THE IMPORTANCE OF CAPTURING CARBON EMISSIONS IN TRANSPORTATION AND ACCOMMODATION.

AIM ?

To promote and facilitate sustainable company travel practices by providing actionable insights that can lead to more sustainable and environmentally conscious travel decisions.

Objectives

1.Carbon Footprint Assessment: Evaluate the environmental impacts of company travel by analyzing carbon emissions associated with different modes of transportation and accommodation.

2.Optimization of Routes:
a) Identify and suggest sustainable routes and transportation options to reduce overall environmental impact.
b) Analyze data to understand public transportation usage and identify areas for improvement.
c) Examine travel data to understand peak travel times and locations.

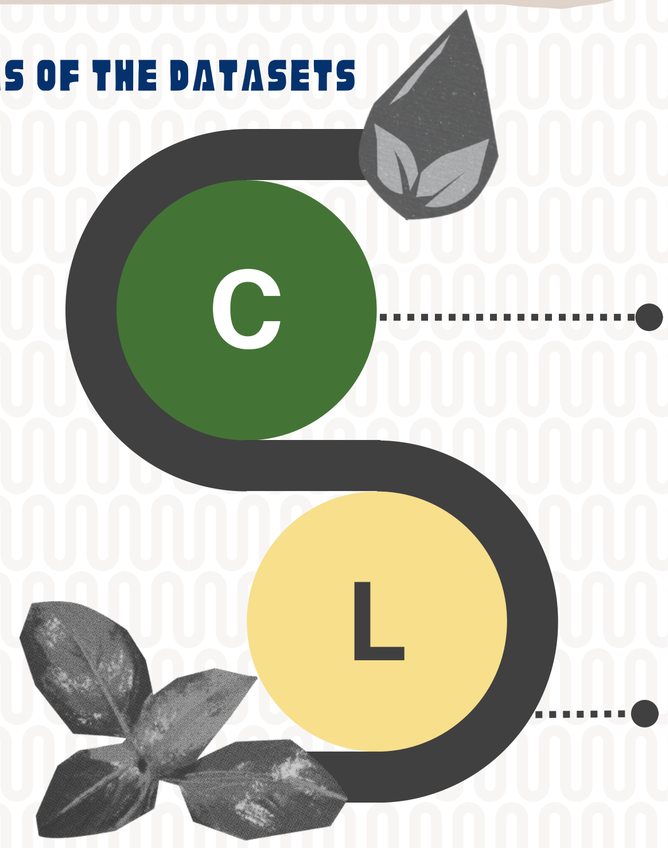
3. Sustainability in Accommodation: Assess associated emissions and practices of company accommodation and recommend more sustainable options

4.Behavioral Analysis: Understand traveler behavior to develop strategies that promote sustainable choices during travel.

ISSUES REGARDING THE TREATMENT AND ANALYSIS OF THE DATASETS

We're dealing with 4 datasets, train ticket data, car hire data, air ticket data and hotel data. Here are some issues to consider regarding these datasets.

- **Missing data:** There are categories that have some fields missing. For example, some of the entries in the drop-off region for the car hire data is missing. We will have to look at each attribute that has missing entries and choose to delete rows, impute values, etc.
- **Maintaining consistency:** We have to make sure that the data in each dataset do not contradict one other.
- **Gaining completeness:** The problem should be described fully by the data. For example, we do not have the CO2 emission information, so we will need to find some more data to achieve completeness.
- **Joining data together:** If we can find a way to link the data together, we can join the datasets together to give a clearer comparison.



CHALLENGES :

- Incomplete CO2 emission data across all dataset files obstructs carbon footprint assessment.

- Estimating CO2 emissions for car hires is complicated due to insufficient distance information (pick-up and drop-off), making direct calculation via distance-based methods challenging. Alternative approaches, such as searching external data or employing a spend-based method as instructed by DEFRA 2023, may be necessary.

- The hotel dataset also contains missing CO2 emission, hotel chain and country information, necessitating the use of relevant Data Science techniques for handling missing data.

LIMITATIONS:

-DEFRA 2023's emission factors for spend-based methods categorize vehicles broadly, potentially impacting the accuracy of specific car type emissions.

-The data estimation process for car hires and hotels involves multiple steps, potentially affecting the accuracy of the final results.

IMPLEMENTATION PLAN

1. Data Exploration.
2. Data Cleaning and Integration.
3. Feature Engineering.
4. Carbon Footprint Calculation.)
5. Route Optimization and Public Transport Analysis.
6. Sustainability in Accommodation.
7. Behavioural Analysis.
8. Exploratory Data Analysis.
9. Recommendation and Implementations.

ISSUES REGARDING THE ENGAGEMENT WITH THE CLIENT

- **Data Incompleteness and Inaccuracy:** The data provided by the client may be incomplete or inaccurate, impacting the accuracy of our analysis. Further communication is needed to ensure we have precise and comprehensive data.

- **Changing Business Requirements:** The client's business needs may change during the project. Timely communication and adjustments in our plans are crucial to meet new requirements and ensure project success.

- **Communication & Feedback:** Establishing effective communication and feedback is vital. Smooth communication, prompt issue resolution, and timely feedback from the client are essential for project progress.