

Project Report: Optimizing User Health Through Smart Insights

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Acknowledgment: Inspired by the work of Macarena Lacasa (presented on Kaggle [1]), this analysis delves deeper into user heart rate data, to develop key insights that can be used by the Bellabeat company to improve their marketing strategy.

1. Summary ¶

Bellabeat is a high-tech company that manufactures health-focused smart products. They offer different smart devices that collect data on activity, sleep, stress, and reproductive health to empower women with knowledge about their own health and habits.

The main focus of this case is to analyze smart devices fitness data and determine how it could help unlock new growth opportunities for Bellabeat. We will focus on one of Bellabeat's products: Bellabeat app.

The Bellabeat app provides users with health data related to their activity, sleep, stress, menstrual cycle, and mindfulness habits. This data can help users better understand their current habits and make healthy decisions. The Bellabeat app connects to their line of smart wellness products

2. Ask Phase

2.1 Business Task

Identify trends in how consumers use non-Bellabeat smart devices to apply insights into Bellabeat's marketing strategy.

Stakeholders

- Urška Sršen - Bellabeat cofounder and Chief Creative Officer

- Sando Mur - Bellabeat cofounder and key member of Bellabeat executive team
- Bellabeat Marketing Analytics team

3. Prepare Phase ¶

3.1 Dataset used:

The data source used for our case study is FitBit Fitness Tracker Data. This dataset is stored in Kaggle.

3.2 Accessibility and privacy of data:

Verifying the metadata of our dataset we can confirm it is open-source. The owner has dedicated the work to the public domain by waiving all of his or her rights to the work worldwide under copyright law, including all related and neighboring rights, to the extent allowed by law. You can copy, modify, distribute and perform the work, even for commercial purposes, all without asking permission.

3.3 Information about our dataset:

These datasets were generated by respondents to a distributed survey via Amazon Mechanical Turk between 03.12.2016-05.12.2016. Thirty eligible Fitbit users consented to the submission of personal tracker data, including minute-level output for physical activity, heart rate, and sleep monitoring. Variation between output represents use of different types of Fitbit trackers and individual tracking behaviors / preferences.

3.4 Data Organization and verification:

Available to us are 18 CSV documents. Each document represents different quantitative data tracked by Fitbit. The data is considered long since each row is one time point per subject, so each subject will have data in multiple rows. Every user has a unique ID and different rows since data is tracked by day and time.

We have used the “heartrate_seconds_merged”, “dailyActivity_merged” and “hourlySteps_merged” for our analysis.

4. Process and Analyze Phase ¶

I will focus my analysis in R due to the accessibility, amount of data and to be able to create data visualization to share my results with stakeholders.

The three data frames mentioned above were merged on the basis of Id and Date, in order to find the correlation between "heart rate & total steps taken" and negative correlation between " heart rate & total minutes slept".

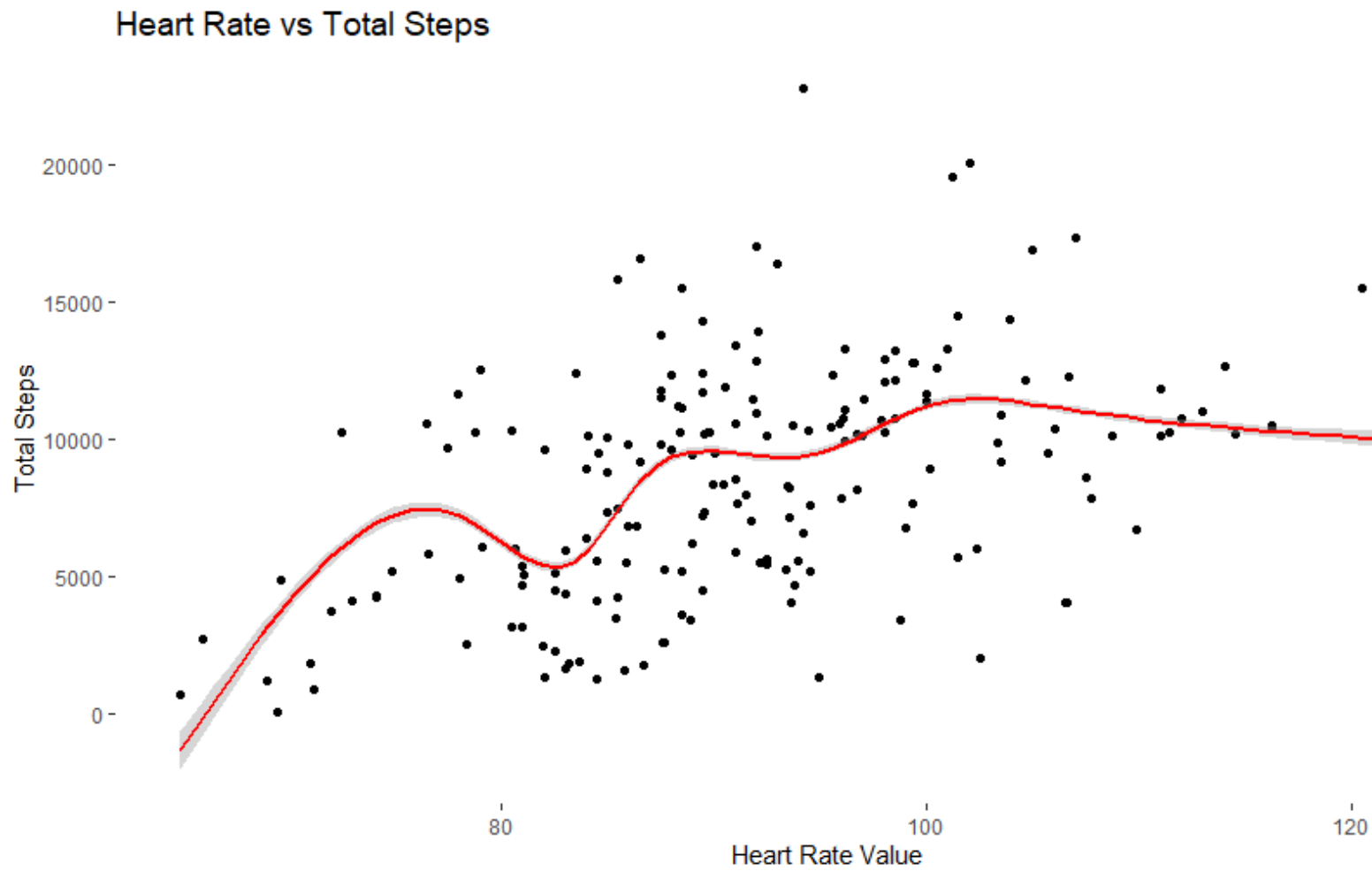


Fig 1: Correlation between heart rate & total steps taken

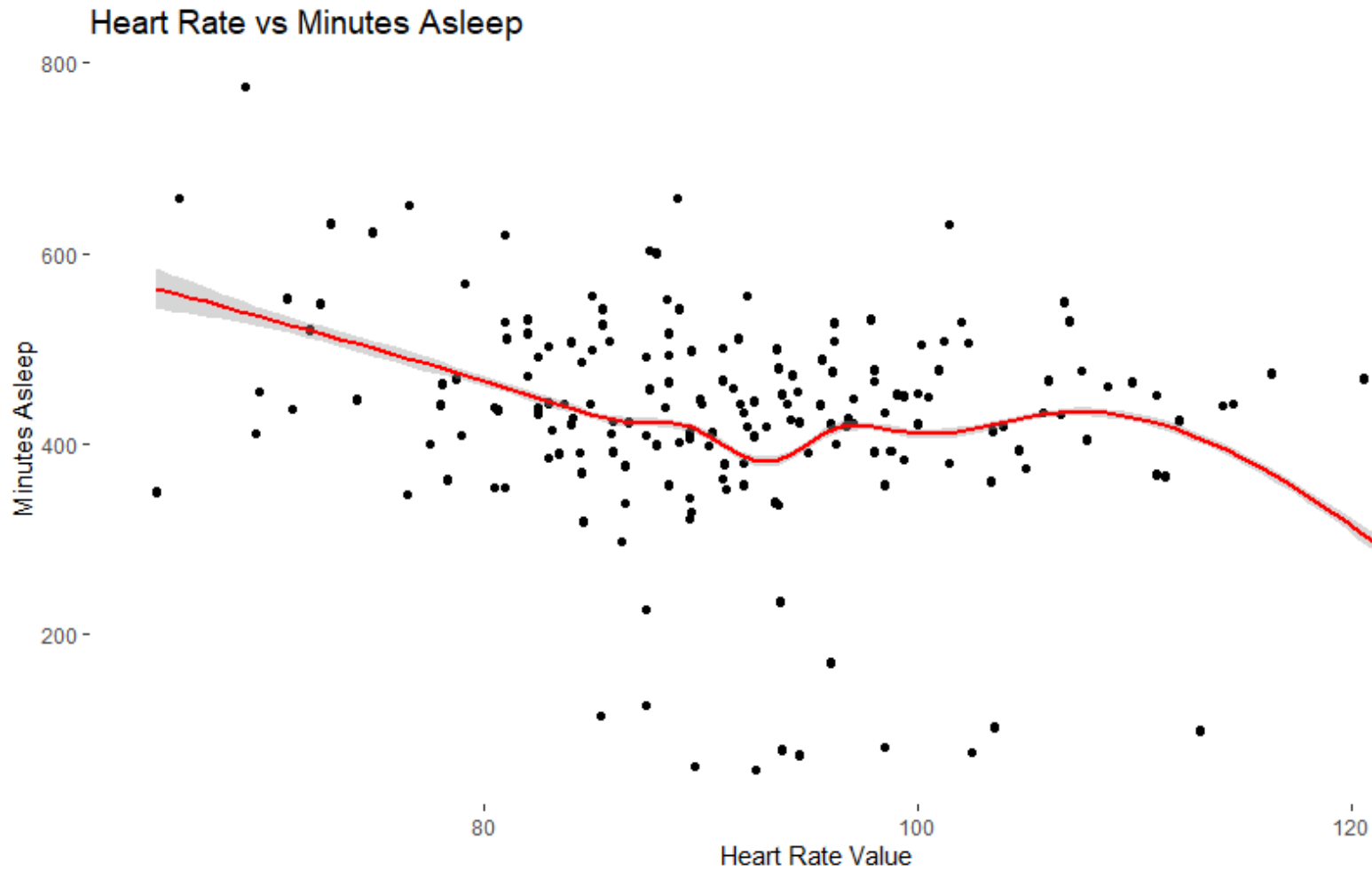


Fig 2: heart rate & total minutes slept

Further "heart rate" variation of users throughout the weekdays and across a 24-hour cycle was analysed to get the following figures.

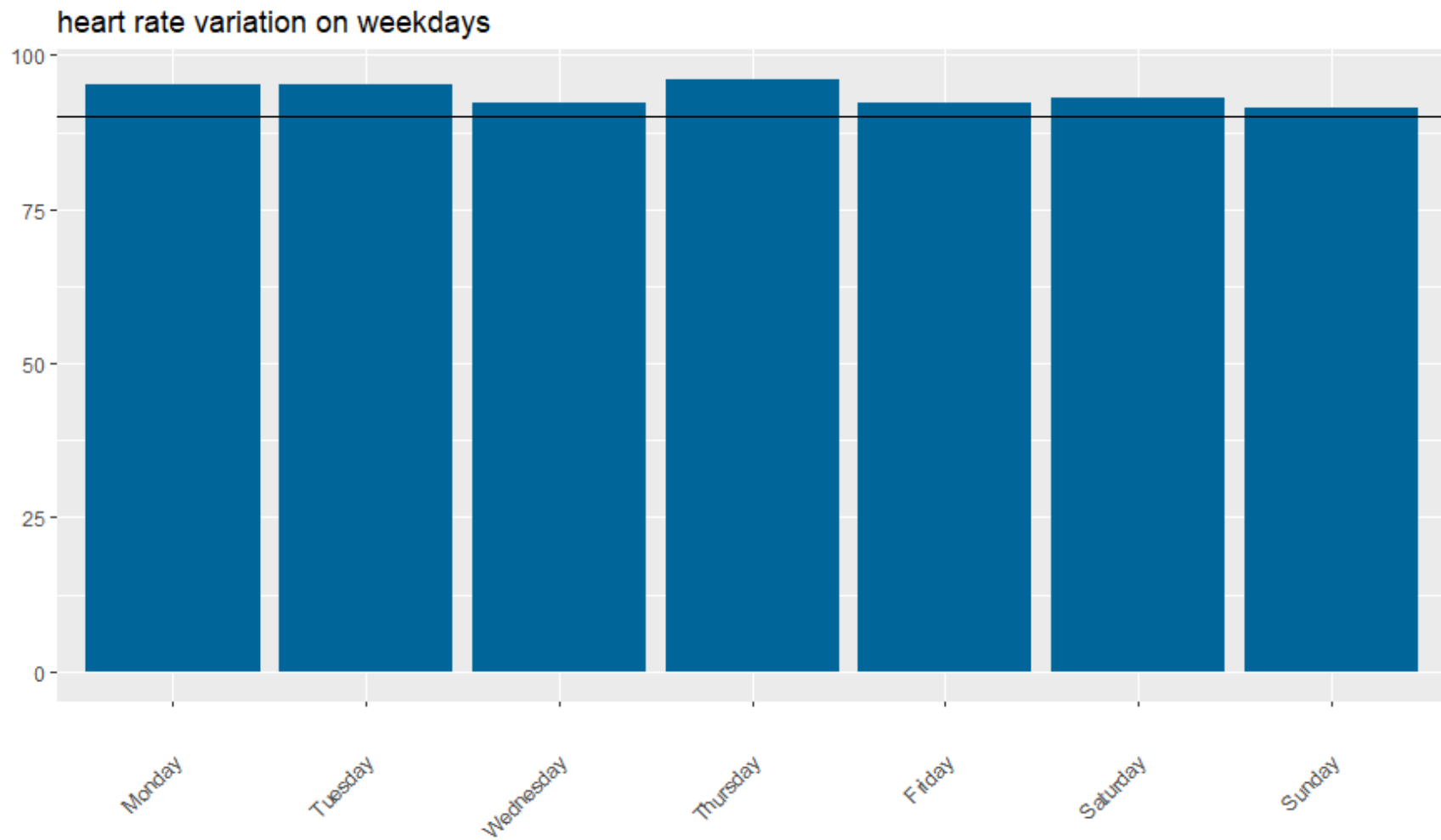


Fig 3: heart rate variation over week days

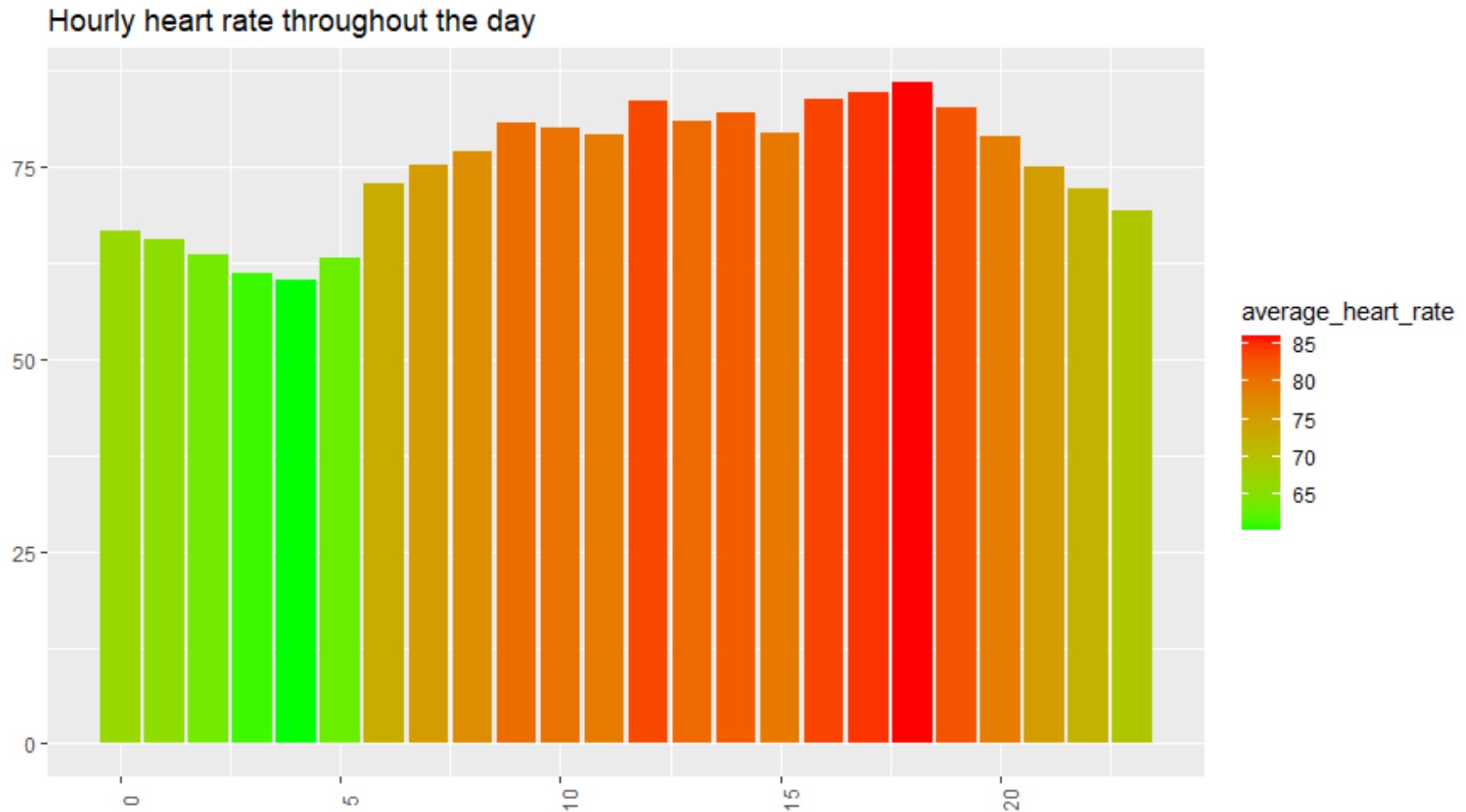


Fig 4: heart rate variation across a 24-hour cycle

5. Conclusion

From Fig 4 we can observe that the average heart rate is highest between 3 pm and 8 pm, this information can be used by the company to deliver timed recommendations to maintain a healthy heart rate.

Also using the 90 beats per minute intercept (Fig 3) the company can check and notify the user about higher heart rate and recommend necessary lifestyle changes or relaxation exercises.

6. Reference

1. Author: Macarena Lacasa (<https://www.kaggle.com/code/macarenalacasa/capstone-case-study-bellabeat>) (Accessed: June 12, 2024)