Humanitarian Aid Cost Integration Tool (HACIT)

An innovative tool for optimizing humanitarian aid costs globally, integrating real-time data for efficient resource allocation and effective delivery across all Mercy Corps operations.

Presented By

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HACIT

Critical Challenges : Food Scarcity & Aid Delivery

> 1 Million

People facing **ACUTE STARVATION**, with children under two years severely malnourished.

84%

Planned humanitarian aid missions to northern Gaza in January 2024 were **UNABLE TO REACH DESTINATIONS,** intensifying the crisis

Case Study: Humanitarian Aid Flow to Gaza

Jordan (Amman)	Air Transport to Egypt	Ground Transport Across the Border	Crossing into Gaza	Distribution within Gaza	Final Delivery
Assembling and preparing food kits and essentials for air transport	Essentials flown to Egypt for initial processing by the Egyptian Red Cross.	Supplies trucked from airport to Rafah border crossing.	Transport to warehouses and coordination with local humanitarian teams.	Moving supplies from warehouses to distribution centers across Gaza	Delivering food and essentials directly to families and individuals in need

Our Solution

HACIT: Innovative Cost Calculation Tool for Efficient Humanitarian Aid Delivery

SYSTEM INPUTS

APIs Utilized

- **Google Maps API:**
  - For accurate routing and distance calculations.
- **Gas Price API**
  - To estimate transportation costs based on current fuel prices.
- **Forex API**
  - For real-time currency conversion, essential in international settings.

User Inputs

- **Transportation Details**
  - Location, mode, rent price, and number of locations.
- **Supply Basket**
  - Types of food items, quantities, and total number of baskets.
- **Human Resources**
  - Number of employees and their salaries.

MODEL OUTPUTS

Logistics Details

- Calculated distance, travel time.

Environmental Impact

- Carbon footprint and emissions.

Cost Analysis

- Detailed breakdown of transportation costs, food costs, and HR expenses.

BENEFITS

Efficiency

- Streamlines planning and execution of aid delivery.

Accuracy

- Ensures budgeting is based on up-to-date information.

Impact

- Optimizes resource allocation for maximum humanitarian impact.

Input the location of Transit

Input the locations of Destination, Transit, and Final destination

```
How many locations would you like to enter? 4
Enter the location name for point 1: Amman, Jordan
Enter the location name for point 2: Queen Alia Airport
Enter the location name for point 3: El Arish Airport
Enter the location name for point 4: Rafah border Gaza
```

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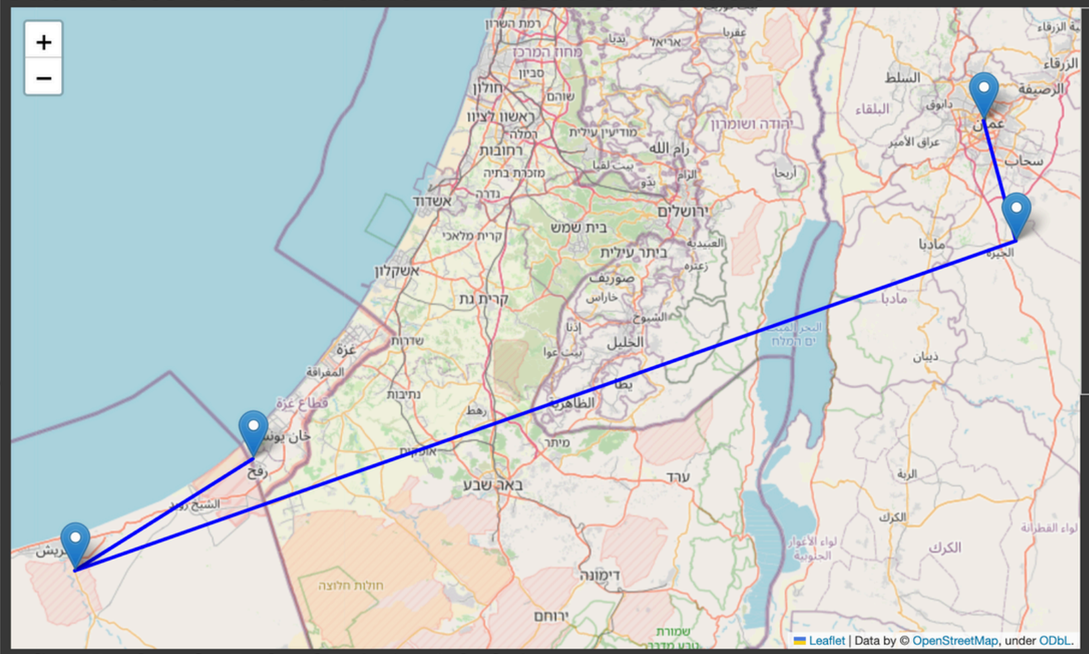
Aid Route with Fuel and Emission Calculation



Waypoints

- Point 1 : (Amman, Jordan)
  Coordinate: (31.9543786, 35.9105776)
- Point 2 : (Queen Alia Airport)
  Coordinate: (31.721942, 35.9856051)
- Point 3 : (El Arish Airport)
  Coordinate: (31.0784134, 33.8367825)
- Point 4 : (Rafah border Gaza)
  Coordinate: (31.29677999999999, 34.243482)

Distances

- Point 1 to Point 2 with Car/Truck: 26.80 km
- Point 2 to Point 3 with Plane: 216.13 km
- Point 3 to Point 4 with Car/Truck: 45.68 km
- Total loop distance: 288.61 km

Adjust Numbers for Fuel and Emission Calculation

Km/L (Plan...	0.30
$/L Fuel Pla...	1.64
Emission p...	7
Km/L Car/T...	10.00
$/L Fuel Car...	0.21
Emission p...	3.5

Gas Price: 1187.60 USD

Emission: 2527.56 kg CO2

We Calculate Fuel Consumption & Emissions.

Google API provides precise distance data for accurate predictions.

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Minimum Expenditure Basket (MEB)

Cross referenced with Google Spreadsheet for Price & Currency

Choose Items to Put Into Basket

Number of Baskets: 1300
Number of Items: 10

Food 1 Name:	PACKING BOX - CARDBOARD
Quantity:	1
Food 2 Name:	SARDINES, CANNED IN SUNF
Quantity:	1
Food 3 Name:	FAVA BEANS
Quantity:	1
Food 4 Name:	CANNED MEAT - Pork or Beef
Quantity:	1
Food 5 Name:	OIL, SUNFLOWER, UNFORTIF
Quantity:	1
Food 6 Name:	Dates Dried
Quantity:	1
Food 7 Name:	WATER
Quantity:	1
Food 8 Name:	PASTA, MACARONI
Quantity:	1
Food 9 Name:	High Energy Biscuit
Quantity:	1
Food 10 Name:	SUGAR, WHITE
Quantity:	1

Capture Inputs

Input by User

HACIT_Food_Database

File Edit View Insert Format Data Tools Extensions Help

A4 | FAVA BEANS

	A	B	C	D	E	F
1	Food	Price	Nutrition	Size	Metric	Currency
2	BUCKWHEAT GRAIN	16.15	20	41	kg	ILS
3	PASTA, MACARONI	21.40	21	42	kg	ILS
4	FAVA BEANS	150.00	22	1	kg	ILS
5	CANNED MEAT - Pork or Beef	60.00	23	44	kg	ILS
6	OIL, SUNFLOWER, UNFORTIFIED	49.11	24	45	kg	ILS
7	SUGAR, WHITE	74.20	25	1	kg	ILS
8	SALT, IODIZED	12.00	26	1	kg	ILS
9	OATMEAL (OAT FLAKES)	14.38	27	48	kg	ILS
10	SARDINES, CANNED IN SUNFLOWER OIL, DRAINED	9.00	28	49	kg	ILS
11	RICE, WHITE, MEDIUM GRAIN	10.00	29	50	kg	ILS
12	TEA, BLACK, NUTRIENTS PER 100 ML OF BREWED TEA	11.00	30	51	kg	ILS
13	PACKING BOX - CARDBOARD BOXES SUITABLE TO CONTAIN THE FULL KIT (~56 KG WEIGHT)	12.00	31	52	kg	ILS
14	WATER	5.00	1	1	kg	ILS
15	LENTILS	10.00	1	1	kg	ILS
16	CORN FLOWER	120.00		1	bag	ILS
17	POTATO	25.00		1	kg	ILS
18	Onions	50.00			kg	ILS
19	Lemons	35.00			kg	ILS

Output

Collected Food Data:

	Food	Quantity	Unit Price	Sub Total	Currency
0	PACKING BOX - CARDBOARD BOXES SUITABLE TO CONT...	1	12.00	12.00	ILS
1	SARDINES, CANNED IN SUNFLOWER OIL, DRAINED	1	9.00	9.00	ILS
2	FAVA BEANS	1	150.00	150.00	ILS
3	CANNED MEAT - Pork or Beef	1	60.00	60.00	ILS
4	OIL, SUNFLOWER, UNFORTIFIED	1	49.11	49.11	ILS
5	Dates Dried	1	50.00	50.00	ILS
6	WATER	1	5.00	5.00	ILS

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Currency Conversion Impact on Basket Costs

Calculate the Basket Based on Currency

Convert Currency to: USD

User input the converted currency

Convert Currency

	Food	Quantity	Unit Price	Sub Total	Currency	Sub Total (converted)	Chosen Currency
0	PACKING BOX - CARDBOARD BOXES SUITABLE TO CONT...	1	12.00	12.00	ILS	3.23	USD
1	SARDINES, CANNED IN SUNFLOWER OIL, DRAINED	1	9.00	9.00	ILS	2.42	USD
2	FAVA BEANS	1	150.00	150.00	ILS	40.35	USD
3	CANNED MEAT - Pork or Beef	1	60.00	60.00	ILS	16.14	USD
4	OIL, SUNFLOWER, UNFORTIFIED	1	49.11	49.11	ILS	13.21	USD
5	Dates Dried	1	50.00	50.00	ILS	13.45	USD
6	WATER	1	5.00	5.00	ILS	1.35	USD
7	PASTA, MACARONI	1	21.40	21.40	ILS	5.76	USD
8	High Energy Biscuit	1	3.72	3.72	ILS	1.00	USD
9	SUGAR, WHITE	1	74.20	74.20	ILS	19.96	USD

Total per Basket: 116.87 USD
Total for 1300 baskets: 151931.00 USD

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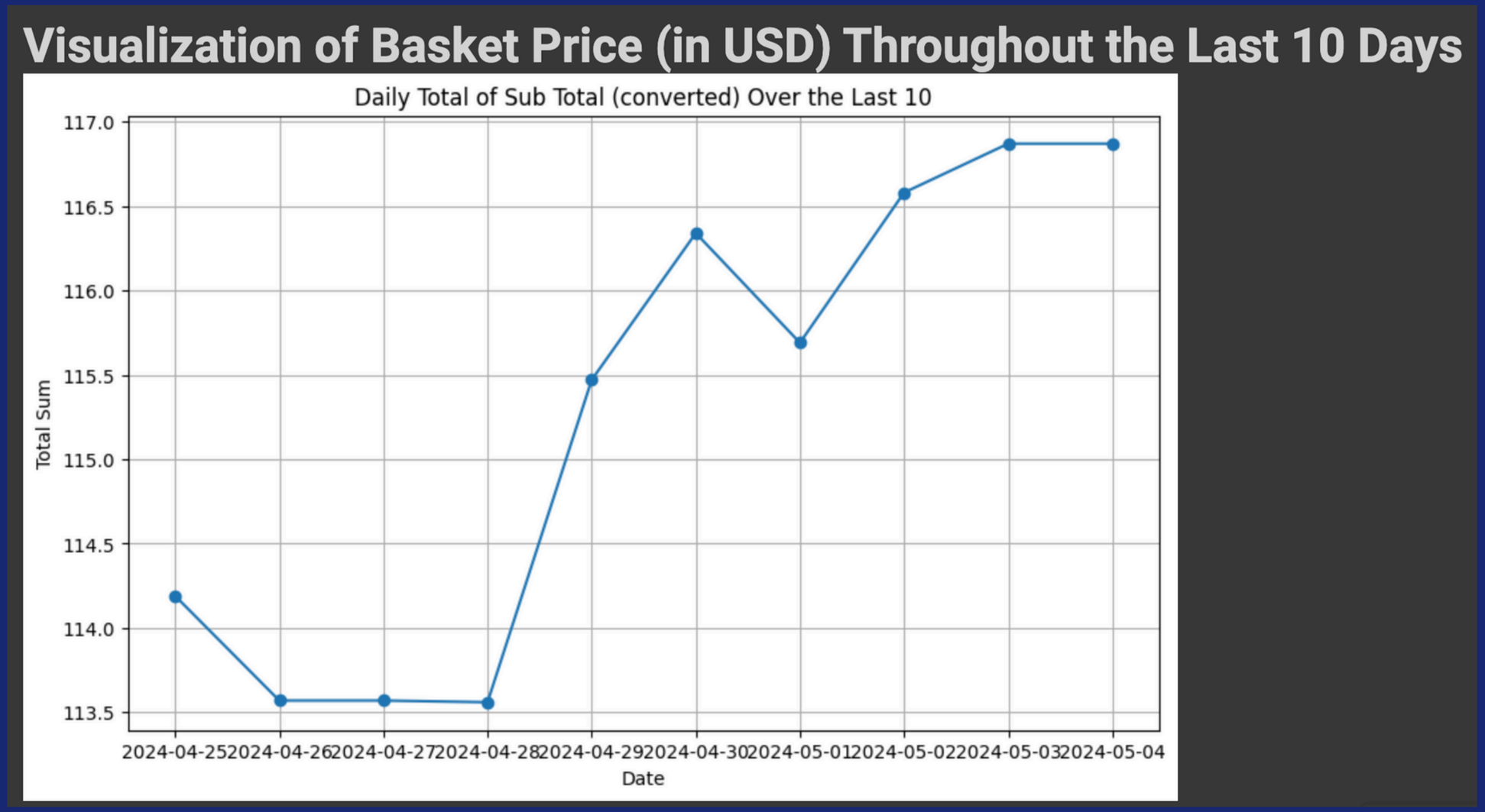
10-Day Trend of Basket Prices

Based on User input the converted currency



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Project Salary Calculator Overview

Calculate Salary for Employees to this Project

# Employees:	3

Input Employees

#1 Hours:	8
Hourly Wage:	17
Days Worked:	4
#2 Hours:	8
Hourly Wage:	21
Days Worked:	5
#3 Hours:	8
Hourly Wage:	21
Days Worked:	5

Calculate Total Salary

Total Salary for 3 employees: $2224.00

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Comprehensive Project Cost Breakdown and Metrics

Summary Values to this Project

Price Calculated

	Transportation Fuel	Price per basket	Baskets Price	Salary for Employees	TOTAL	Currency
Value	1189.730000	115.720000	153959.000000	1417.000000	156565.730000	USD

Other Matrix

	Emission (kgCO2)	Number of Employees	Number of Baskets
Value	3175.950000	3	1300

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Our Demo

- **COMPREHENSIVE** cost calculation tool tailored for humanitarian efforts.
- **ESTIMATES COSTS** for purchasing, sorting, and distributing essential supplies.
- **INTEGRATES REAL TIME DATA** from multiple sources like Foreign Exchange API, Open Food Facts API, and Google Maps API.

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HACIT - Humanitarian Aid Cost Integration Tool

File Edit Lihat Sisipkan Runtime Fitur Bantuan

Komentar Bagikan D

+ Kode + Teks

RAM Disk

2. Tool Implementation

2.1 Select The Method of Transportation

```
[31] # Re-Initialization
     coordinates = {'Point 1': (-6.8947248, 107.6333932),
      'Point 2': (-6.9039886, 107.5799633),
      'Point 3': (-6.2653379, 106.8855528),
      'Point 4': (-6.192745299999999, 106.8940801)}
```

```
# Re-initialize
location_names = []

# Displaying the HTML title
display(HTML('<strong style="font-size: 32px;">Input the locations of Destination, Transit, and Final destination</strong>'))

coordinates = collect_locations(API_KEY)

# For Case Study, Gaza
# Location point 1: Amman, Jordan
# Location point 2: Queen Alia Airport
# Location point 3: El Arish Airport
# Location point 4: Rafah border Gaza
```

ations of Destination, Transit, and Final destination

ld you like to enter? 4
e for point 1: Amman, Jordan
e for point 2: Queen Alia Airport

Distance and Visualization of location for each Segment:

```
[209] # Mock data: Coordinates dictionary
      map_obj = plot_locations(coordinates)
      map_html = map_obj._repr_html_()
```

Mengeksekusi (8 d) <cell line: 7> › collect_locations() › raw_input() › _input_request() › select()

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OPERATIONAL EFFICIENCY

- **REDUCES TIME** for budgeting and planning from weeks to mere hours.
- **ENSURES ACCURATE FUND ALLOCATION** by using up-to-date local pricing and logistics data.

RESOURCE OPTIMIZATION

- **HELPS IDENTIFY THE MOST COST-EFFECTIVE** sources for supplies.
- **OPTIMIZES LOGISTICS** for transport routes and storage, cutting unnecessary expenses.

ENHANCED RESPONSE CAPABILITY

- **IMPROVES RAPID DEPLOYMENT** of aid by enabling quicker decision-making.
- **RESOURCES REACH THOSE MOST IN NEED** effectively and timely.

Potential Impact

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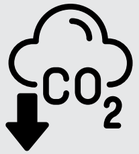
Upcoming Features

Nutritional Value Analysis

Quantitatively assess macro and micronutrient profiles in humanitarian food supplies, enhancing nutrition intervention effectiveness.

Relief Operations Carbon Footprint



Quantitative analysis and mitigation strategies for reducing the carbon footprint of humanitarian aid activities.

AI-Powered Price Trend Analysis

Employing advanced machine learning algorithms to interpret historical food pricing data and predict future market trends to inform strategic aid planning

Sustainable Food Packaging Solution

Cost-effective evaluation and eco-friendly material substitution in food packaging, complemented by an environmental impact quantification

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Upcoming Features - 1st Priority

AI-Powered Price Trend Analysis

Employing advanced machine learning algorithms to interpret historical food pricing data and predict future market trends to inform strategic aid planning

Data Source:

Forex Data:

- Access via Open Exchange Rates API.

Inflation Data:

- Available through the World Bank's Country Inflation Data for 2024.

Future Use:

Understanding the trends and impact of forex exchange to the packages and supply chain for humanitarian aid.

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Upcoming Features - 2nd Priority

Nutritional Value Analysis

Quantitatively assess macro and micronutrient profiles in humanitarian food supplies, enhancing nutrition intervention effectiveness.

Data Source:

Food Data:

- Accessible via Open Food Facts API.

Future Use:

- Fulfilling the needs of people based on the nutritional value. Making sure their daily nutrition fulfilled.
- Calculate and document the calorie content of each food basket.

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Upcoming Features - 3rd Priority

Sustainable Food Packaging Solution

Cost-effective evaluation and eco-friendly material substitution in food packaging, complemented by an environmental impact quantification

Data Source:

Evaluate the type of packaging used and calculate its eco-friendliness.

Future Use:

Explore options for sustainable food packaging to enhance the environmental friendliness of the aid distribution.

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Upcoming Features - 4th Priority

Relief Operations Carbon Footprint

Quantitative analysis and mitigation strategies for reducing the carbon footprint of humanitarian aid activities.

Data Source:

Through web scraping from internet sources or by using paid API services.

Future Use:

To understand, evaluate, and mitigate the environmental impact of humanitarian aid projects.

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Upcoming Features

Operational Efficiency with Weather API

Leverage real-time weather data to optimize deployment schedules and reroute transportation .

Data Source:

- API Provider: Real-time data from https://open-meteo.com/
- Integration Points: Connect with internal scheduling systems and transportation logistics

Future Use:

- Operational Efficiency : Minimize delays and disruptions caused by adverse weather conditions
- Cost Reduction: Optimize resource allocation and reduce wasted effort
- Enhanced Safety: Ensure safety of the deployment team by avoiding risky weather conditions

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Upcoming Features

Ease of Data Export and Sharing

One-button click to share insight of basket distribution that will help people on the ground.

Future Use:

- Enable desk workers to share platform insights as images with a single click using the "Share" button.
- This streamlines the process, eliminating the need to navigate a website, log in, and search for insights on a mobile device.

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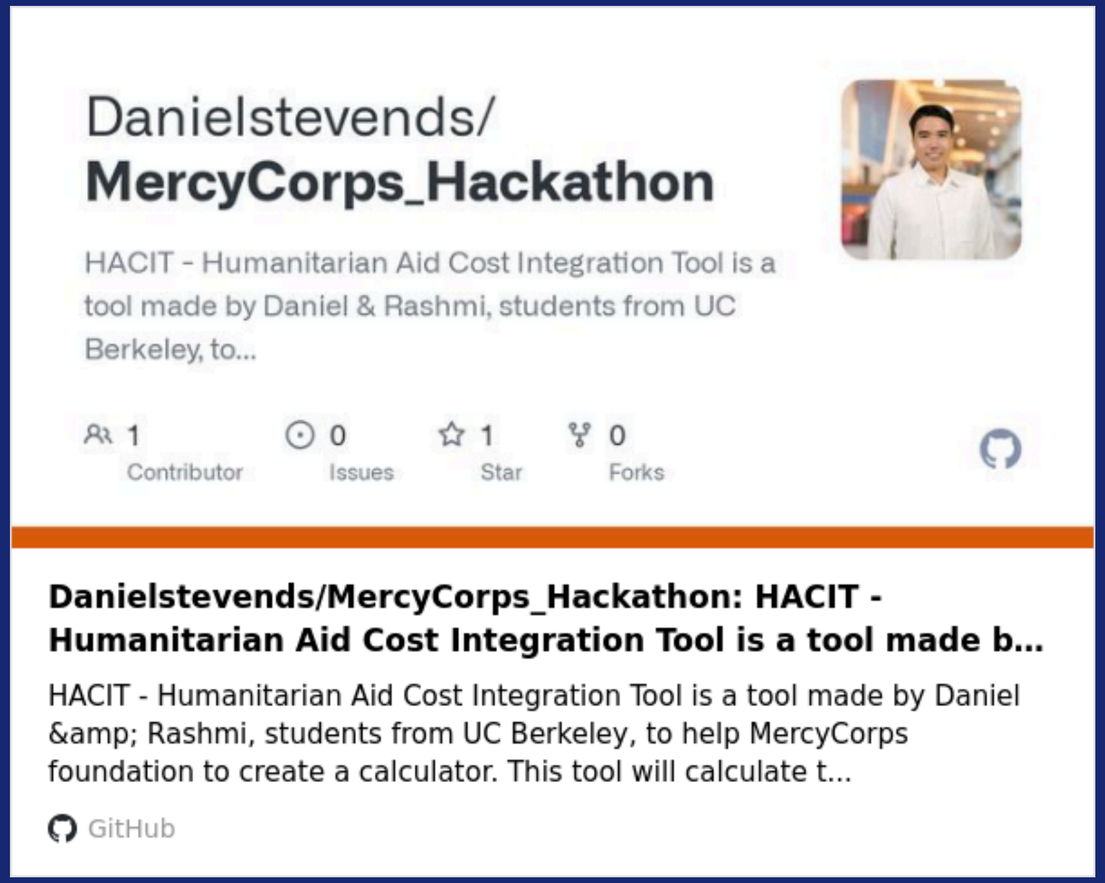
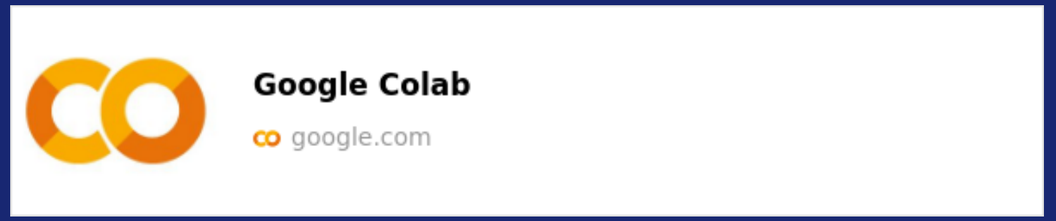
Project Links



[Github Link]



[Google Colab Link]

Food	Price
Aubergine	
Bottled Water	
BUCKWHEAT GRAIN	
CANNED MEAT - Pork or Beef	
CORN FLOWER	
Cucumber	
Dates Dried	
Eggs	
Falafel (three, in a small bread sandwich)	
FAVA BEANS	
Flour bag (northern gaza)	
Flour bag (southern gaza)	
Flowering cabbage	
Frying Oil	
Green Beans	
High Energy Biscuit	
Instant coffee (250g)	
Leafy vegetables	
Lemons	

Sheet1

Food Data : Link

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Thank You

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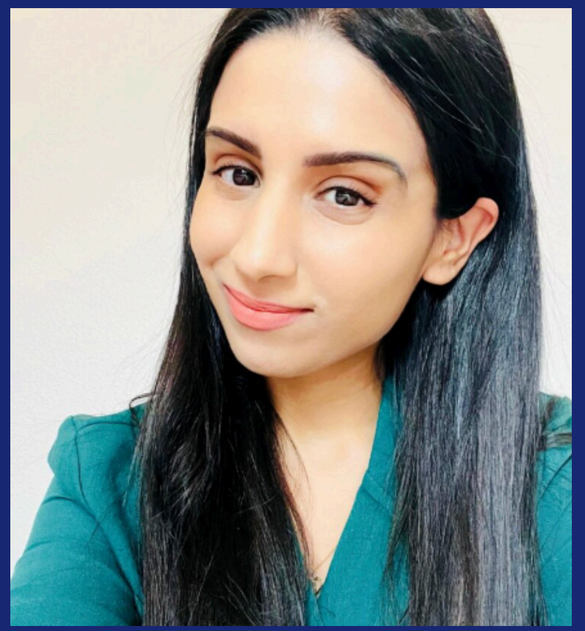

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LinkedIn

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