

0.0.1 Sustainable Ai Plateform "ShopSense" For Enhancing
Transparency and Trust in Consumer Goods

0.1 Project :ConsumeWise From PeoplePlusAi
(on Devfolio Hackathon)

0.2 Project Name: ShopSense

Introduction

In an era where consumer choices significantly impact health, the environment, and society, the need for transparency in product information has never been more critical. A need of an platform which provides unbiased information regarding product we are going to choose. I've worked on such a platform and named it **ShopSense**. **The ShopSense is an AI-driven platform that empowers consumers by providing clear, verifiable details about food and personal care products.** It offers insights on nutritional content, ingredient safety, and environmental sustainability, helping users make informed decisions. Currently operating as a Python demo, ShopSense will evolve into a full-scale platform with user-friendly features like barcode scanning and product image recognition, promoting healthier, more sustainable consumer behavior.

0.3 Objective of the Project

The primary objective of the ShopSense is to create an AI-driven platform that enhances transparency and trust in consumer goods, particularly in the food and personal care sectors. The platform aims to empower consumers by providing them with trusted verifiable and personalized information about the products they are going to purchase. This information encompasses not only health impacts but also environmental and social considerations.

By leveraging data from credible sources, ShopSense seeks to transform how consumers engage with products, encouraging them to make informed choices that benefit both their health and the planet.

0.3.1 The goals of the project include:

- Offering comprehensive insights into nutritional values, ingredient compositions (including hidden elements), and potential health effects.
- Highlighting the environmental impact of products and their ingredients, promoting a more sustainable consumer culture.
- Personalizing recommendations based on individual health concerns, dietary preferences, and ethical considerations, inspiring users toward healthier and eco-friendly alternatives.
- Creating a impact on society that influences producers and retailers to adopt more transparent and sustainable practices.

0.4 Scope of the Project

the Plateform ShopSense is designed as a holistic public information system that serves consumers to take better health choices for themselves.

0.4.1 The project scope encompasses:

- **Data Collection:** Utilizing publicly available information from credible sources such as government health organizations, research studies, and producer disclosures to ensure comprehensive and accurate data.
- **AI-Powered Analysis:** Implementing advanced AI algorithms such as Google Gemini to analyze product ingredients, assess health risks, and evaluate sustainability metric.
- **Personalized User Experience:** Crafting an intuitive user interface that delivers personalized insights, ensuring that information is actionable and tailored to individual consumer needs.
- **E-Commerce Integration:** Collaborating with online retail platforms to provide real-time product information during the shopping process, enhancing decision-making at the point of purchase.
- **Behavioral Impact:** Encouraging healthier and more sustainable consumption patterns by presenting users with relevant alternatives and highlighting the benefits of better choices.

0.5 Existing System

Currently, consumers face significant challenges when seeking reliable information about products. Many rely solely on product labels, which often lack detailed information about hidden ingredients, their health implications, and the environmental impact of production processes. While some apps provide basic product information through barcode scanning, they often lack depth, personalization, and actionable insights based on robust research.

0.6 Proposed System

ShopSense proposes a transformative solution that fills this gap in consumer awareness.

The platform will harness generative AI to deliver:

- **Accurate Data Retrieval:** Access to a vast array of data from credible sources, ensuring users receive up-to-date and trustworthy information about product ingredients and their effects from the trusted and government approved research Papers and Official Website.
- **Data Verification:** leveraging the power of Ai either by web Scrapping and or cross search from research Papers or from data from official Website to verify the integrity of data, particularly concerning health impacts and sustainability metrics.
- **User-Friendly Insights:** A seamless interface that presents information in a digestible format, allowing consumers to quickly understand using Website or App.
- **Personalized Recommendations:** providing better Natural alternative to users based on the product they are searching at that price section.
- **E-Commerce Integration:** In future ShopSense can be integrated with E-commerce platforms for Real-time product information delivery during online shopping, enabling consumers to make healthier and more environmentally friendly decisions on the spot.

Status Of Project

0.7 Current User Interface

Currently To validate the concepts and functionalities of ShopSense, a pilot program has been initiated using a Python notebook as the initial testing platform. This approach allows for rapid prototyping and experimentation with the AI models and data processing functionalities in a controlled environment.

The pilot project will involve:

- **Prototyping :** Utilizing Jupyter Notebooks to develop the core functionalities of ShopSense, including data collection, AI analysis, and user interface components.
- **Testing Algorithms:** Evaluating the performance of generative AI models to ensure accurate product information retrieval and personalized recommendations. tuning the model to the specific genre. utilising the features and vast data on which the Ai has been made.
- **User Testing:** Gathering feedback from a small group of users to assess the usability and effectiveness of the platform, making necessary adjustments based on their experiences. adding mosre features and option based on feedbacks for optimised and efficient plateform .

0.8 Hardware Interface

ShopSense will primarily operate as a cloud-based solution; currently in testing phase its much better on laptops and Desktop and it runs on jupyter Notebook without ui .however, on successful launching the project it will be compatible with various hardware platforms like phones,tablet and other. This includes:

0.9 Software Interface

ShopSense will integrate with various software systems, including:

- **AI APIs:** Utilizing generative AI APIs (Gemini Api) to process user queries and retrieve data about products, ingredients, and health impacts.
- **Data Sources:** Establishing connections with trusted databases from government agencies (CDC, FDA, FSSAI) and research organizations (NCBI) for real-time data updates.
- **E-Commerce Platforms:** In Future Collaborating with major online retail platforms to provide seamless integration of product information during the shopping experience.

Functional Requirements

Currently the development of ShopSense has involved a systematic approach to creating a robust platform that meets its core objectives. Below is a brief overview of how the project has been made, focusing on the key functionalities:

0.10 Data Collection and Integration

- **Importing APIs:** The project begins with importing AI API key from google studio that facilitate data processing and retrieval. the APIs provide most essential functionalities such as natural language processing and data analysis.
- **AI Tuning:** The generative AI models are fine-tuned to cater specifically to the needs of ShopSense. This involves tuning the system instructions for the model on relevant datasets, and how it will serve response to user like focusing on areas such as ingredient analysis, nutritional information, and health impacts to enhance its accuracy and relevance.

0.11 Prompting and Programming the API

0.11.1 Current Model

To retrieve meaningful data, effective prompting techniques should be utilized. however, Currently only text based prompts are used either just name of the product or name with brands and other details. Prompts are designed to elicit specific information about products, ingredients, and their effects on health and sustainability.

0.11.2 further developement

further the ShopSense can take input as image,voice utilising the ai feature. user will just need to click the photo of product the it will provide the Information of the product. Further In Future on integrating with E-commerce websites users just need to prompt it about the product and it will provide the details of product like hoew it will impact on their body, health and environment

0.11.3 Local Data Integration and Formatting

- **Integrating with Local Data:** The platform is designed to integrate local data sources, including government health databases and research publications. This ensures that users receive accurate and reliable information that complements the API data. this will further enhance the plateform and it can provide better alternative to users
- **Formatting the Data:** Once data is retrieved, it is formatted for clarity and ease of understanding. This includes structuring nutritional information, ingredient lists, and health considerations in a user-friendly manner, enabling consumers to quickly grasp the implications of their choices.

Demonstration of the Project

0.12 Current Implementation

Currently, ShopSense operates as a prototype within a jupyter notebook environment, allowing for an agile and flexible development process. This demo focuses on the core functionalities of the platform without a user interface (UI).

Below are the key components of the current demo:

0.12.1 Interactive Data Analysis

- **Data Retrieval:** The Jupyter notebook allows for direct interaction with Gemini APIs, enabling real-time data retrieval. Users can input specific product queries, and the notebook will make API calls to fetch relevant information about nutritional values, ingredient compositions, and health impacts.
- **Ingredient Analysis:** Upon receiving product data, the notebook utilizes generative AI to analyze ingredient lists. This includes identifying hidden ingredients, assessing their potential health effects, and providing a balanced overview of the product's composition.
- **Nutritional Insights:** The demo showcases the capability to extract and present detailed nutritional information. For instance, users can see the per-100g values

of key nutrients, along with recommended dietary allowances (RDA) and potential health outcomes associated with the product.

0.12.2 User Input Simulation

- **Prompting Mechanism:** currently Users can simulate input by entering product names or specific queries directly into the notebook. The AI's responses are generated dynamically, allowing users to see how the system interprets and analyzes their requests. In future interactive input as image from camera or file and voice input can also be used
- **Output Formatting:** Through Ai Tuning The output from the notebook is structured to be clear and informative. For instance, the analysis includes sections such as "Ingredient Breakdown," "Nutritional Values," and "Health Considerations," making it easy for users to digest the information.

0.13 Results Visualization

Data Visualization:- While limited compared to a full UI, the notebook may include basic visualizations (e.g., bar charts or tables) to represent nutritional comparisons or ingredient distributions. This enhances the understanding of how different products stack up against each other. Further the details also include the source of the information its providing. this further improves the authenticity of platform. In Last it provides natural alternatives to the product in the same Price section.

here is the prototype of the output the platform currently produces upon users input. currently I've used one of the most popular biscuit brand **BRITANIA GOOD DAY BISCUIT** as a product for testing.

Britannia Good Day Biscuit: A Detailed Analysis

Product Name: Britannia Good Day Biscuit

Official Website: <https://www.britannia.in/products/biscuits/good-day>

Ingredients:

- **Wheat Flour:** Provides carbohydrates for energy.
- **Sugar:** Provides sweetness and energy.
- **Vegetable Oil:** Provides fat and contributes to texture. (Type of oil varies, check specific packaging for details.)
- **Milk Solids:** Adds creaminess and flavor.
- **Baking Soda:** Acts as a leavening agent.
- **Salt:** Enhances flavor.
- **Emulsifiers:** (May include **Mono & Diglycerides of Fatty Acids, Soy Lecithin, Lecithin**). Help to mix oil and water in the dough.
- **Preservatives:** (May include **Sodium Metabisulphite, Potassium Metabisulphite**). Prevent spoilage.
- **Flavoring Agents:** Add desired flavor. (Specific flavoring varies depending on biscuit flavor).
- **Color:** (May include **Caramel Color**). Adds color to the biscuit.

Extra Ingredients & Their Effects:

- **Emulsifiers:**
 - **Mono & Diglycerides of Fatty Acids:** Derived from vegetable oils, generally considered safe for consumption. May contribute to digestive discomfort in some individuals. [Source: FDA](#)
 - **Soy Lecithin:** Derived from soybeans, generally considered safe for consumption. Some people may have soy allergies. [Source: FDA](#)
 - **Lecithin:** Derived from various sources (soybeans, eggs, sunflowers), generally considered safe for consumption. Some individuals may have allergies to specific sources. [Source: FDA](#)
- **Preservatives:**
 - **Sodium Metabisulphite & Potassium Metabisulphite:** Act as antioxidants and prevent spoilage. May cause allergic reactions in some individuals. [Source: FDA](#)
- **Caramel Color:** Used for coloring. May contain sulfites, which can cause allergic reactions in some individuals. [Source: FDA](#)

Nutritional Information:

- **Per 100g (Approximate):**
 - Calories: 500kcal
 - Fat: 20g
 - Carbohydrates: 65g
 - Sugar: 25g
 - Protein: 5g
 - Fiber: 2g
 - Sodium: 250mg

Nutritional Analysis:

- High in carbohydrates and sugar, providing quick energy but contributing to potential weight gain if consumed in excess.
- Moderate fat content, primarily from vegetable oil.
- Low in protein and fiber, contributing to a less satiating effect compared to other snacks.
- Contains added sugar, which can contribute to dental issues if consumed regularly.

Dietary Intake:

- Can be part of a balanced diet as an occasional treat.
- Should be consumed in moderation to avoid excessive calorie and sugar intake.
- Not suitable for individuals with specific dietary restrictions or allergies.

Health Outcomes:

- **Potential Benefits:** Provides quick energy.
- **Potential Risks:** High in sugar and fat, contributing to potential weight gain, cardiovascular disease, and dental issues if consumed excessively.

Processing:

- Wheat flour, sugar, and other ingredients are mixed to create dough.
- Dough is shaped and baked.
- Biscuits are cooled and packaged.

Health Considerations:

- **Allergies:** May contain allergens such as soy, milk, and sulfites.
- **Sugar Content:** High sugar content can contribute to weight gain and dental issues.
- **Fat Content:** High fat content can contribute to cardiovascular disease.

Naturally Available Alternatives:

- **Fruits:** Apples, bananas, oranges, etc.
- **Nuts:** Almonds, walnuts, cashews, etc.
- **Seeds:** Sunflower seeds, pumpkin seeds, etc.
- **Whole Grain Crackers:** Made with whole wheat flour and less sugar.

Source:

- Britannia Good Day Biscuit Website: <https://www.britannia.in/products/biscuits/good-day>
- FDA Website: <https://www.fda.gov>
- NCBI: <https://www.ncbi.nlm.nih.gov>

Note: Specific ingredient lists and nutritional information may vary depending on the specific flavor and packaging of the Britannia Good Day Biscuit. Always check the product label for the most accurate information.

Future Development:

As ShopSense progresses, the transition from a Python notebook prototype to a fully developed web-based platform is essential for enhancing user experience and accessibility. The future development will focus on creating an intuitive and engaging frontend to complement the backend functionalities. Below are the key elements of this future development:

0.14 User Interface Design

Currently, ShopSense operates as a prototype within a jupyter notebook environment, allowing for an agile and flexible development process. in future i will design the frontend as it will facilitate easy navigation through various sections of the platform, such as product searches, detailed analysis pages, and personalized recommendations. Users will have access to a clean and organized layout that minimizes cognitive load.

0.15 Input Methods

as userintarface will be developed.ShopSense will offer multiple input methods to make product analysis and information retrieval more accessible and user-friendly. Here's a

brief overview of the various input option:

Text Input: Users can manually enter the name or details of a product they are interested in. This is ideal for those who know the specific product they want to analyze or compare.

Image/Camera Input: Users can take a picture of a product label or scan a barcode using their device's camera. The system will then extract relevant data (such as ingredients or nutritional facts) from the image using optical character recognition (OCR) and provide a detailed analysis. This method allows for quick and easy input while shopping or at home.

Barcode Scanning: Users can scan product barcodes for instant identification and analysis. The system will match the barcode to a product database and retrieve all relevant health, ingredient, and sustainability information.

Voice Input (Future Feature): Future versions of ShopSense may include voice input functionality, allowing users to simply speak the product name or ask about ingredients for a hands-free experience.

0.16 Modern Web Frameworks:

The frontend will be developed using modern web technologies , providing a dynamic and responsive user experience. that will allow for efficient updates and scalability as new features are added.

0.17 Integration with Backend Services:

The frontend will communicate with the backend (built in Python) through RESTful APIs. This will enable real-time data exchanges, allowing users to access the latest product information and recommendations seamlessly.

0.18 Enhanced Data Visualization

0.18.1 Comprehensive Dashboards:

The UI will feature dashboards that present personalized insights, product comparisons, and nutrition tracking. Users will be able to visualize their dietary intake and see how their choices align with health recommendations.

0.18.2 Graphs and Charts:

Advanced visualizations, such as pie charts for ingredient breakdowns or line graphs for tracking nutritional intake over time, will provide users with a clearer understanding of their consumption patterns.

0.19 Reference

The development of ShopSense relies on a diverse set of resources, including APIs, government databases, research papers, and frameworks for building the platform. Below i'm providing the key references used for this project:

- **APIs and AI Tools:**

Publicly available APIs (google) for product and nutritional data retrieval, such as the USDA FoodData Central API and OpenFoodFacts API. Government and Official Health Databases:

- **Food Safety and Standards Authority of India (FSSAI):** Standards and regulations for food products in India.

<https://www.fssai.gov.in/>

- **U.S. Food and Drug Administration (FDA):** Data on food ingredients, preservatives, and their effects on human health.

<https://www.fda.gov/>

: <https://fdc.nal.usda.gov/>

- **Centers for Disease Control and Prevention (CDC):** Health impact data related to nutrition and food consumption.

- **National Center for Biotechnology Information (NCBI):** Research papers and scientific studies on food ingredients, additives, and their biological effects.

<https://www.ncbi.nlm.nih.gov/>

- **Scientific Journals and Research Papers:**

Various academic journals and peer-reviewed papers on nutritional science, ingredient toxicity, food additives, and their impact on human health and the environment.

- **Technological Frameworks:**

Python for backend programming, API integration, and AI model tuning. Jupyter Notebooks for initial prototype and demo creation. Future consideration of frontend frameworks like React and Vue.js for the development of a user-friendly interface.

- **E-Commerce Platforms:**

Analysis of existing platforms like Amazon, Flipkart, and BigBasket for e-commerce integration and understanding consumer behavior in the online shopping context.

- **Sustainability Resources:**

World Health Organization (WHO) and United Nations Food and Agriculture Organization (FAO) reports on sustainable food production and its health impact. Research on eco-friendly and sustainable alternatives to processed food

These resources have contributed to the technical, scientific, and practical aspects of building ShopSense, helping me in making it to become an informed, transparent, and consumer-centric platform