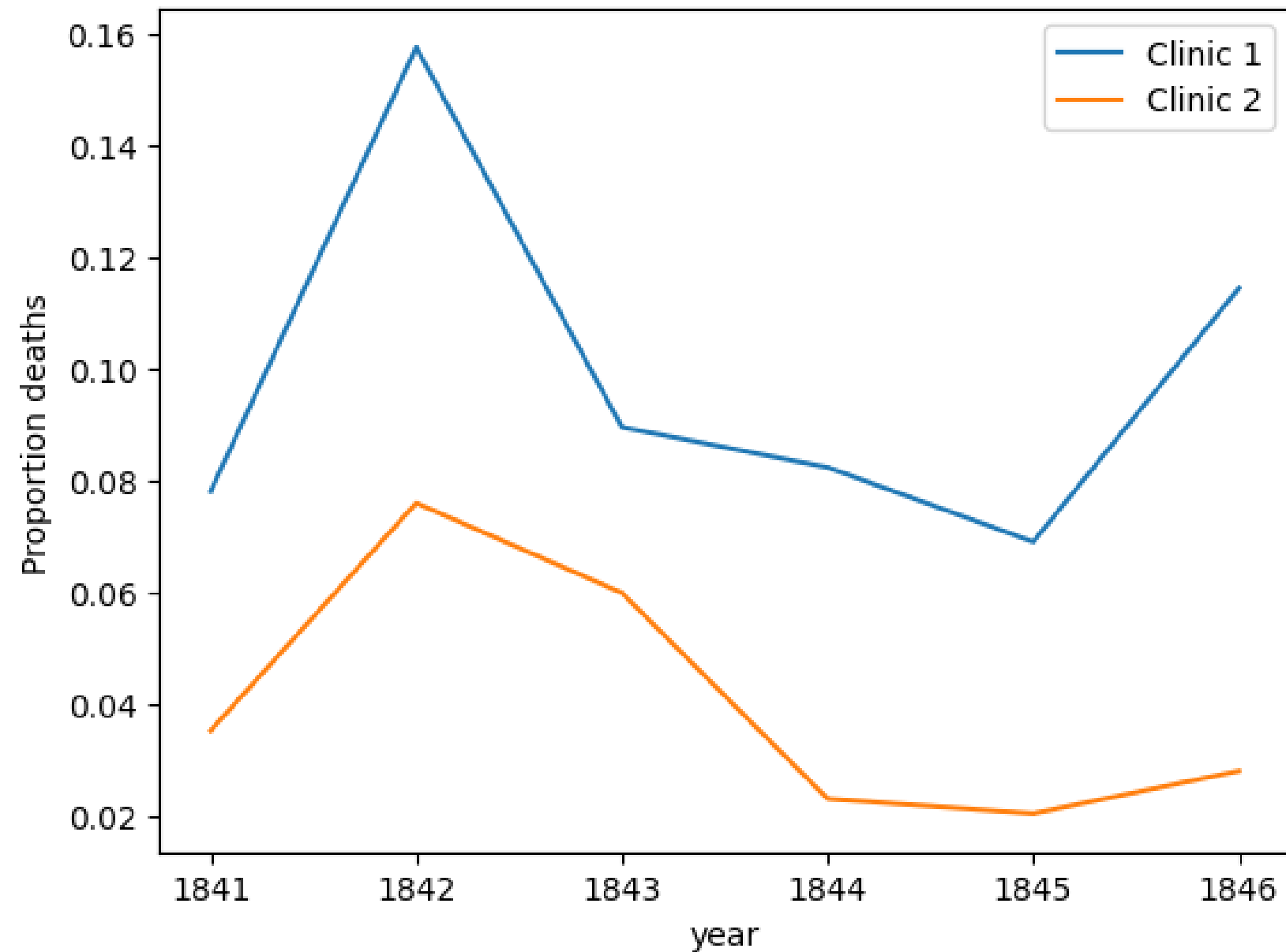
- Highlight the period of mandatory handwashing to visually demonstrate its impact.
- Calculate the average reduction in monthly proportion of deaths before and after handwashing.
- Perform bootstrap analysis to estimate uncertainty and derive a confidence interval.
- Conclude findings, emphasizing the importance of statistical analysis and data visualization in scientific discoveries.

Results and Finding

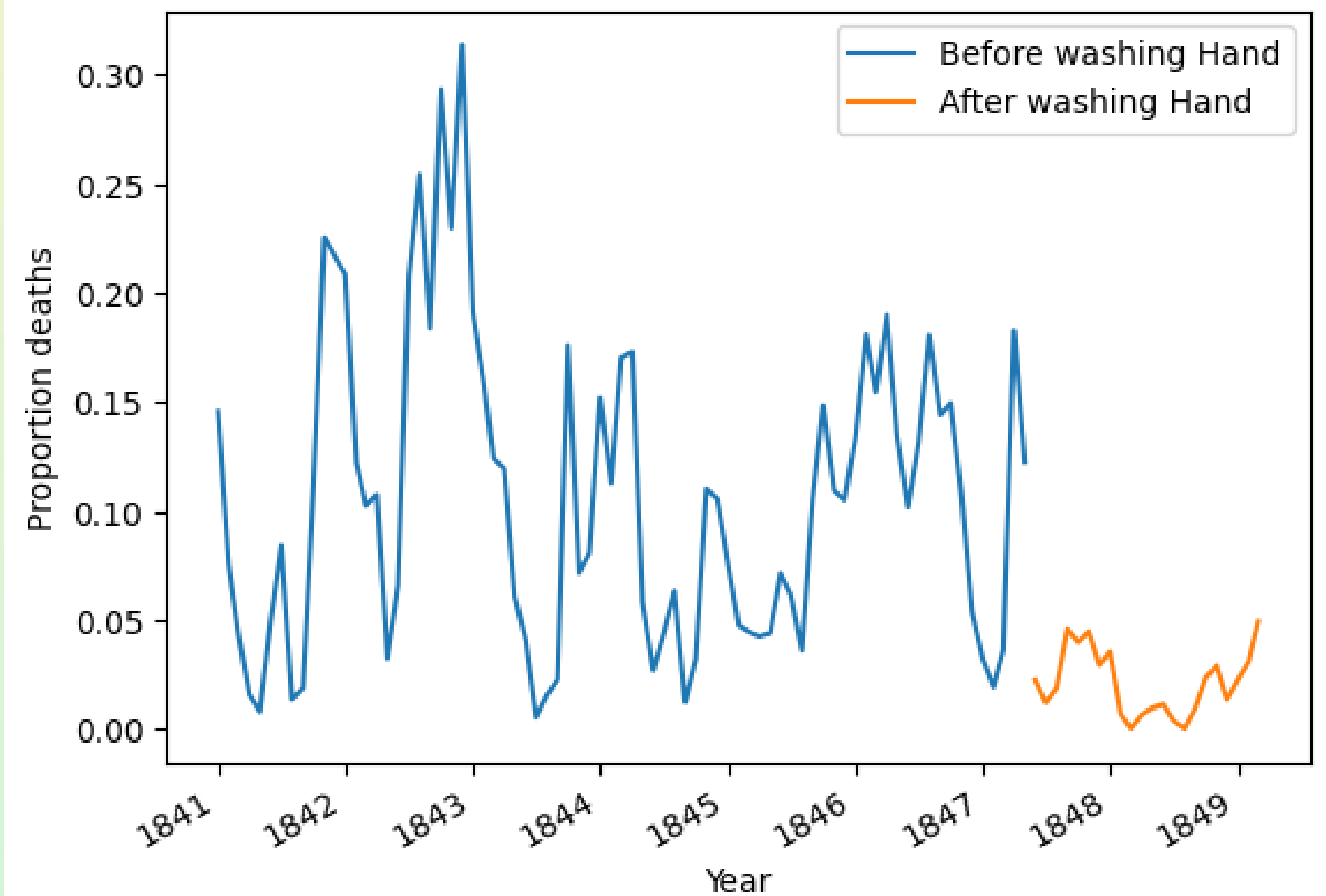
- Alarming number of deaths due to childbed fever in the 1840s at Vienna General Hospital.
- Clinic 1 had consistently higher death rates than Clinic 2.
- Medical students at Clinic 1 possibly spread harmful substances from autopsy rooms, contributing to higher mortality.
- Obligatory handwashing implemented by Dr. Semmelweis led to a significant reduction in deaths at Clinic 1 from summer 1847.
- Clear evidence of handwashing effectiveness seen in the plotted monthly proportion of deaths.
- Handwashing reduced monthly deaths by an average of 8 percentage points.
- Bootstrap analysis provided a 95% confidence interval for the reduction in deaths due to handwashing.

Visual Evidence

Proportion of Death due to Childbed Fever by Clinic



Effect of Handwashing on Proportion of Death



Conclusion

- Dr. Ignaz Semmelweis discovered the importance of handwashing in reducing deaths caused by childbed fever.
- The proportion of deaths was alarmingly high in the early 1840s at the Vienna General Hospital, with Clinic 1 experiencing higher mortality rates than Clinic 2.
- Semmelweis suspected that the contamination from the hands of medical students, who also worked in autopsy rooms, caused childbed fever.
- When handwashing was made mandatory, there was a significant reduction in the proportion of deaths.
- A bootstrap analysis estimated that handwashing reduced the proportion of deaths by around 8 percentage points.

Acknowledgments and Project Link

- **Acknowledgment to DataCamp:** I would like to express my gratitude to DataCamp for providing valuable courses and resources that have contributed to my learning journey and the completion of this project.
- **Acknowledgment to Kaggle:** I would like to acknowledge Kaggle for providing the dataset used in this project. The dataset from Kaggle has been instrumental in conducting the analysis and deriving meaningful insights.

To access the code and detailed documentation for this project, please visit the my GitHub repository by [Clicking Here](#)

Future Scope

- Automation of data analysis: Streamlining healthcare research data analysis through automation and software integration.
- Machine learning for infection prediction: Utilizing machine learning to predict infection likelihood based on historical hand hygiene and infection data.
- IoT-enabled hand hygiene monitoring: Real-time monitoring of hand hygiene compliance using IoT devices and wearable sensors.
- Integration with electronic health records: Incorporating project findings into electronic health records for reminders and adherence to hand hygiene protocols.
- Global impact on infection control: Disseminating project insights globally to enhance infection control practices and reduce healthcare-associated infections.

