Carbon Footprint Analysis
Capstone Project

Group - 14
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Approach to Capturing Individuals CO2 Emissions

The goal of our capstone project is to help reduce an individual's carbon footprint. "A carbon footprint is the total greenhouse gas (GHG) emissions caused directly and indirectly by an individual, organization, event or product." (Source: University of Michigan). We will reduce individuals' carbon footprint by capturing data that is relevant in determining the amount of GHG produced by a person and using machine learning to provide suggestions on ways to reduce it. Overall, we will focus on the direct emissions produced by an individual in the following 3 categories:

- Diet (food consumption)
    - (30% of personal emissions)
        - (26% Source: ourworldindata.org)
        - (34% Source: United Nations)
- Household Energy Consumption (heating, appliances, etc.)
    - (20% of personal emissions)
        - (21% Source: United Nations)
        - (20% Source: PNAS.org)
- Transportation
    - (16% of personal emissions)
        - (13% Source: ourworldindata.org)
        - (19% Source: United States Environmental Protection Agency)

Other aspects that contribute to an individual's GHG emissions include waste, personal consumption, investments, and many other things.

Why Focus on Diet, Household Energy and Transportation?

Our project will only look to capture carbon footprint related to diet, household energy consumption and personal transportation. By doing this it enables our calculations to be accurate and reduces the complexity of the problem, while still capturing more than 65% of a person's carbon footprint. The reason why our project will only focus on the direct factors of a person's carbon footprint is because indirect factors are just too complex and too hard to quantify.

Diet

To accurately capture the CO2 produced from an individual's diet, we will only focus on what type of food they eat. Because more than 90% of a food's carbon footprint is related to the type of food and not where it comes from, how it is grown or how it is packaged.

Note: Serving information per food type was in accordance with the Canadian Food Guide and BC Health Department

Food Type	g CO2 Produce per serving
Beef (Cows Meat)	7461
Chocolate	1400
Lamb	2979
Coffee	4993
Shellfish (Shrimp, Scallops, Crab, Lobster)	2015
Cheese	1194
Fish	1022
Pork, Bacon (Pig Meat	923
Chicken, Turkey	740
Eggs	560
Rice	445
Nuts	129
Tofu (soybeans)	474
Milk	756
Oatmeal	248
Other Vegetables	45
Beer	518
Wine	358
Bread, Pasta, Crackers	133
Berries & Grapes	176
Other Fruit	121
Peas and Legumes	147
Root Vegetables	37
Juice	121
Muffins/Baked Goods	63
Potatoes	39

Transportation

The two things that contribute to the carbon footprint of an individual's transportation are mode of transportation and duration of transportation. To accurately capture the CO2 produced from an individual's transportation we will ask the user for input about their transportation methods.

Mode of Transportation	Average gCO2 per person KM
Domestic Flight	240
Long Haul Flight	195
Car (1 passenger)	194
Bus	99
Car (4 passengers)	48
Domestic Rail	46
Coach Bus	29
Electric Vehicle	80
Taxi/Uber	244
Motorbike	126
Bike	8
Walk	0

Source: Statista and BBC

Per Person CO2 Emissions

*In the U.K the average carbon footprint is 20.7 tonnes CO2 (indirect and direct measurements)
* In the Canada the average carbon footprint is 20.0 tonnes CO2 (indirect and direct measurements) (and 5.0 tonnes of CO2 directly measured)
* In the U.S. the average carbon footprint is 20.6 tonnes CO2 (indirect and direct measurements) (Source: Britannica)
* In the U.S. the average carbon footprint is 48 tonnes CO2 (indirect and direct measurements) (Source: Britannica)