



Carbon footprint due to Food Production

By

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Challenge Statement

A photograph of a red tractor with a white spray rig attached, spraying a field of green crops under a cloudy sky. A horizontal orange bar is positioned above the text area.

- We are producing food with all the resources available on earth without being frugal about the usage of the resources. Global food production contributes about 17.3 billion metric tonnes of carbon dioxide equivalent per year.

How can we:

- Estimate the current effect of each food.
- Evaluate the food production that causing damage in all stages.
- Work on the steps to be taken in future.

Facts to note

- By 2050 we'll need the equivalent of three planets resources to meet our current needs.
- Studies show that food production contributes 37% of world's greenhouse gas(GHG)

Ways to reduce Carbon footprint

STOP wasting food

Food waste is a major contributor to greenhouse gas emissions. Food that's thrown away decomposes in landfills and emits methane, a particularly potent greenhouse gas

Fiber-rich foods

Eating more fiber-rich foods not only improves your health but may also reduce your carbon footprint. A study found that the diets lowest in greenhouse gas emissions were high in fiber-rich plant foods.

Pay attention to disposal/Plastic removal

Garbage disposal has to be taken seriously. Segregating garbage is a lot more important than it's promoted. Remember lovelace? Avoid single use plastics.

Cut down on meat

Switching to a vegetarian or vegan diet is one of the most effective ways to shrink your food carbon footprint. It is difficult to cut down at once, maybe reducing it to one meal a day.

Purchase Local/Grow your own food

To further cut your food carbon footprint, it would make sense to buy locally grown produce but it's not that simple. Urban farming is growing very rapidly and encouraging people to grow their own produce in their small places is going to make a real change

Redesign your cooking methods

Numbers show that cooking is responsible for 13.8% of the electricity we use in our homes, so finding more efficient ways to cook means less electricity and, in turn, less CO₂ produced.

Proposed Solution

- Building informative chatbot that brings awareness.
- Chatbot contains all the information about the greenhouse emission, eutrophication, land usage and water usage of food items.
- Alternative food suggestions that includes sourcing and processing.

Dataset

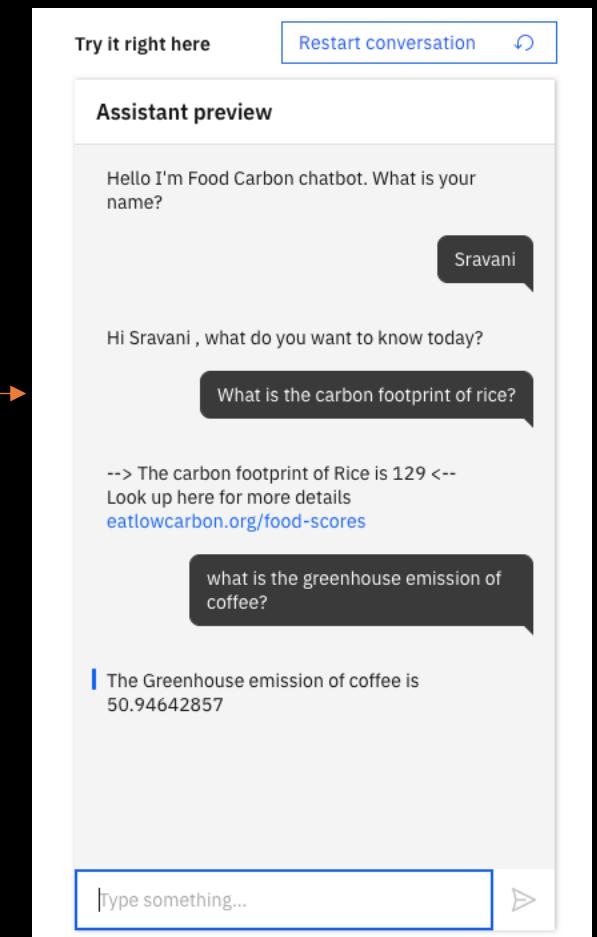
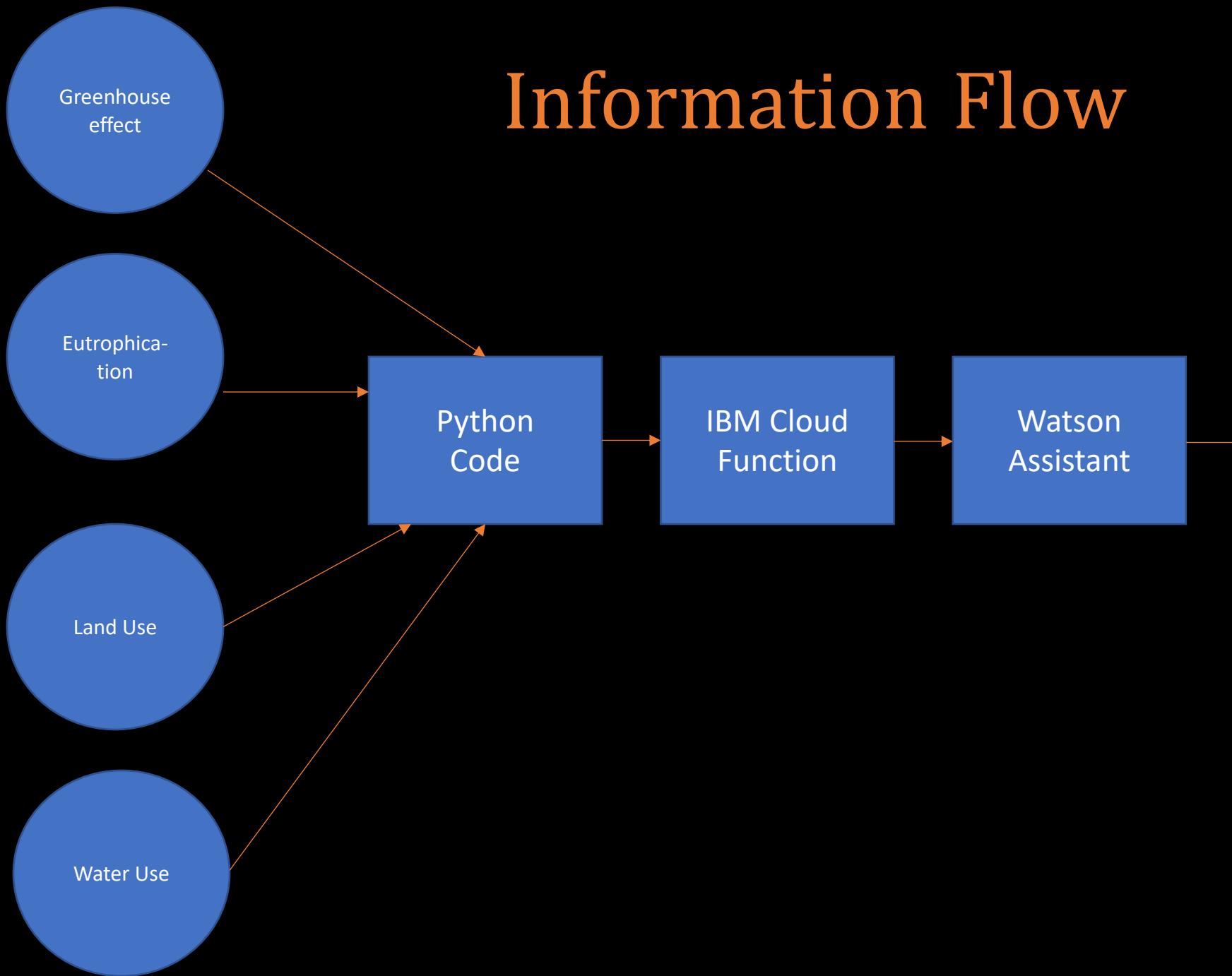
- The data consists of 42 food items and their values used to calculate the carbon footprint.
 - It includes greenhouse emission values(per kilogram and per 1000kcal)
 - It includes the land usage and water usage.
 - Eutrophication values
 - Scarcity-weighted water usage.
-

IBM resources used to build the chatbot

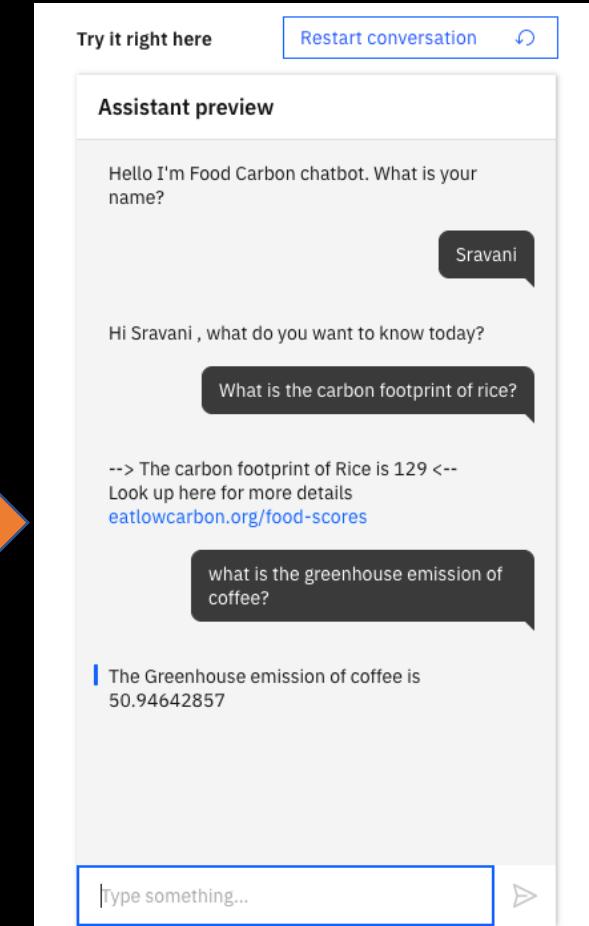
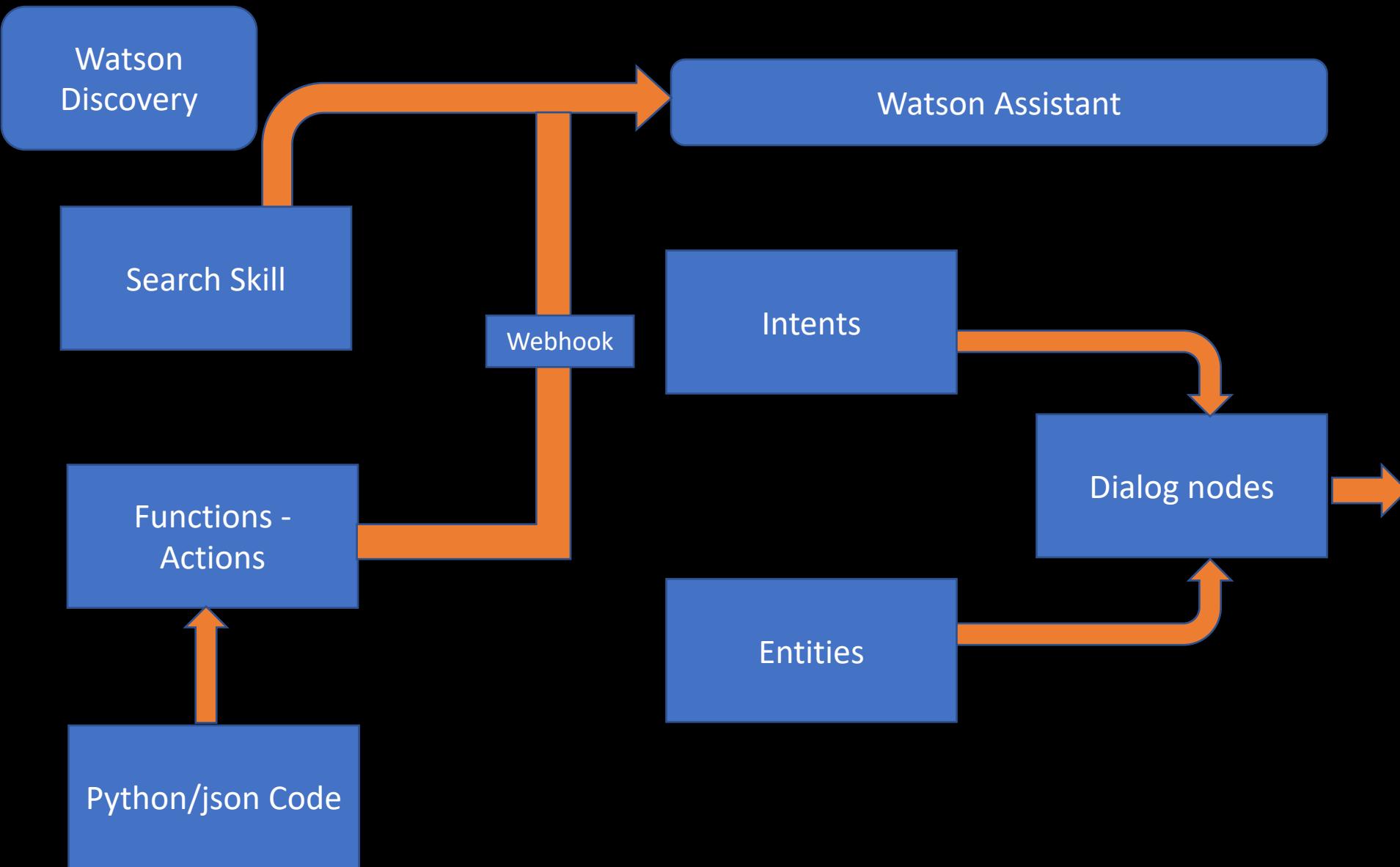
- IBM Watson assistant – To build the chatbot
- IBM Watson discovery – To add the search skills
- IBM Functions – Deploy the Python code
- Various other IBM resources were used to improve the search and fetch the data from the json file..

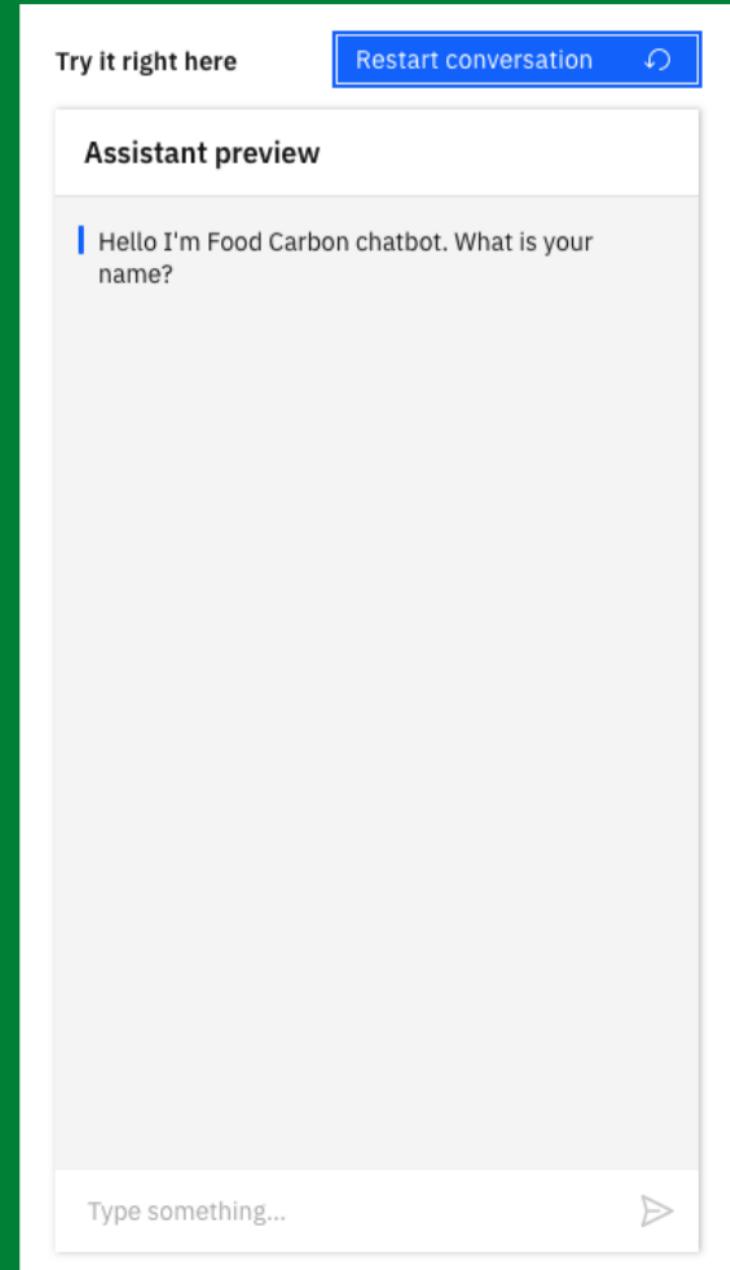


Information Flow

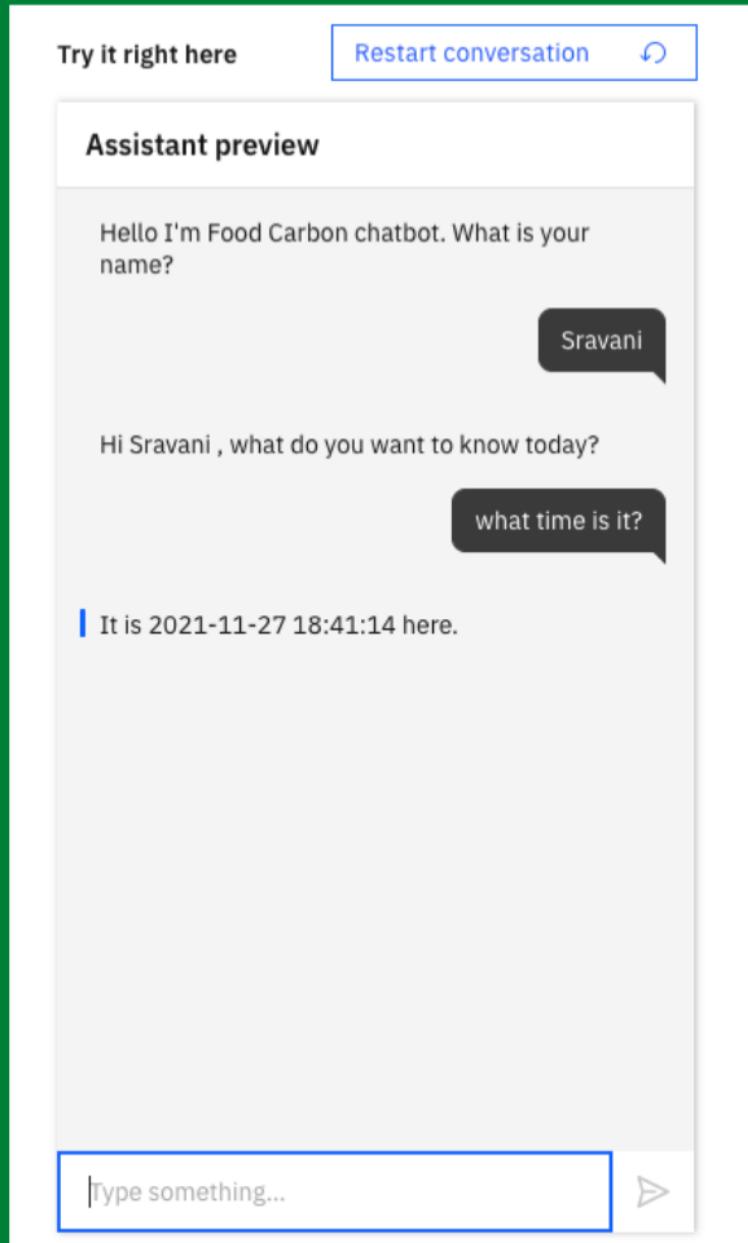


Working model





Welcome message of chatbot



Responds to basic questions

Try it right here

Restart conversation 

Assistant preview

Hello I'm Food Carbon chatbot. What is your name?

what is the greenhouse emission of coffee?

The Greenhouse emission of coffee is 50.94642857

what is the food with high water usage?

Duh! The food item with high water usage is Fish(All values compared energy per 1000kcal). Do you want to see the top 5 food items with high water usage ?

Type something... 

**Responds with information about
Greenhouse emission
Eutrophication
Land usage
Water usage
Scarcity-weighted water usage**

Try it right here [Restart conversation](#) 

Assistant preview

Hello I'm Food Carbon chatbot. What is your name?

Sravani

Hi Sravani , what do you want to know today?

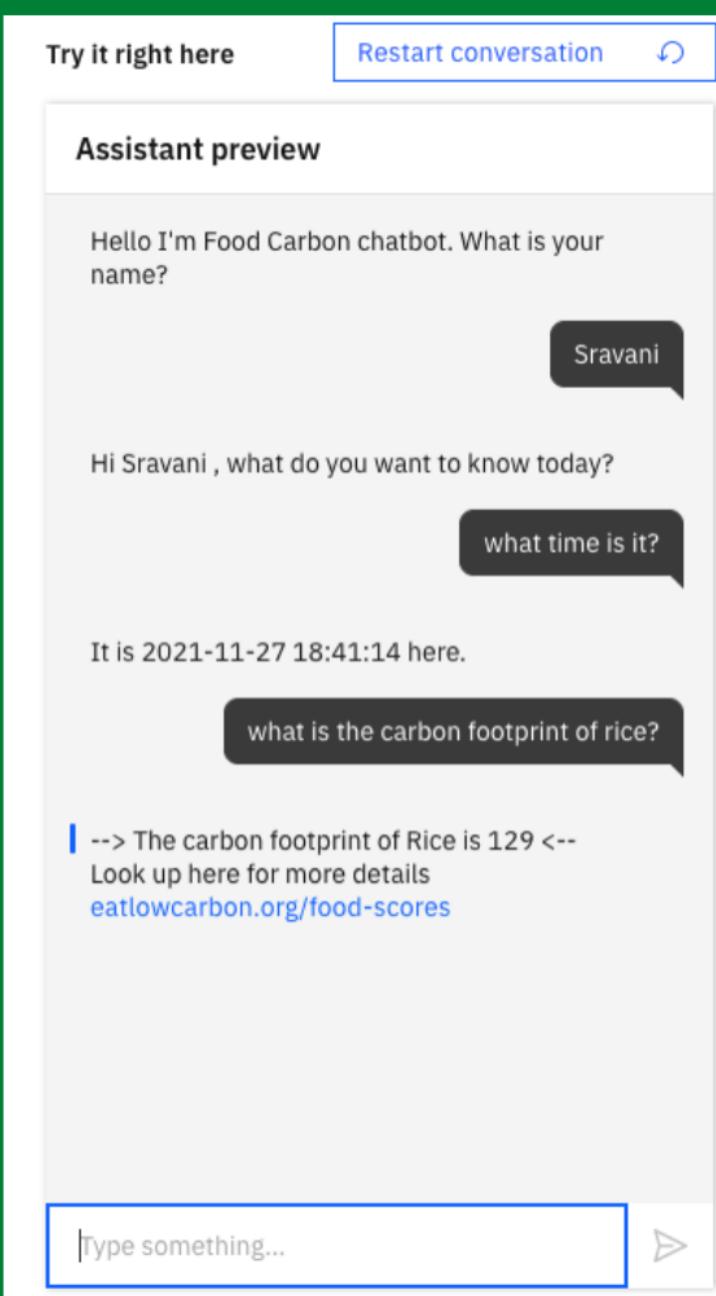
what time is it?

It is 2021-11-27 18:41:14 here.

what is the carbon footprint of rice?

--> The carbon footprint of Rice is 129 <--
Look up here for more details
eatlowcarbon.org/food-scores

Type something... 



Replies with the carbon footprint values feeded using JSON file

Try it right here

Restart conversation 

Assistant preview

define eutrophication

Sorry. I do not have an answer this time. Do you want me to search the web for results?

yes

I searched my knowledge base and found this information which might be useful:

Life Cycle Assessment - an overview 

Environmental impact = consequences of pollution, e.g. *eutrophication* and depletion of stratospheric ozone. FU = functional unit; the function of the studied products or services in quantitative terms...

[See more](#)

Carbon Footprint - an overview 

Read full chapter
URL: <https://www.sciencedirect.com/science/article/pii/B9780128182932000033> Accounting for the environmental impact of food waste on water...

Type something... 

Using search skill, searches the web to retrieve relevant information

Utterances



What is the greenhouse emission of coffee?

What is the food that has highest water usage?

What percent of Scarcity-weighted water use caused by chocolate?

How much Eutrophication is being caused by cheese?

Define Eutrophication.

I want to see the food distribution by land use

Show me top 5 foods with most land usage

Show me the food with lowest greenhouse emission

Food distribution emission via Land use change

What is the water usage of Tomatoes?

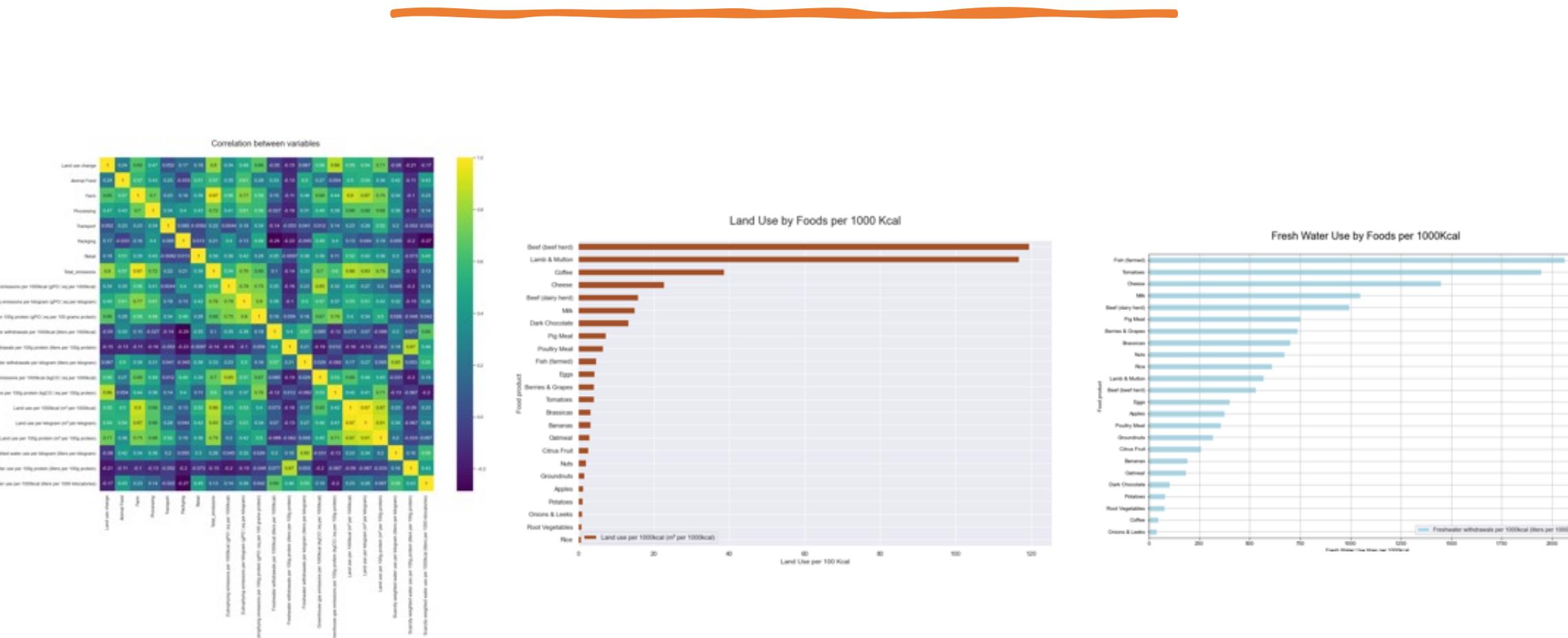
What is the carbon footprint of Rice?

What time is it?

Show me the distribution of water usage Per 1000kcal

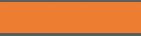
Show me the correlation of all stages of supply chain

Distribution Charts



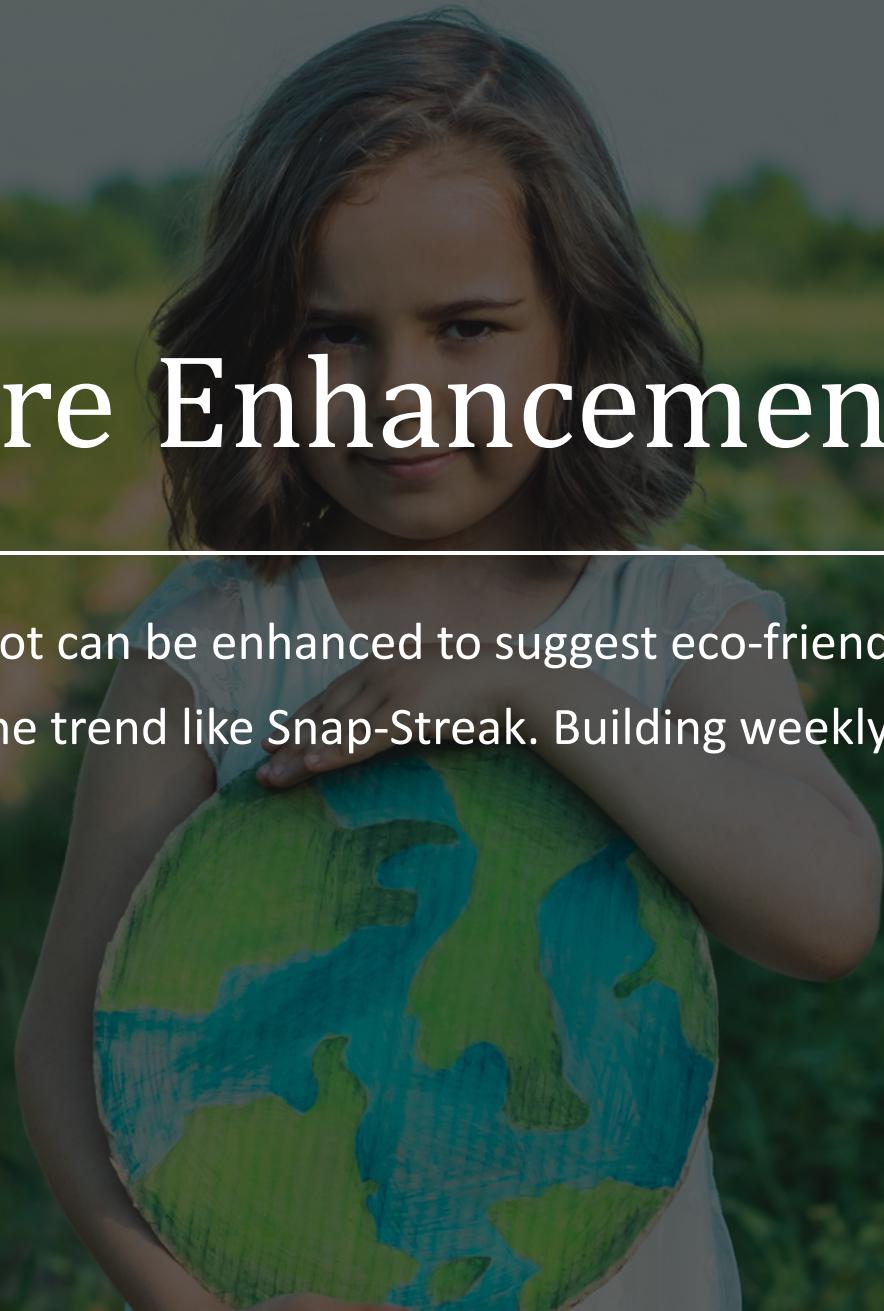
Deployment

- The chatbot can be integrated to the communication channels like slack for quick access.
- It can be integrated with grocery delivery websites to increase the awareness
- It can be integrated to smartphones for instant access
- The Deployment can be directly done through IBM cloud



Future Enhancements

- The chatbot can be enhanced to suggest eco-friendly alternatives based on picture.
- Starting the trend like Snap-Streak. Building weekly strategies that reduce the carbon footprint the most.





Thank You
