🛍️ **Task 10: Product Search Based on User Preferences**

In this task, you’ll learn how to build a **product filtering system** using **OpenAI’s function calling** capabilities. Instead of manually writing filtering logic, you’ll define a function schema, describe user preferences, and let the model invoke the function with the appropriate structured arguments.

**📚 Theory**

Traditional product filtering relies on **conditional logic written in code**. But with **OpenAI’s function calling** [documentation], you can hand off this logic to the model.

Function calling lets the model decide **when and how to invoke a predefined function**, using structured reasoning over both **user preferences** and **JSON-formatted data**. You define the function signature, and the model fills in the arguments based on **natural language input** and **dataset context**.

This approach allows for **flexible, natural filtering behavior**—while keeping full control over **structure, safety**, and **post-processing**.

**🧠 AI Technique**

This challenge combines several AI techniques:

* **OpenAI Function Calling** – Let the model select matching products and call your function with structured arguments
* **Natural Language-to-Structure Conversion** – Translate input like “under $200 and in stock” into clean, typed JSON
* **Reasoning over Datasets** – Guide the model to extract relevant products from a JSON dataset based on user intent

**📝 Task**

**Introduction**

**User Preferences**: Inputs provided by the user that define the filtering criteria for a search query. Examples include:

* Maximum price
* Minimum rating
* Specific product categories (Electronics, Fitness, Kitchen, Books, Clothing)
* Stock availability

**Filtering Logic**: The mechanism or algorithm used to narrow down a dataset based on user-defined conditions. In this task, filtering logic is performed by leveraging:

* Hardcoded datasets ([products.json](https://github.com/VentionComms/AI-Challenge/blob/main/main/task_10/products.json" \t "_blank)) and queries (user input)
* OpenAI API for natural language filtering

**Dataset**: A structured collection of data in **JSON format** used as the source for product searches. Each item typically contains attributes like:

* name
* category
* price
* rating
* in\_stock

Your task is to create a **console-based product search tool** that:

* Accepts user preferences (e.g., category, max price, min rating, in-stock status) in **natural language**

***e.g., "I need a smartphone under $800 with a great camera and long battery life"***

* Calls the **OpenAI API using**[**function calling**](https://ventioncomms.github.io/AI-Challenge/main/task_10/function_calling.pdf)
* Searches the given dataset for requested items
* Returns the final **filtered product list** in structured format (see example below)

📦 Use the dataset from [products.json](https://github.com/VentionComms/AI-Challenge/blob/main/main/task_10/products.json" \t "_blank) as an input parameter for this task.

**💬 Example Response**

**Filtered Products:**

1. Wireless Headphones – $99.99, Rating: 4.5, In Stock
2. Smart Watch – $199.99, Rating: 4.6, In Stock

⚠️ You must use **OpenAI’s function calling** to extract and return matching products. **Manual filtering logic is not allowed.**

**📌 Requirements**

* The app must include **calls to OpenAI API**
* The app must use the **function calling mechanism**
* The app must accept **input from the console in natural language**
* README.md should contain **clear and detailed instructions** on how to run the application
* sample\_outputs.md must include at least **two sample runs** of your application for different user requests
* Output must be **clear, properly formatted**, and align with all the requirements stated in task description