Fitness Data Analytics Report

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1. Project Overview:

This report aims to analyse and visualize fitness and health metrics from multiple datasets to uncover patterns, correlations, and trends. The datasets include daily activity, heart rate, hourly activity, sleep data, and weight logs. The analysis will help in understanding the interplay between different health metrics and provide actionable insights for improving overall wellness.

2. Data Sources:

1.DailyActivityMerged.csv: Contains daily metrics such as steps, distance, calories burned, and active minutes.
2.HeartRate.csv: Tracks heart rate data recorded at different times throughout the day.
3. HourlyActivityMerged.csv: Provides hourly breakdowns of steps and calories burned.
4. MinutesActivity.csv: Details on minutes spent in different activity levels (e.g., sedentary, light, moderate, vigorous).
5. SleepDataMerged.csv: Contains data on sleep duration and efficiency.
6. WeightLogInfo.csv: Records weight, BMI, and body fat percentage over time.

3. Data Connections:

Relationships:
- DailyActivityMerged.csv ↔ HeartRate.csv: Linked by `UserID` and `Date`.
- MinutesActivity.csv ↔ SleepDataMerged.csv: Linked by `UserID` and `Date`.
- WeightLogInfo.csv ↔ Other datasets: Linked by `UserID`.

Joins:
- Merged datasets using common fields to create a unified view for analysis.
- Used joins to combine daily activity data with hourly activity data for a detailed analysis.

Data Blending (if needed):
- Used blending to combine data from unrelated datasets (e.g., combining sleep data with heart rate data).

4. Data Visualization:

4.1 Daily Activity Overview:
- Line Chart: Displays daily steps and calories burned. This visualization helps in understanding trends and identifying days with high activity.
- Bar Chart: Shows the distribution of active minutes across different activity levels (sedentary, light, moderate, vigorous).

4.2 Heart Rate Analysis:

- Time-Series Line Chart: Illustrates average heart rate throughout the day, highlighting peak periods and trends.
- Scatter Plot: Compares heart rate with active minutes, revealing correlations between activity intensity and heart rate.

4.3 Sleep Patterns:

- Bar Chart: Compares sleep duration with sleep efficiency. This chart helps in understanding how sleep quality varies with total sleep time.
- Correlation Plot: Examines the relationship between daily activity levels and sleep efficiency, showing how increased activity may impact sleep quality.

4.4 Weight and BMI Trends:

- Line Chart: Tracks changes in weight and BMI over time, providing insights into weight management and trends.
- Scatter Plot: Compares weight against daily steps, helping to visualize the relationship between physical activity and weight changes.

4.5 Combined Insights:

- Dashboard Filters: Allow users to explore data by different time periods, activity levels, or specific users.
- Interactive Visualizations: Enable users to drill down into specific data points and analyze correlations between metrics.

5. Key Insights:

- Activity and Sleep: Users who maintain consistent activity levels tend to have better sleep efficiency. High activity levels during the day are linked to improved sleep quality.
- Heart Rate Trends: Peak heart rate times correlate with periods of moderate to vigorous physical activity. Regular exercise often results in lower average heart rates.
- Weight Management: There is a notable correlation between increased daily steps and decreased weight. Regular physical activity is associated with weight loss over time.

6. Recommendations:

- Consistent Activity: Encourage maintaining a steady level of physical activity throughout the day. This can improve sleep quality and overall health.
- Optimize Exercise: Monitor heart rate during workouts to ensure the intensity is appropriate for fitness goals. Adjust exercise routines based on heart rate data.
- Improve Sleep: Promote practices that enhance sleep quality, such as maintaining a regular sleep schedule and engaging in physical activity during the day.
- Monitor Weight: Regularly track weight and physical activity to manage weight effectively. Incorporate more steps into daily routines to support weight loss goals.

7. Conclusion:

The integrated analysis of fitness data provides valuable insights into how daily activities, heart rate, sleep, and weight interact. By leveraging these insights, users can make informed decisions to enhance their health and wellness. The dashboard offers a comprehensive view of individual fitness metrics, enabling users to track progress and identify areas for improvement.

8. Next Steps:

- Refine Visualizations: Based on user feedback, refine visualizations to better highlight key metrics and trends.
- Expand Analysis: Consider incorporating additional datasets or metrics for a more comprehensive analysis.
- User Engagement: Develop interactive features to engage users and facilitate deeper exploration of their fitness data.

Tableau dashboard link:
https://public.tableau.com/views/FitBitCaseStudyVisualized_17241533093440/FitBitCaseStudyVisualized?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link