Strava Fitness Data Analytics Report

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Tools Used: Python, Pandas, Matplotlib, Seaborn

1. Introduction

The purpose of this project was to analyze fitness tracker data to uncover patterns in physical activity, calorie expenditure, and sleep. By visualizing user behaviors, we can derive insights that guide recommendations for healthier lifestyles and help companies like Bellabeat/Strava refine their wellness products.

2. Visualizations and Insights

1. Histogram of Daily Steps

- What it shows: Distribution of daily steps taken by users.
- Insight: Many users fall short of the 10,000 daily step guideline, while a smaller group achieves high step counts.
- Challenge: Inconsistent activity levels across the population.

2. Scatterplot: Steps vs Calories Burned

- What it shows: Relationship between total steps and calories burned.
- Insight: A clear positive correlation — higher steps generally lead to more calories burned.
- Challenge: Some users show high calories burned with relatively fewer steps, possibly due to other physical activity or recording inconsistencies.

3. Histogram of Sleep Duration (Hours per Night)

- What it shows: How many hours users sleep per night.
- Insight: Sleep duration is often below the recommended 7–9 hours.
- Challenge: Sleep deprivation is common among users, affecting overall health.

4. Bar Chart: Weekday vs Weekend Sleep

- What it shows: Comparison of average sleep on weekdays vs weekends.
- Insight: Users tend to sleep longer on weekends, suggesting 'catch-up' sleep behavior.
- Challenge: Irregular patterns disrupt circadian rhythm and recovery.

5. Line Plot: Hourly Activity Trends

- What it shows: Activity intensity throughout the day.
- Insight: Peak activity occurs in the morning and evening hours.
- Challenge: Afternoon hours are mostly sedentary, suggesting limited midday movement.

6. Boxplot: Calories Burned Distribution

- What it shows: Spread of daily calories burned among users.
- Insight: Wide variability, with some outliers showing unusually high calorie expenditure.
- Challenge: Indicates different fitness levels and potential data inconsistencies.

7. Bar Chart: Sedentary Minutes

- What it shows: Time spent sedentary across users.
- Insight: Many users spend excessive hours sedentary, reducing fitness benefits.
- Challenge: Prolonged sedentary time impacts health even if step goals are met.

8. Correlation Heatmap

- What it shows: Relationships between variables (steps, calories, sleep, sedentary minutes).
- Insight: Strong correlation between steps and calories; weak correlation between sleep and steps.
- Challenge: Indicates need for integrated tracking to balance activity and rest.

9. Bar Chart: Activity Intensity Levels

- What it shows: Distribution of light, moderate, and vigorous activity.
- Insight: Majority of logged activity is light intensity, with fewer vigorous activities.
- Challenge: Users may not be reaching optimal fitness intensity levels.

3. Overall Findings

- Most users struggle to meet recommended step goals.
- There is a strong link between physical activity and calories burned.
- Sleep patterns are inconsistent, with weekday sleep deficits and weekend compensation.
- Sedentary behavior remains a challenge, reducing overall health benefits.

4. Recommendations

✅ Encourage step consistency: Use gamification, reminders, and milestone badges to motivate daily activity.

✅ Promote balanced sleep habits: Educate users on regular sleep schedules, discourage late-night activity logging.

✅ Personalized fitness plans: Highlight calorie–activity balance with tailored targets.

✅ Weekend adjustments: Encourage users to spread activity more evenly instead of relying on weekend boosts.

5. Conclusion

This visualization-driven analysis highlights critical areas where users can improve their fitness and wellness behaviors. By leveraging these insights, companies like Bellabeat/Strava can design features that encourage daily step goals, consistent sleep patterns, and sustainable calorie management, ultimately leading to improved user health and stronger product engagement.