Motivation:

In December 2023, I had surgery that significantly affected my health and weight.

I Began a dedicated journey of dieting and exercise from May, focusing on tracking the number of pushups performed and monitoring weight regularly.

The process of meticulously tracking these metrics holds immense personal importance, as it not only aids in physical recovery but also serves as a testament to my commitment and consistency in improving health and fitness post-surgery.

This project represents not just a set of data, but a deeply personal narrative of resilience, discipline, and gradual progress towards health goals.

Data Source:

The data for this project was meticulously gathered from an application named "Fat Secret," which is used for tracking various health metrics.

Since "Fat Secret" does not offer an API for direct data extraction, nor does it have a website amenable to web scraping, the data collection process was conducted manually.

This involved regularly inputting and updating personal metrics within the app, thereby creating a comprehensive dataset over time.

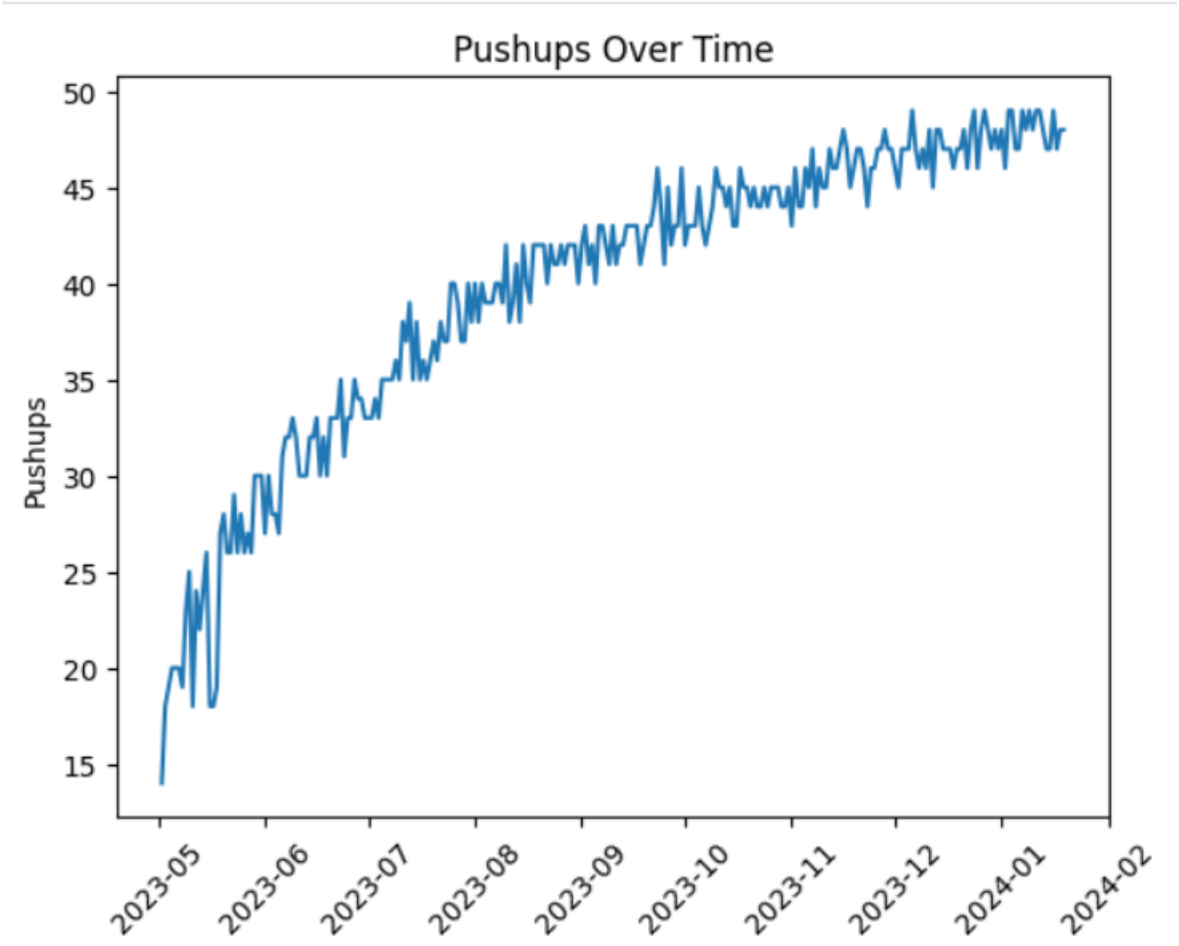
The collected data encompasses key information points: the date of each entry, my weight on that day, and the number of pushups performed. This dataset provides a detailed and chronological insight into my fitness journey post-surgery.

Data Analysis:

Initial Data Preparation:

Enhanced the original dataset by calculating and adding new fields such as 'day' (representing the sequential day count) and 'BMI' (Body Mass Index), enabling a more multifaceted analysis.

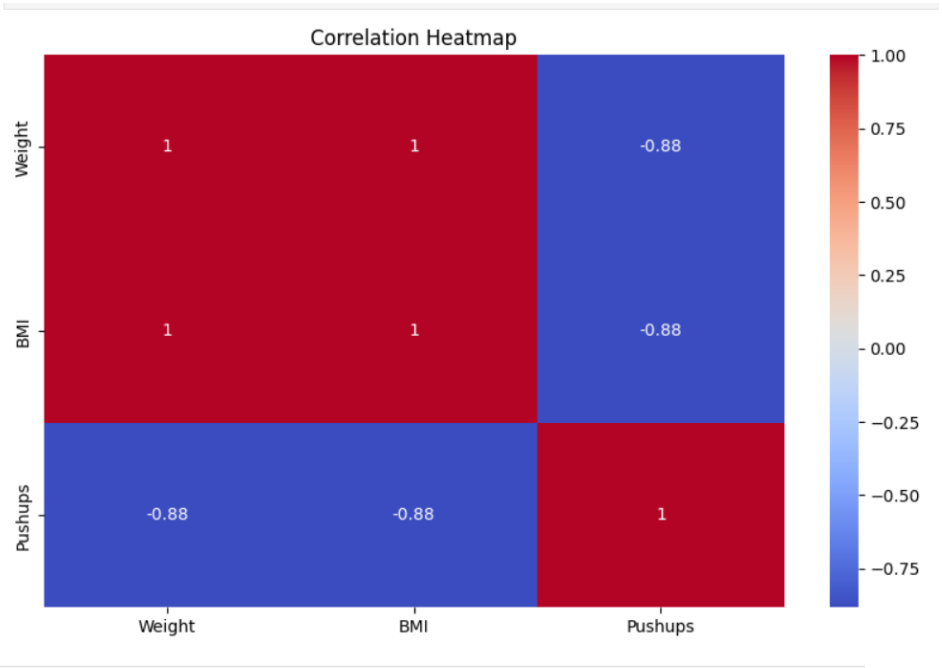
Employed Python visualization libraries to identify patterns and trends within the data.

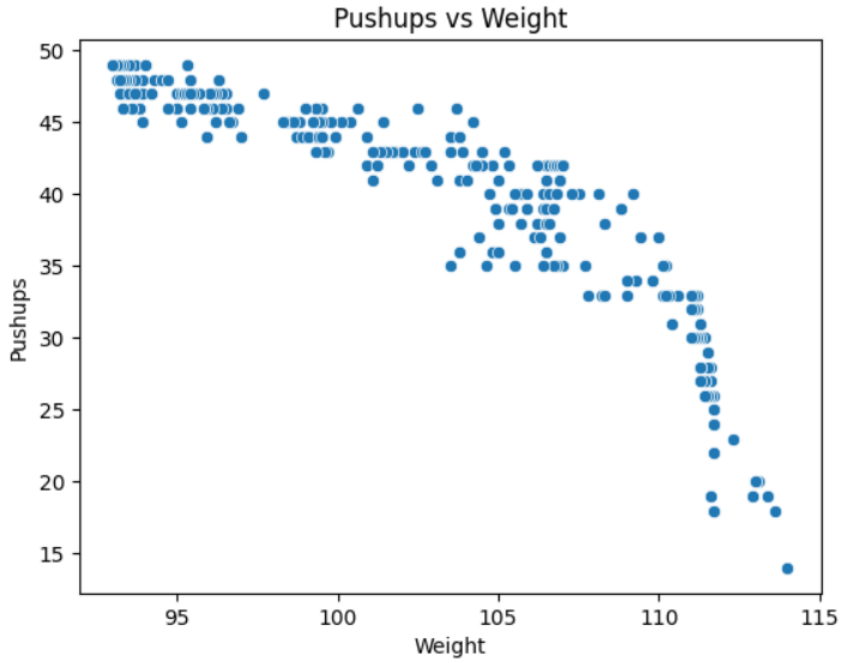


Correlation Analysis:

Constructed correlation matrices and visual graphs to explore relationships between key variables: weight, day count, and the number of pushups.

Observed a notable negative linear correlation between weight and the number of pushups, suggesting as weight decreased, the number of pushups tended to increase.





Machine Learning Models:

Applied various regression models to predict the number of pushups based on weight and day.

Linear Regression Model:

Achieved an R^2 value of 0.87 and a Mean Squared Error (MSE) of 9.72, indicating a strong predictive capability with just a basic model.

Support Vector Regression (SVR):

Obtained a slightly improved R^2 of 0.88 and an MSE of 8.21, offering a marginal enhancement over the linear model.

Random Forest Regressor:

Chosen for its proficiency in handling relationships and its ability to model complex interactions between features, making it particularly suitable for this dataset.

Yielded significantly better results with an MSE of 2.44 and an R^2 Score of 0.967, demonstrating a substantial improvement in predictive accuracy and reliability.

These improvements highlight the model's ability to capture the intricate dynamics between the day count, weight, and pushup numbers more effectively than simpler models.

The progression through different models underscored the complexity of the relationship between the tracked metrics and the effectiveness of advanced machine learning techniques in deriving meaningful predictions from personal health data.

Findings:

Impact of Consistent Tracking:

The process of diligently recording daily metrics revealed the significance of consistency in health and fitness regimes. Regularly tracking weight and exercise painted a clear picture of progress and highlighted areas needing improvement.

Health Improvements:

Analysis of the data showed a noticeable improvement in fitness levels, as evidenced by the increase in pushup counts over time. This improvement was concurrently accompanied by a healthy reduction in weight, underscoring the effectiveness of my diet and exercise plan.

Relationship Between Weight and Exercise Capacity:

The negative correlation between weight and the number of pushups demonstrated a clear relationship between weight loss and increased physical capability. This finding was a motivating factor, reinforcing the importance of maintaining a healthy weight for enhanced physical performance.

Learning from Data:

The data-driven approach provided objective insights that went beyond subjective feelings and perceptions. It offered a factual basis for understanding the impact of lifestyle changes on my physical health.

Predictive Power of Machine Learning:

The success of machine learning models, especially the Random Forest Regressor, in predicting pushup counts based on weight and day demonstrated the potential of data science in personal health and fitness. It provided a glimpse into how technology can be harnessed for personal health monitoring and goal setting.

What Could Be Done Better and Future Plans

Inclusion of Additional Health Metrics:

A notable limitation was the exclusion of other potentially influential health metrics such as daily caloric intake and estimated fat ratio. Incorporating these fields could provide a more comprehensive understanding of the relationship between diet, body composition, and exercise performance.

Extended Data Collection Period:

While the existing dataset has provided valuable insights, a longer duration of data collection could yield more substantial and statistically significant results. A more extended dataset would allow for the analysis of long-term trends and the observation of seasonal or annual patterns in health and fitness metrics.

Future Monitoring and Tracking Plans:

The intention to continue monitoring health metrics, including the new fields of daily calory intake and estimated fat ratio, is set. Although not in the structured format of a project, this ongoing data collection will be instrumental for personal health management.

Future data tracking will facilitate a deeper understanding of how dietary habits directly correlate with physical fitness levels, particularly in relation to exercise capacity like pushup counts.

This continued effort in data collection and analysis can serve as a valuable personal health repository, potentially useful for future health-related projects or even for sharing insights with healthcare professionals.