**TRACKING WELLNESS : FITNESS AND NUTRITION**

**Team Members : Group 25**

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4. **Project Overview :**

More people seek individualized understanding about their exercise routines and nutrition behavior because wellness has gained increased attention. Several tracking applications for fitness and nutrition exist but their lacking point derives from inadequate data-supported solutions connecting physical activity with dietary recommendations into one cohesive wellness regimen.The project targets this knowledge gap by processing user health data and dietary habits to create tailored wellness recommendations. Our analysis of exercise patterns and nutritional choices through data-driven methods will find evaluative links between these factors to provide meaningful guidance for enhancing general health status.

1. **Objective :**

Project 1 aims to explore the Fitness Activity dataset through visual depictions to uncover fitness patterns along with related trends. Our team will perform data cleaning tasks to deal with missing data entries then perform needed transformations before proceeding. We will apply our skills in Power BI to develop bar charts along with line graphs and histograms and scatter plots to examine workout types and calorie consumption and heart rate and step count data. We will then use a correlation analysis to measure exercise activity effects on performance measurements.

For Project 2 we aggregate Fitness Activity and Nutrition datasets to analyze advanced correlations through Pearson and Spearman statistical methods. Plotly alongside Altair and D3.js will be used for creating interactive visualizations which will analyze exercise intensity in relation to nutritional factors. The results from this analysis enable the creation of custom fitness and nutrition solutions which can help people maximize their workout effectiveness through their specific exercise and dietary behaviors.

1. **Tools and Technologies :**

* **Project 1 :**

The tool Power BI enables users to perform data decluttering and develop interactive dashboard interfaces. Through visualization Power BI displays health metrics which compare caloric intake against expenditure alongside nutrient breakdowns and workout results to help users understand their health data easily.

* **Project 2 :**
* Through Plotly and Altair users access sophisticated statistical visualization tools which create scatter plots and trend lines and heatmaps to help uncover detailed interactive information about their fitness and nutrition data.
* The web visualization framework D3.js provides dynamic customizable features which enable real-time updates of interactive charts including progress bars and interactive graphs for tracking fitness and nutrition goals.

1. **Dataset Description :**

* In project 1, fitness dataset is used for visualizations
* In project 2, fitness dataset is integrated with Nutrition dataset for advanced analysis
* **Fitness dataset :**

This dataset is taken from Kaggle. It contains data related to the user's day-to-day fitness activities like sleep hours, workout types, place of the workouts and their mood. This dataset is ideal for analyzing fitness patterns and understanding the relationship between workout intensity and physiological metrics. It provides valuable insights into fitness activities and can be used for data visualization of workout performance & health trends.

<https://www.kaggle.com/datasets/arnavsmayan/fitness-tracker-dataset>

* **Nutrition dataset :**

The nutrition dataset tracks 4,303 rows across 48 features which include assessment details and unique “Nutrient Data Bank Numbers”. The dietary content features the basic dietary components including carbohydrates together with proteins along with fats and cholesterol and necessary dietary elements (Vitamin A, B6, B12, C, D, E, K, Calcium, Iron, Potassium). The dataset includes controls over carotenoids with Beta Carotene and Lycopene aside from Ash measurements and Water content determinations and household weights.

<https://www.kaggle.com/datasets/shrutisaxena/food-nutrition-dataset?resource=download>

1. **Methodology :**

**Project 1 : Initial Insights**

* **Stage 1: Data Exploration :**

The journey begins with an examination of the fitness dataset which provides us with an understanding of its basic structure. Through Power BI we import the data and determine important data variables including calories consumed per day together with workout schedules and nighttime hours. The dataset distribution patterns become visible in histograms and bar charts that we create to monitor feature distributions while looking for early trends. The initial analysis provides essential background information about the data by showing how diet together with exercise levels affect someone's fitness level.

* **Stage 2 : Data preprocessing and Correlation Analysis :**

We use Power BI to clean the loaded data by resolving missing values while also fixing inconsistent patterns. Following data import we proceed to explore the relationships between essential values to study their impact on workout performance as well as the relationship between fitness improvement and calorie consumption. Scatter plots together with heat maps enable visual discovery of meaningful patterns.

**Project 2 : Advanced Analysis**

* **Stage 3 : Integrating Datasets and Deeper Analysis**

We merge user profile data with environmental factors including weather conditions alongside stress measurements, nutrients intake in the Power BI platform. We use Plotly along with Altair to develop interactive visualizations that show how weather elements shape workout behaviors as well as how age groups differ in fitness objectives. The display of visualization data enables researchers to examine trends that traditional methods of analysis would miss.

* **Stage 4 : Advanced Visualizations and Interactive Webpage :**

The conclusion brings analysis to life through D3.js which creates dynamic interactive visualizations that provide real-time data interaction. Through dashboard interaction users can explore their fitness data by clicking on it and performing filtering operations while using hovering functionality to inspect different workout types and progress metrics. Plotly delivers customized graphics including line charts and pie charts to visualize fitness metric alterations across durations. Through an interactive platform users achieve greater depth in understanding their individual fitness and nutrition experiences.

1. **Interactive Webpage :**

* **Main page :** On the main page users will find an introduction that outlines the solution of assisting users with fitness and nutrition tracking for better health effects. The content summarizes Project 1's research findings to present crucial observations about fitness developments impacted by sleep and exercise patterns. An overview displaying dataset information about calorie intake and workout routines as well as sleep patterns will appear on the page.
* **Inner pages :** The more detailed analysis exists on the inner pages which demonstrates advanced correlation analysis results. These dynamic charts allow users to assess the relationship of multiple factors including calorie intake alongside exercise frequency and sleep duration which together affect fitness targets. Through interactive visualizations users can explore advanced correlations which provide them with personalized insights into their fitness data.

1. **Timeline :**

* **Project 1 ( Weeks 1-7) :**
* **Weeks 1-3 :** Data Understanding, Exploration, Cleaning the data
* **Weeks 4-5 :** Understanding correlational analysis & finding key relationships
* **Weeks 6-7 :** Creating Visualizations and dashboard on Power BI
* **Project 2 (Weeks 8-12) :**
* **Weeks 8-9 :** Integrating with other datasets and checking for any inconsistencies
* **Weeks 10-11 :** Performing advanced visualizations
* **Week 12 :** Creating a webpage and deploying it

1. **Deliverables :**

* **Project 1 :** Fundamental data insights, visualisations & correlational analysis for fitness
* **Project 2 :** Advanced statistical analysis, merging nutrition dataset, high level visualizations and interactive webpage