**Summary of the business task**

The Business task main objective is to analyse Fitbit Tracker App to know how the customers are utilizing the Fitbit app. And, to identify trends and patterns in users behaviour for marketing decisions. Here, there are 18 CSV files that shows the various aspects of user activity. These are collected between 03.12.2016 and 05.12.2016 through a survey on Amazon Mechanical Turk. This also analyse trend in daily and hourly activities, sleep patterns. Weight logs, heartrate and understand user’s preferences. Tools used are data cleaning, visualization, analysis.

**What are the trends identified?**

Based on the analysis of Fitbit dataset, several trends have been identified based on users activity like peak activity times, variation in activity levels and sleep quality, common sleep durations, active heart rate level, weight pattern, clustering analysis shows the users activity level and sleep behaviour. Understand how the trends change over days, weeks, months.

**How could these trends apply to customers?**

The users can plan workout based on peak activity times and can establish healthy sleeping habits. They can observe their weight patterns and based on that the fitness and nutrition to be consumed can be planned. The heart rate can be monitories overall health and stress levels. The users can receive personalized health and fitness recommendations. Based on these everything can be managed, and new habits can be obtained.

**How could these trends help influence marketing strategy?**

Use peak activity times to promote fitness challenges or special offers. Offer personalized nutrition plans or weight management products. Heart rate monitoring as a crucial feature for stress management and fitness optimization. User engagement enhances the appeal of Fitbit products, and increases the overall impact of marketing efforts on user satisfaction and retention.

**A description of all data sources used.**

The dataset for the analysis contain18 CSV files that were generated because of a distributed survey conducted through Amazon Mechanical Turk. The survey took place over a period from March 12, 2016, to May 12, 2016. The participants in this survey are the Fitbit users who share their personal tracker data. Each CSV file corresponds to a specific type of data related to Fitbit user activities, including physical activity, sleep patterns, weight logs, and heart rate. The variation observed in the data is attributed to the use of different Fitbit trackers and the individual tracking behaviour and preferences of the participants. The diverse range of files, such as daily and hourly activity logs, sleep day records, and heart rate data, provides a view of how users interact with the Fitbit app.

**Documentation of any cleaning or manipulation of data**

Firstly, check whether there any missing values in the given datasets and one dataset has have a missing value and it is handled using isnull(). Convert date columns to datetime using datetime function. Merge relevant data based on common identifiers using merge function. Create aggregated metrics by applying functions.

**A summary of the analysis**

Different users engage in varying levels of very active, moderately active, and lightly active minutes. Some users displayed consistent sleep quality, while others showed variations over time. Individual users exhibited unique patterns in weight logs. Users displayed diverse levels of active heart rate during specific activities. Clustering analysis identified distinct user segments based on activity levels and sleep behaviour. Trends analysed over time, such as daily, hourly, and monthly variations, to understand user behaviour changes.

**Supporting visualizations and key findings**

Average steps during different hours of the day that reveals peak activity times and understanding user preferences for physical activity. Daily Calories vs Total Distance illustrate the relationship between daily calories burned and total distance covered. Distribution of daily activity minutes provide a pie chart showcasing the distribution of very active, fairly active, lightly active, and sedentary minutes. Distribution of total steps highlights the overall distribution of total steps taken by users. Distribution of total minute asleep displays the distribution of total minute asleep offering insights into users sleep patterns. Distribution of Total sleep records depicts the frequency distribution of total sleep records recorded by users. Weight over time shows the trends in user’s weight over the recorded time period. Distribution of weight illustrates the distribution of recorded weights providing an overview of user’s weight variations. Distribution of sleep duration display the distribution of sleep duration recorded by users. Distribution of daily calories highlights the frequency distribution of daily calorie burn.

**High-level content recommendations based on the analysis.**

Customized Fitness plan based on individual user habits and preferences. Advertise features and promotions during times when users are most active. Provide personalized sleep tips considering users unique sleep patterns. Enhance community challenges and introduce fun activities to boost engagement. Create customized weight management plans to adapt to user’s weight changes. Educate users on heart health by explaining resting and active heart rate data. Customize marketing campaigns based on age, gender, and other demographic factors. Improve app look and make it user friendly charts and interactive visuals. Partner with brands that aligns the user’s health and wellness interests.