Navigating the Nutritional Maze A Case for the Food Insight Scanner for Personalized Health

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ABSTRACT

A growing number of food allergies and diet-related non-communicable diseases are causing India to face a rapidly worsening public health crisis. Concurrently, food labeling systems governed by the Food Safety and Standards Authority of India (FSSAI) continue to be complicated, unclear, and frequently deceptive, leading to widespread consumer confusion and health hazards. This study looks at the shortcomings of India's current food information ecosystem, such as poor consumer understanding, false health claims, and misinformation motivated by marketing. There are significant financial, social, and human costs associated with these failures.

An analysis of the digital health ecosystem in India reveals a disjointed market where current applications are unable to incorporate trustworthy data collection, customized health profiling, and nutritional assessment tailored to India. The Food Insight Scanner for Personalized Health, a mobile-based system that combines Optical Character Recognition (OCR), a multi-source Indian food database, and an AI-driven health engine, is proposed in this study as a solution to this gap. The system creates warnings specific to allergies and diseases, assesses dietary suitability based on individual health profiles, and transforms food label data into a customized "Good for You" score. The proposed framework seeks to improve consumer transparency, lower health risks associated with diet, and advance better public health outcomes throughout India.

Keywords: Personalized Nutrition, Food Label Transparency, OCR, Digital Health, Indian Food Ecosystem, Public Health

INTRODUCTION

The Modern Indian Dietary Dilemma

The current food scene in India shows a clear contradiction.As access to packaged and processed foods has gone up, the country is facing a major public health problem. This issue revolves around two main trends: a rise in diet-related non-communicable diseases like diabetes and a noticeable increase in food allergies. Adding to this problem is a major failure of the main tool meant to guide consumers: the food label. The nutritional information system, managed by the Food Safety and Standards Authority of India (FSSAI), now confuses a lot of people and spreads false information, directly impacting the health of millions.

Literature Survey

The Converging Crises in India

The health statistics in 21st-century India paint a clear picture of the consequences of the modern diet, revealing a multi-generational crisis that is putting a strain on the nation's healthcare system.

- **The Diabetes Capital** : Out of 828 million people with diabetes worldwide, about 212 million live in

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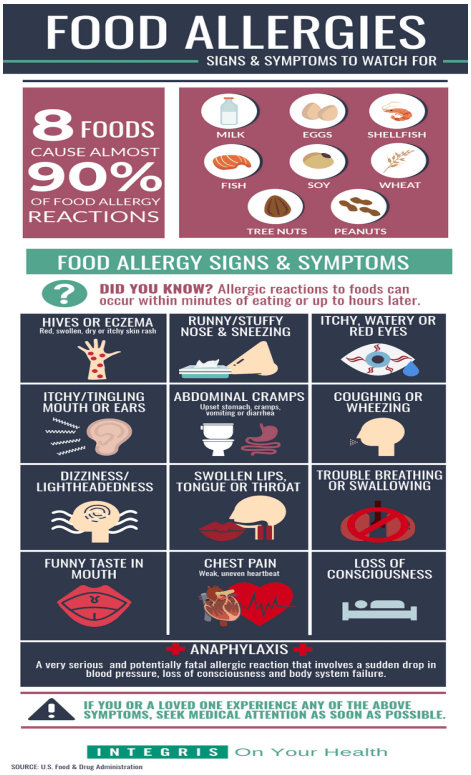
India. One in four people with diabetes globally is from India. The International Diabetes Federation (IDF) reported that in 2020, 77 million of the 88 million people with diabetes in Southeast Asia were in India. The diabetes rate in the Indian population is roughly 8.9%. Around 90-95% of these cases are Type 2 diabetes.

Fig1: Diabetes capital of World

- **The Growing Food Allergy Burden:** The food allergy market in India is growing rapidly.This growth is due to increased awareness and a rise in allergic incidents. The market was valued at USD 74.8 million in 2024 and is expected to reach USD 283.2 million by 2033, growing at a strong rate of 15.9% per year. Another report puts the market at USD 320.4 million in 2024, with projections of reaching USD 638.2 million by 2030. Common allergens identified by FSSAI include dairy, poultry, tree nuts, peanuts, shellfish, wheat, and soy. In 2024, peanuts generated the most revenue among allergen types in India

Living with Anaphylaxis: The Life-Threatening Consequences of Labeling Failures

Fig2: Food allergy cause due to unclear food labels and awareness



The human cost of food labeling failures is devastating, with real tragedies showing the life-or-death stakes.

- **Natasha Ednan-Laperouse (UK, Age 15)**: Died from an allergic reaction to hidden sesame in a Pret A Manger baguette.Her death led to "Natasha's Law," which requires full ingredient labeling on freshly prepared foods in the UK.[2]
- **Órla Baxendale (US, Age 25):** A professional dancer who died after eating mislabeled cookies that contained undisclosed peanuts, leading to FDA recalls.
- **Joanna Salmingo (Canada, Age 30):** Died from a reaction to cashew milk in mochi balls that was not clearly labeled, prompting Whole Foods to improve its labeling practices.

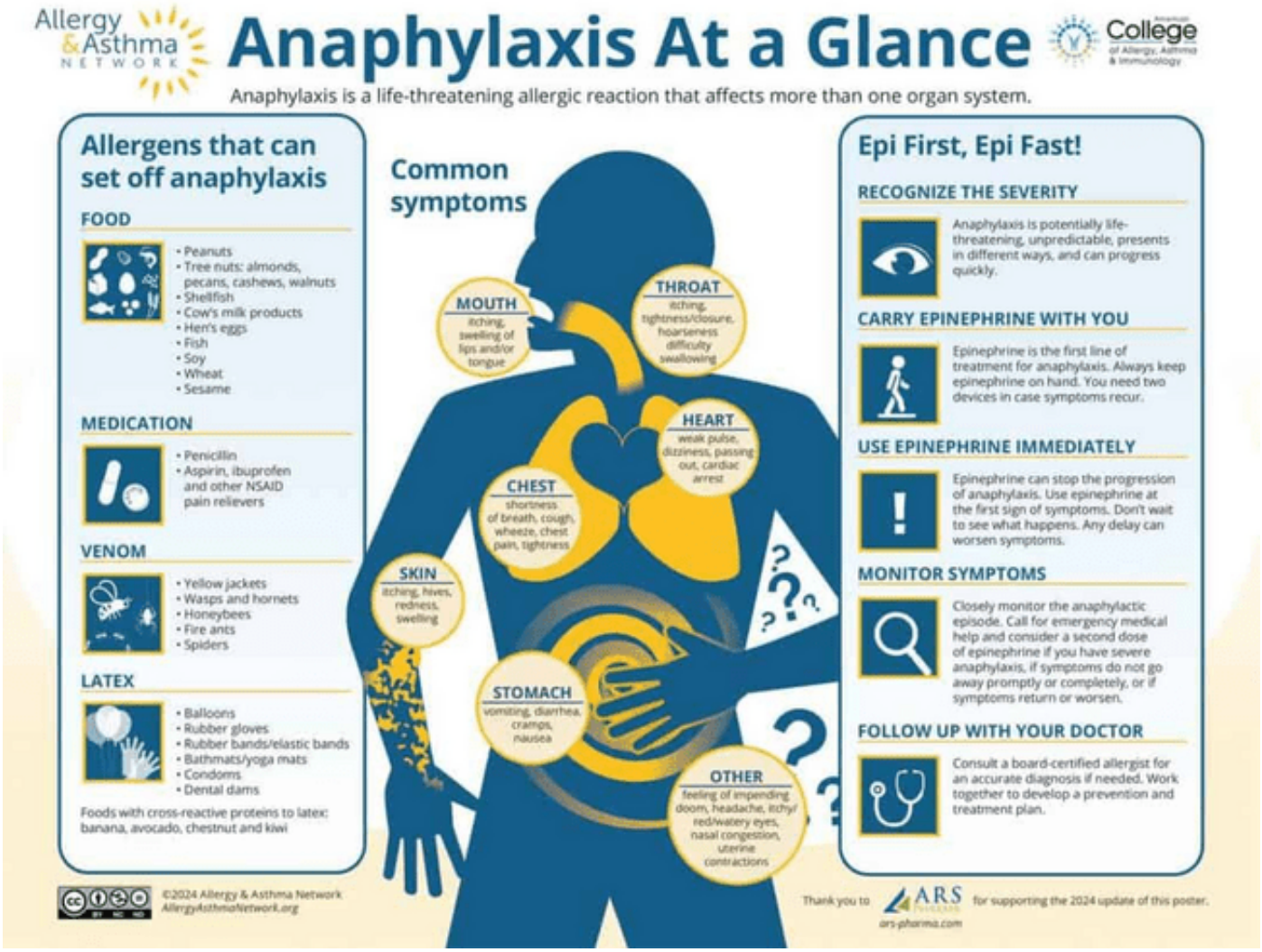


Fig3: Anaphylaxis overview including Allergens, Symptoms, and Epinephrine emergency use guidelines

The Indian Consumer's Struggle with Food Labels

Indian consumers have low practical ability to understand and use food labels, even though their awareness is high (95 percent of participants in one study).Because of the severe information asymmetry this produces, consumers are not well-prepared to make important health decisions.

- **Lack of Comprehension:** Research shows that Indian consumers have a relatively low level of understanding of health messages found on labels. Lack of time and inadequate nutrition knowledge are major blocks to reading labels.

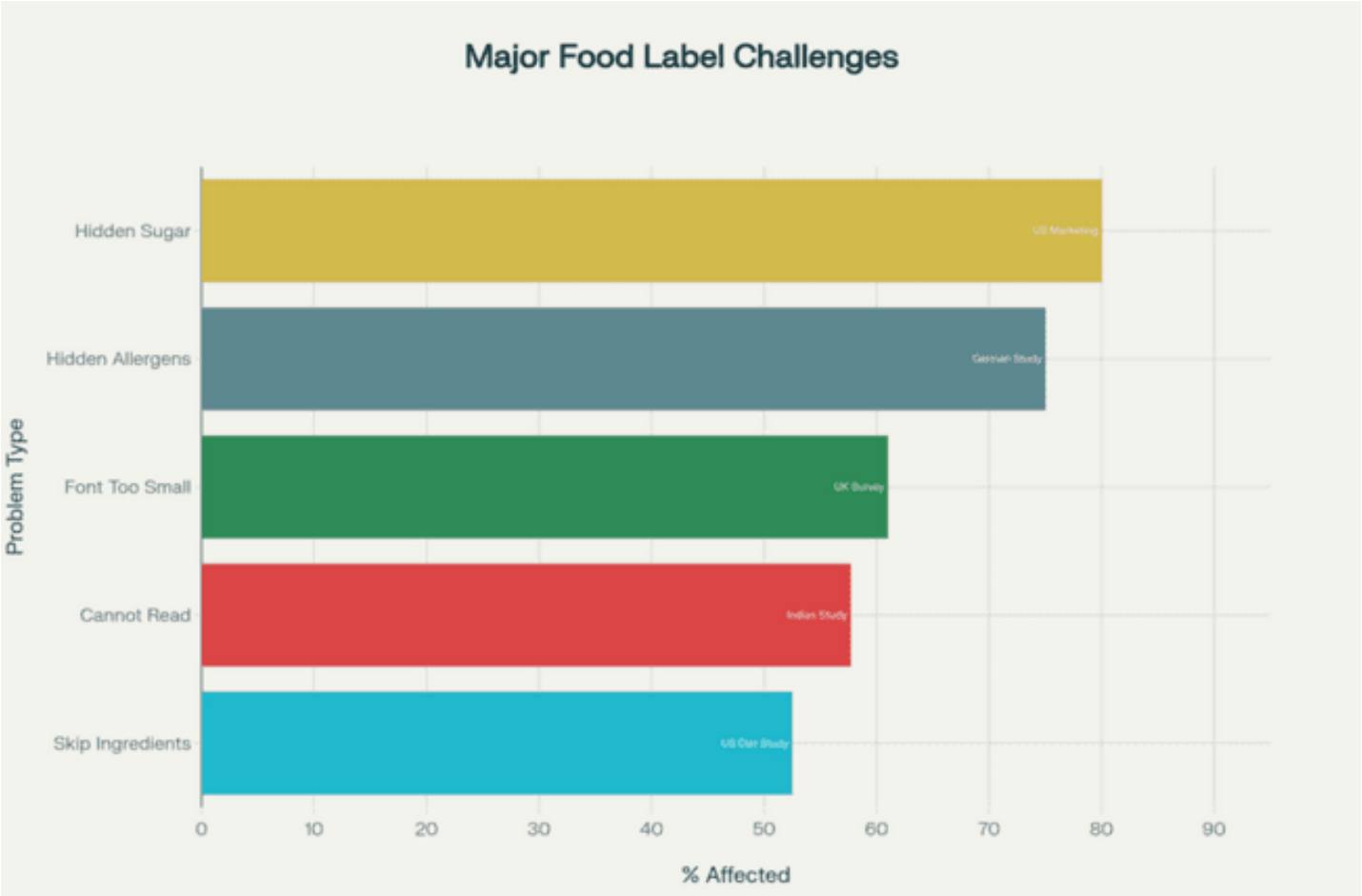


Fig4: Food Label Challenges

- **Priorities and Trust:** The manufacturing/expiration date is the most important factor to Indian consumers (80.6%) when reading labels. There is a lack of trust in the ingredients of processed foods, even though more than half of consumers say that information on labels is trustworthy.

- **Preference for Simpler Systems:** Indian consumers showed a strong preference for Front-of-Package Label (FoPL) designs that are simple and easy to use. The preference for quick-to-read, easily understandable information was shown by the 93% preference for warning labels, which were followed by multiple traffic lights.

Misleading Health Claims in the Indian Market

The Indian market is full of misleading health claims meant to create a "health halo" around products. The FSSAI has looked at many products for such claims and started legal action in several cases[3]. Examples of misleading claims against major brands in India include:

- **Complan**: Claiming that children can grow "two times" faster was found to be misleading..

- **Boost:** A claim of providing "3 times more stamina" than other chocolate drinks was found to be misleading as the producer had not provided specific studies to back it up.

- **Horlicks:** Advertisements claiming children become "taller, stronger, sharper" were flagged.

- **Saffola:** Using a heart symbol and claiming "the heart of a healthy family" was found to be misleading

- **Britannia Nutrichoice:** Claims like "diabetic friendly" were found to be misleading.

- **Kellogg's Special K:** A claim that "research shows that people who eat a low-fat breakfast... tend to be thinner" was seen as a way to trick customers.

- **Real Active Fibre+**:Advertisements for this product were also found to be misleading.

Fig5: Misinformation spreading through marketing labels

These deceptive practices directly contribute to health risks by encouraging unhealthy eating habits and can lead to obesity, heart disease, and diabetes.

The Epidemic of False Marketing: How Brands Engineer a *"Health Halo"*

Many brands use complex marketing techniques to give their products a "**health halo**" in the fiercely competitive Indian food market. This tactic involves using certain words, images, and statements to make a product seem healthier than it is, often misleading customers into choosing unhealthy foods. The public health crises of obesity, diabetes, and other non-communicable diseases are directly worsened by this dishonest marketing, which takes advantage of consumers' desire for healthy options

Real-World Examples of Misleading Marketing in India:

- **Breakfast Cereals Promoted as "Healthy" Ways to Begin the Day :** Many well-known breakfast cereals are promoted as being rich in whole grains, vitamins, and minerals, making them seem like a healthy choice for both kids and adults. However, a closer look at the nutritional data often shows that the amounts of sugar and refined carbs are way too high. For example, even though a product is labeled as "**made with whole grains,**" refined flour may still be the main ingredient, with sugar coming in second or third. This type of marketing cleverly shifts customers' focus away from the product's harmful aspects.

Fig6:False information through labels

● **Fruit Drinks and Juices Declaring the Quality of "Real Fruit" :** Images of juicy, fresh fruits are commonly used in the advertising of packaged fruit juices, creating the idea that they are the same as eating the real thing. However, many of these products are packed with artificial flavors, added sugars, and preservatives, and only contain a small amount of real fruit juice. Technically, the statement "made from real fruit" may be accurate, but it is misleading because it hides the fact that the product is often little more than fruit-flavored sugar water.

Fig7:Misleading food labels

● **"Diet" and "Lite" Snacks That Don't Look as Healthful as They Do** : Snacks with labels like "diet," "lite," "baked, not fried," or "zero trans-fat" are everywhere in the market. These statements can give people a false sense of security, even though they might be true in some way. A "baked" snack, for example, may still have a lot of sodium, refined flour, and bad fats. Similarly, a "diet" snack may be lower in calories but offer little to no nutrition, which could lead to overeating.

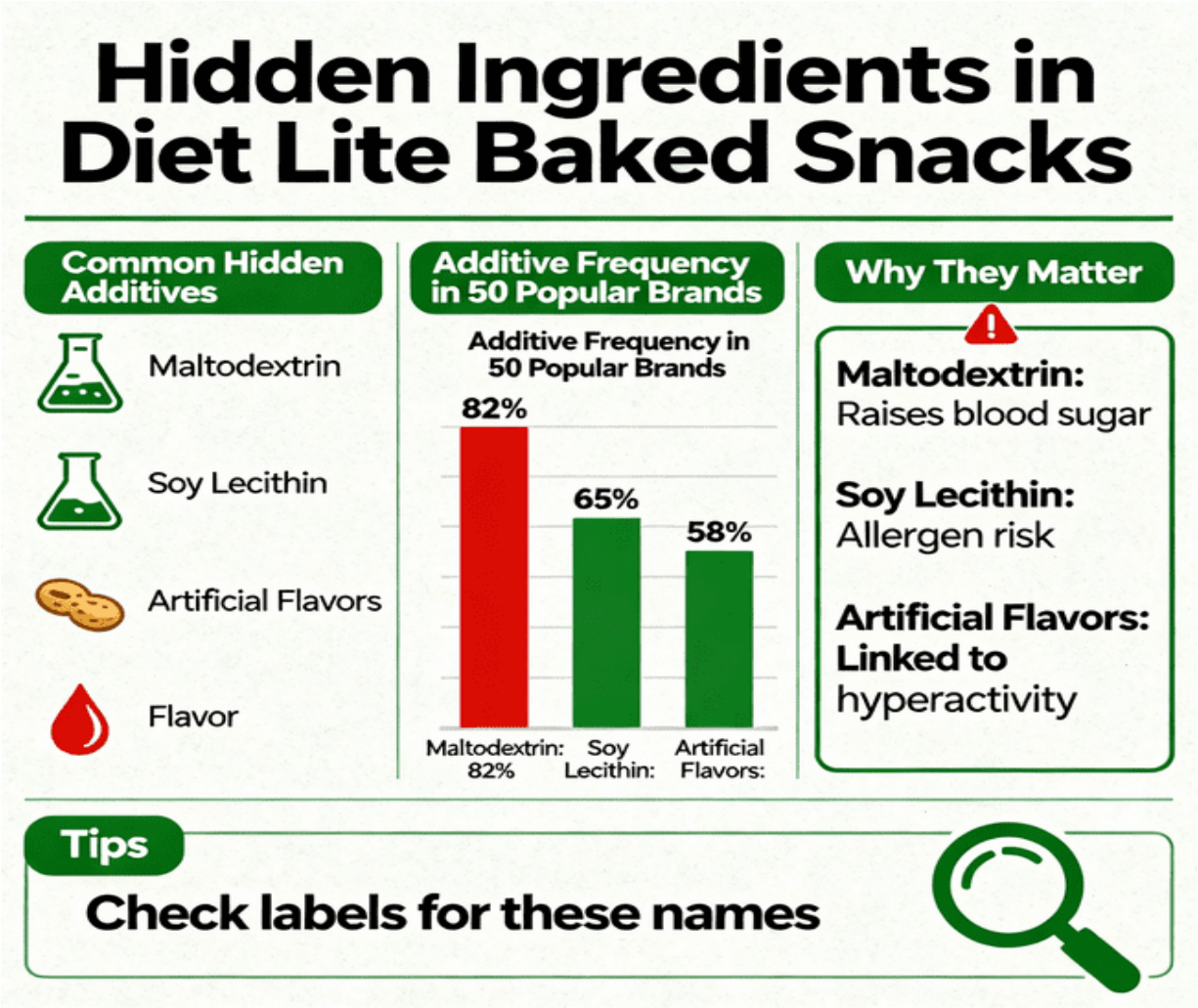


Fig8: Hidden allergens in food packets

How False Marketing Is Counteracted by the Food Insight Scanner ?

The purpose of the "Food Insight Scanner for Personalized Health" is to give consumers clear, objective information while going through the confusion of misleading advertising. Here is how it tackles the problem head-on:

- **'Good for You' objective score:** The "Good for You" score, the app's main feature. It provides a quick and simple evaluation of a product's actual nutritional value. This score helps neutralize the persuasive power of misleading marketing claims on the packaging by thoroughly analyzing the nutrition facts and ingredients list.

- **Ingredient and Processing Analysis:** The scanner's AI engine carefully examines the ingredients list to find "hidden sugars," controversial additives, and the overall level of processing. This feature is important for exposing products that are advertised as "natural" or "healthy" but are actually heavily processed and contain a lot of artificial ingredients.

- **Personalized Health Alerts:** The app offers custom alerts for users with specific medical conditions, such as diabetes or high blood pressure This is especially helpful in challenging unclear marketing claims such as "diabetic-friendly." Regardless of what's on the packaging, the app can identify products with high sodium or sugar content and clearly advise users to avoid them.

By providing a tool that is both data-driven and personalized, the Food Insight Scanner empowers consumers to look past the "health halo" and make choices based on facts, not marketing hype. This not only protects

individual health but also creates a more transparent food industry where brands are held accountable for the nutritional quality of their products.

Nestlé Maggi noodles crisis

A clear example is the **2015 Nestlé Maggi noodles crisis in India[4]**. Routine testing found lead levels nearly seven times the legal limit and detected MSG despite the package being labeled "No added MSG." The incident led to a nationwide ban, the destruction of $50 million worth of stock, and damaged consumer trust in a well-known brand, exposing the hidden dangers that can be behind a trusted label.

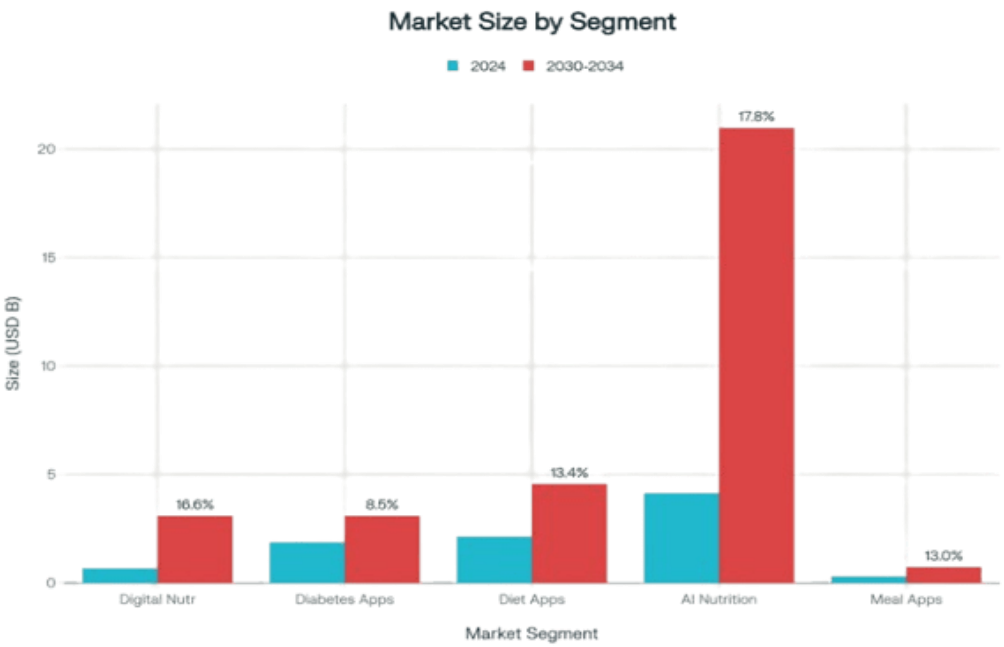
- **Excessive Lead Content**: The samples were found to contain lead at 17.2 parts per million (ppm), which is nearly seven times the permissible limit of 2.5 ppm set by Indian food safety regulations. Lead is a powerful neurotoxin, especially harmful to children, and its presence in a product heavily advertised to them was a major red flag.. ☠

- **Misleading MSG Labeling:** The presence of monosodium glutamate (MSG) was detected, directly contradicting the "No added MSG" claim on the packaging. This wasn't just a health concern but an issue of corporate transparency and truth in advertising[5].

Fig9: Describing Maggie crisis in 2015

The Digital Health Response in India

The widespread consumer frustration has led to explosive growth in India's market for diet and nutrition mobile applications. This sector represents a massive and rapidly expanding opportunity.



Market Opportunity and Validation

Fig10 : Market size and growth

- The Indian diet and nutrition apps market is growing rapidly. The market was valued at **USD 236.96 million in 2024** and is expected to jump to **USD 2,347.68 million by 2032.** This shows an impressive **CAGR of 44.55%.**
- Another study estimates the market at **USD 109.4 million in 2024.** It predicts growth to **USD 256.8 million** by **2030 with a CAGR of 15%.**

This data confirms a substantial, commercially viable market where Indian consumers are actively spending money on digital tools to gain clarity over their dietary choices.

Existing System

Even though the market is active, **no single app** has become a complete solution. The current situation is fragmented, creating **a clear opportunity for an all-in-one platform.** The analysis shows a major need that is not being met. Consumers have to choose between apps that give numerical data but lack deeper insights **(like MyFitnessPal)**, those that offer insights but are too basic **(like Yuka),** or **apps that are very tailored but not very safe**. No app successfully brings all the important features together in one easy-to-use tool.

- **Existing Platform:**

Feature	**MyFitnessPal**	**Yuka**	**Fig (Food Is Good)**	**Foodvisor**
Primary Function	Calorie & Macro Logging	Simplistic Health Score	Allergy & Ingredient Filtering	AI-powered Calorie Tracking

Key Strength	Massive food database	Simplicity, quick score	Deeply customizable for allergies	Photo recognition
Critical Gap	Inaccurate user-generated data; no qualitative assessment	Unscientific algorithm; penalizes healthy foods for single metrics	Primarily a binary safety tool; no graded health score	Focus on calorie counting, not overall health
Target User	General Calorie Counters	Simplicity-Seeking Shoppers	Medically-Restricted Diets	Calorie-focused users

Proposed system

Food Insight Scanner for Personalized Health:

Feature	**Food Insight Scanner (Proposed)**
Primary Function	Integrated Personalized Health Intelligence
Key Strength	Holistic, personalized, and transparent scoring
Critical Gap	Fills the gap by integrating all key functions
Target User	Health-Vulnerable & Health-Conscious Consumers

Methodology and Technology

Core Technology Architecture for the Indian Market

The success of the app depends on a strong, flexible technology setup that handles the unique challenges of the Indian food market

- **Mobile Framework:** Built using Flutter, which allows it to work on both Android and iOS. Android is very popular in India, so this helps reach more users. This setup makes the app easy to develop and gives a smooth experience..

- **Backend:** Uses cloud-based services like AWS or Google Cloud to manage user data, process AI requests, and host the food database. This reduces server costs and ensures the app is always running smoothly, even when there's a lot of activity.

- **Data Capture and Processing:**

- **Dual-Method Input:** Uses two methods to collect every product and ingredient available in the market, ensuring the best possible personalized results.

- **Barcode Scanning:** Uses specialized tools to quickly scan product barcodes and check them against the database. This is the main way to get information for packaged foods.

- **Optical Character Recognition (OCR):** Uses tools like Google's ML Kit to let users take a picture of ingredients and nutrition panels.This is helpful for products not yet in the database, local brands, and checking the accuracy of data.

- I**ndian Food Database Strategy:** This is the most important part. A multi-step approach is needed:

■ **The Diabetes Capital**: Uses international databases that have detailed information on foreign brands sold in India, such as Open Food Facts and FatSecret.

■ **Proprietary Database Development:** A team works on creating a list of products that are only available in India. This includes regional brands, common foods, and products from major Indian FMCG companies like ITC, Amul, Patanjali, and Britannia.

■ **Verified Crowdsourcing:** Lets users add new products through OCR. These entries go into a verification queue and are checked by an internal team before being added to the main database to make sure the data is accurate.

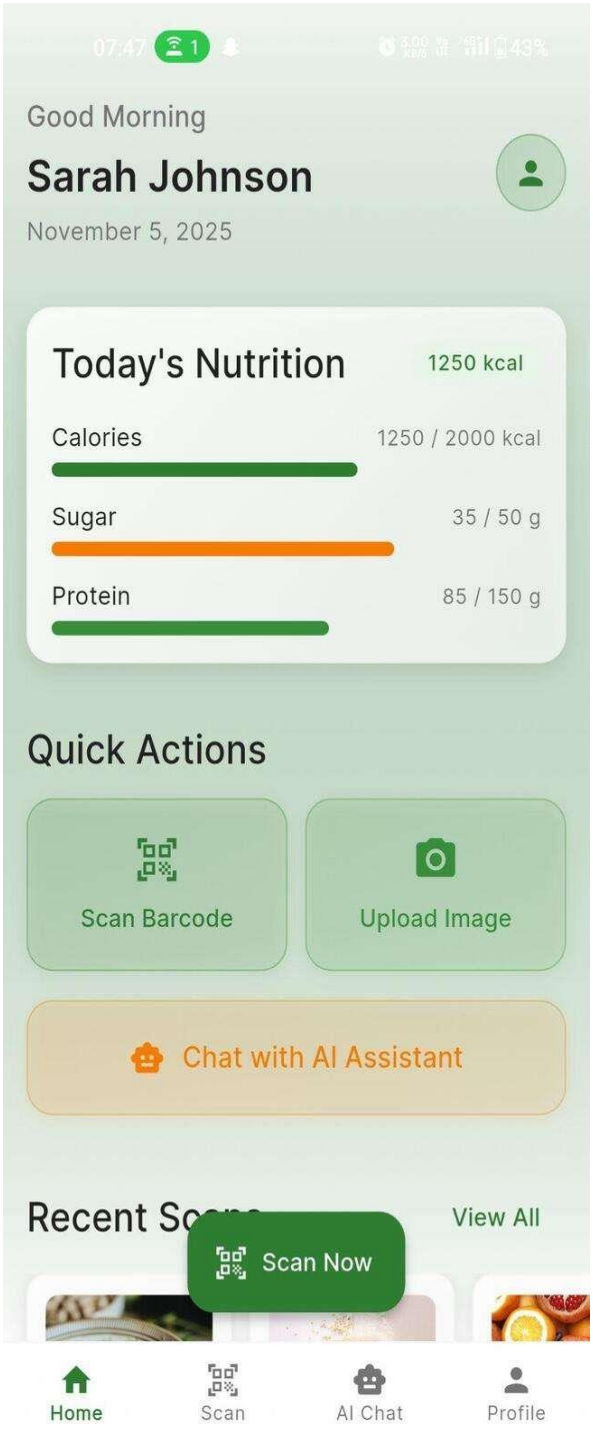


Fig11 : Dashboard Page

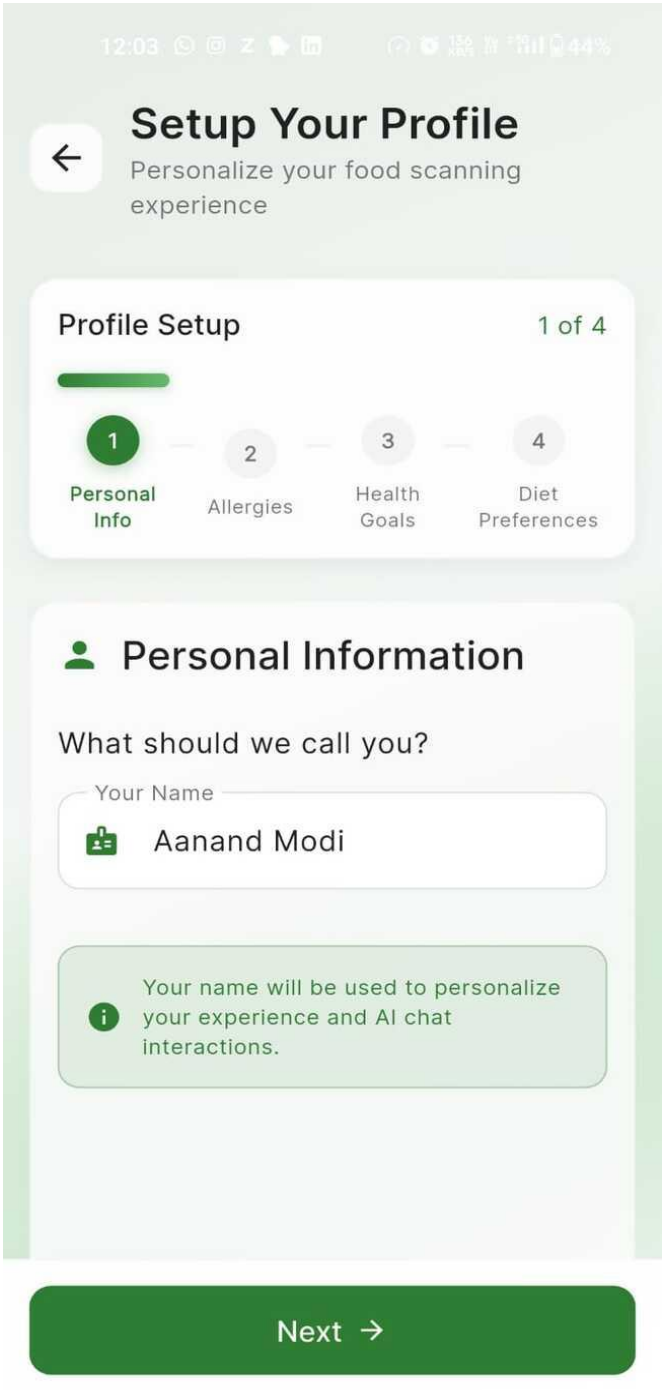


Fig12 : Profile Setup page

Dashboard screen : This is the main page where users can view their nutrition levels and navigate through the app.

- **Basic info Page:** Here, users can enter basic details like their name and address

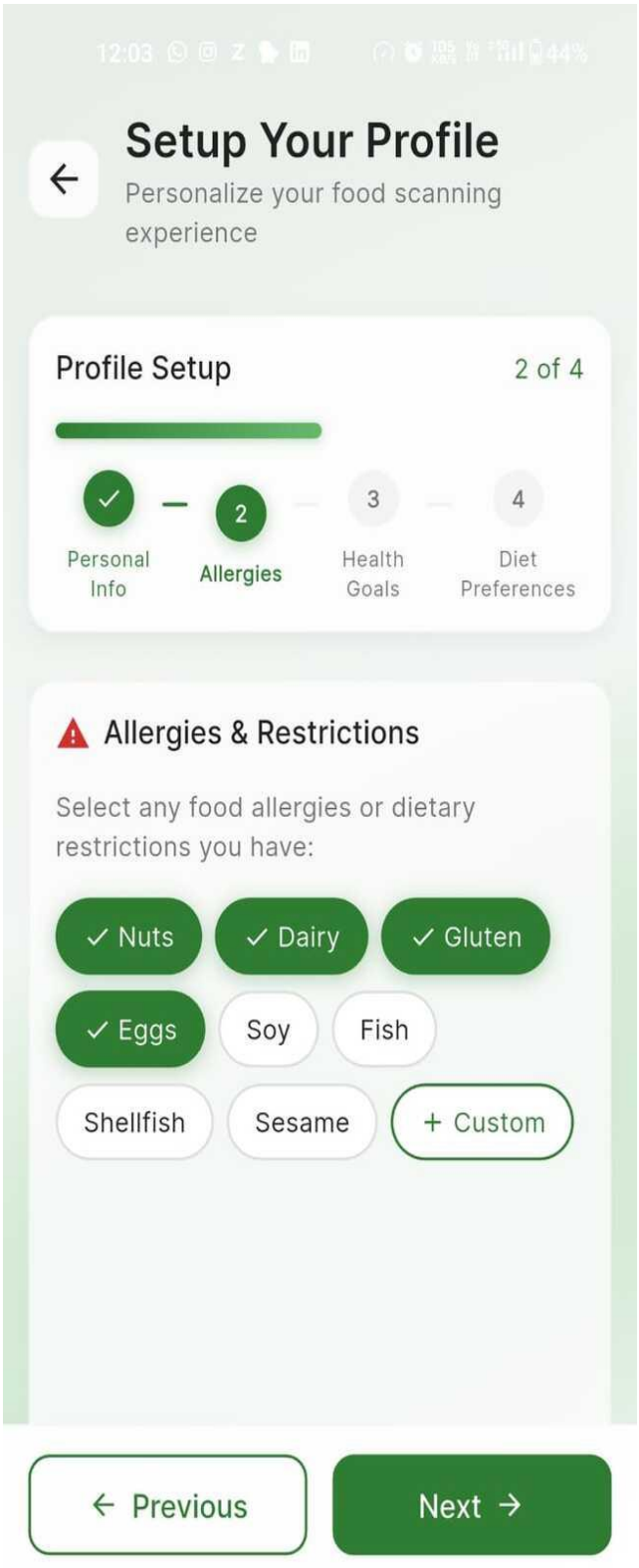


Fig13 : Allergens input screen

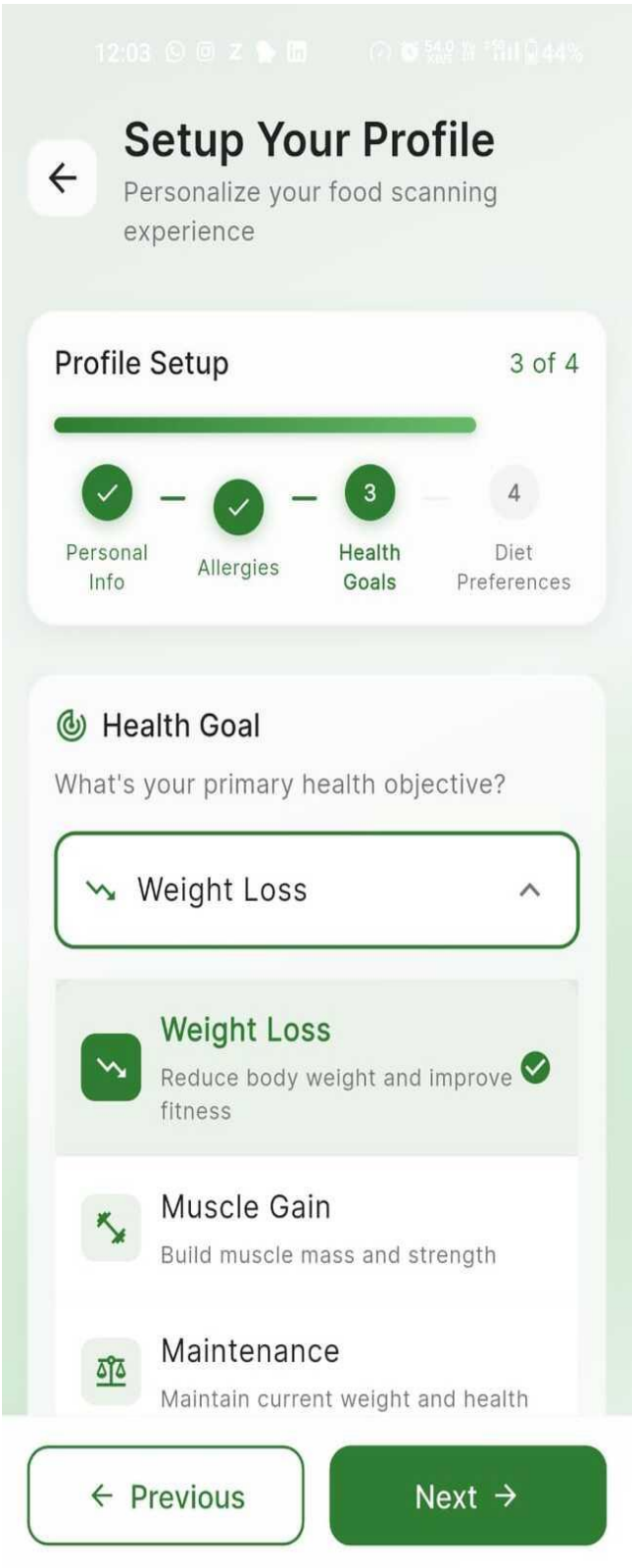


Fig14 : Health goal screen

- **Allergens input screen:** Users can select allergies or dietary restrictions here, which helps tailor the results to their needs.

- **Health Goal Screen :** Users can select their health goals, such as weight loss, gain, or maintain.

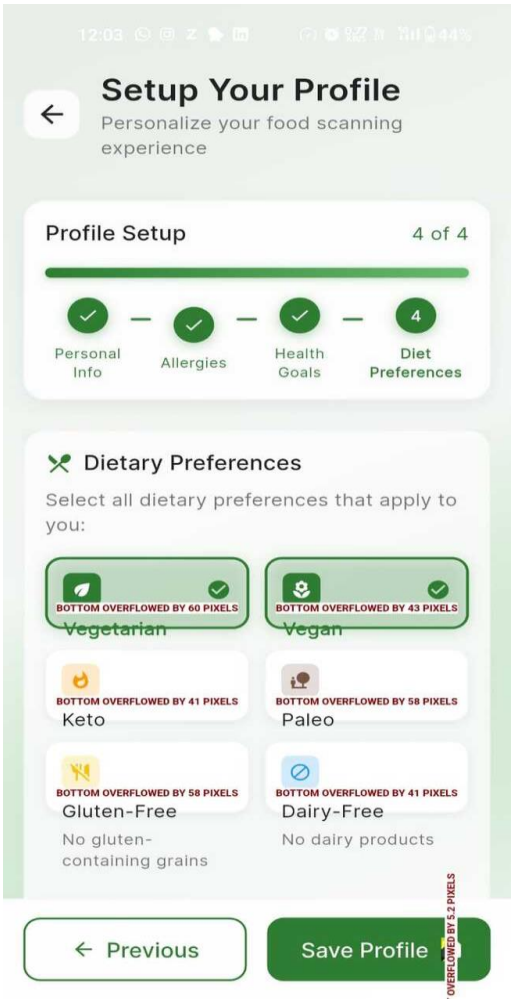


Fig14 : Diet preference screen

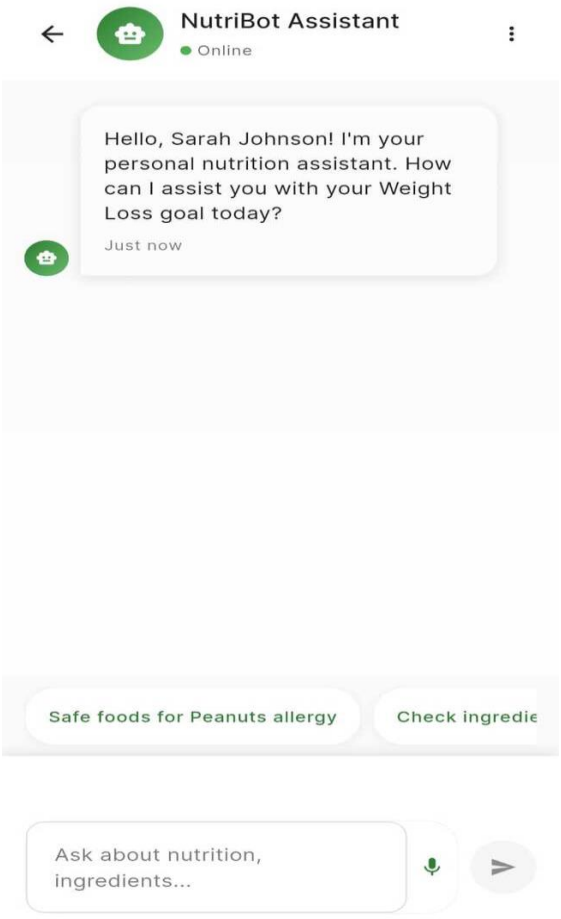


Fig15 : AI Assistant Screen

- **Diet preference screen:** Users can choose their dietary preferences, like vegetarian, non-vegetarian, or gluten-free.

- **AI Assistant screen**: This is where users can ask the AI chatbot questions about nutrition, diet, and food.

DISCUSSION

The 'Good for You' Score: An India-Centric Algorithm

This system apart is a clear, personalized scoring system that goes beyond general ratings.It includes a personalization layer that adjusts the score (out of 10) based on three important areas.

- **Component 1: Nutrition Score (Weight: 50%)**
  - Analyzes the Nutrition Facts Panel for every 100g of food..

- **Positive Factors:** Points are given for nutrients like fiber and protein as suggested by the National Institute of Nutrition (NIN) in India.
- **Negative Factors:** Points are deducted for nutrients to limit, such as added sugar, sodium, saturated fat, and high energy density (calories), with limits based on FSSAI guidelines.

- **Component 2: Ingredient Concern Score (Weight: 30%)**
  - The AI engine checks the ingredient list.
  - Points are taken off for controversial additives, artificial colors (like **Tartrazine**), preservatives, and artificial sweeteners that are under suspicion.
  - It also flags hidden sugars like high-**fructose corn syrup and maltodextrin.**
- **Component 3: Processing Score (Weight: 20%)**
  - Estimates how much the food has been processed.
  - Points are deducted for long ingredient lists, ingredients not used at home (like hydrogenated oils or artificial flavors), and the amount the food is changed from its original, whole-food state.
- **The Personalization Layer (Dynamic Adjustment)**
  - This is the final, important step. The score is adjusted based on the user's profile
  - **Example 1 (Diabetic User):** A product high in added sugar will have a very low score and be clearly marked as a warning, even if it has other positive qualities.
  - **Example 2 (User with Hypertension):** Sodium content will have a heavier negative effect on the final score.
  - **Example 3 (Lactose Intolerant User):** Any product with milk solids, whey, or casein will be automatically given an "Avoid" rating.

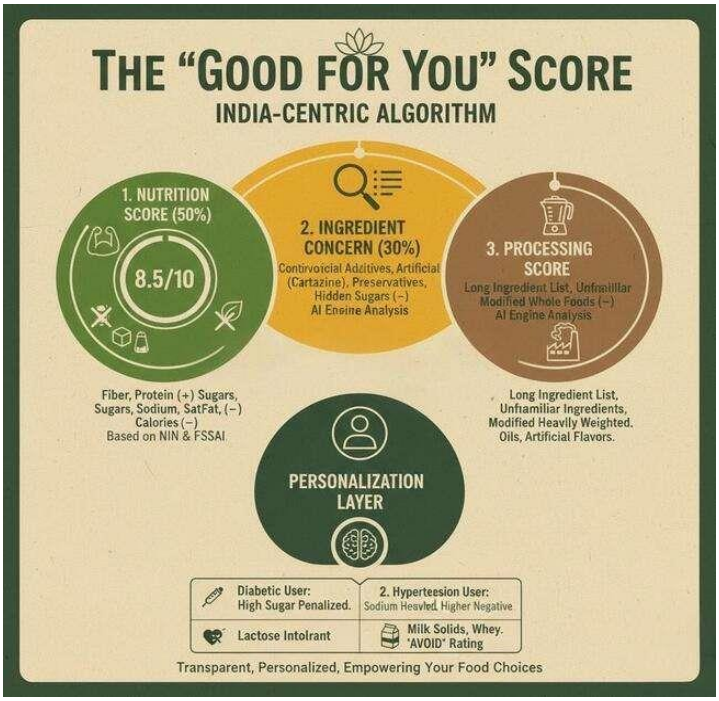


Fig16: Scoring Algorithm

User Experience (UX) and Personalization Engine

The app will be designed to be simple and easy to use for everyone in India.

➔ **Onboarding and Profile Setup:**

When users first start using the app, they'll set up a health profile that's detailed but easy to navigate :

- **Allergies:** Based on the list from FSSAI and also includes other common allergens.
- **Medical Conditions:** Such as diabetes, high blood pressure, PCOD, celiac disease, and more.
- **Dietary Preferences:** Including vegetarian, vegan, Jain, sattvic, halal, keto, and others..
- **Health Goals:** Weight loss, muscle gain, reduce sugar intake, increase fiber.

➔ **Interface and Key Features:**

◆ **Simplified UI:** The app has a clean and easy-to-use design that shows the final score clearly. It uses color codes like **green, yellow, and red,** which are popular with Indian users for quick understanding.

◆ **Multilingual Support:** The app is available in English, Hindi, and many other major regional languages like Tamil, Telugu, Bengali, and Marathi, making it easy for a wide range of users

◆ **Actionable Insights:** After showing the score, the app gives simple and easy-to-understand explanations in plain language, such as "Good source of protein, but high in sodium" or "Contains 3 hidden sugars."

◆ **Healthy Alternatives:** The app also suggests better, healthier product options that are available in the Indian market and may link to well-known online shopping platforms like BigBasket or Blinkit.

CONCLUSION

Empowering a Healthier India

❖ **Recapitulation: Tackling a Major National Issue**

There is a growing problem of lifestyle diseases, and the food environment in India is filled with unclear labels and misleading marketing, which are two big challenges for the public.
The Food Insight Scanner is more than just a helpful tool - it plays a key role in bridging the important gap between what food producers know and what consumers need to know. This app directly tackles the real issues that Indian consumers face by offering a clear, personalized, and science-based solution that helps them make safer and healthier choices for their families.

❖ **The App's Role as a Catalyst for Change**

Beyond helping individual users, the Food Insight Scanner has the potential to bring about significant change.

➢ **For the Consumer:** It gives people immediate power, turning confusing moments in the supermarket into opportunities to make smart decisions. It can help reduce the risk of allergic reactions, support the daily management of chronic illnesses, lower stress, and improve overall life quality.

➢ **For the Food Industry:** The app encourages consumers to choose healthier products by rewarding them with better scores, which in turn creates pressure on food companies to reformulate their offerings and stop using misleading claims. This leads to a competitive environment focused on nutrition and transparency.

➢ **For Public Health:** The app acts as a strong educational resource, helping people understand health better across the population. As more people use it, there could be better eating habits, which might lead to fewer cases of obesity, Type 2 diabetes, and other non-communicable diseases, reducing the strain on India's healthcare system.

Future vision

Future Directions and Long-Term Potential

The **Food Insight Scanner** has a plan to grow beyond its first release and become a full public health tool.

➢ **Health System Integration:** This tool can be used in hospitals and clinics. Doctors and nutritionists can check what people eat, recommend the app to them, and help with diet advice in a smarter and more efficient way.

➢ **Perspectives on Public Health Data:** Groups like **FSSAI, ICMR, and NIN** can use data from the app. This data, which is hidden and grouped, can help track what people eat, how much of certain ingredients they consume, and where unhealthy foods are popular. This can help make better health policies that aren't possible right now.

➢ **Promoting Regulatory Change:** If data shows people **avoid foods with high salt, sugar, or harmful additives,** it can help push for better food labels and remove harmful ingredients from the market.

In conclusion, the '**Food Insight Scanner for Personalized Health**' is positioned to be more than just a successful mobile application; It is a key tool that can help Indian people make better health choices, improve the country's health, and support a clearer and healthier food system for a billion people

REFERENCE

1. https://integrishealth.org/resources/on-your-health/2018/june/signs-you-might-have-a-food-allergy
2. https://allergyasthmanetwork.org/anaphylaxis/
3. https://www.indiatoday.in/india/north/story/food-regulator-begins-prosecution-of-leading-health-products-india-today-122768-2012-11-28
4. https://news.biharprabha.com/2015/05/beware-eating-2-minute-maggi-noodles-can-ruin-your-nervous-system/#google_vignette
5. https://www.indiatoday.in/business/story/nestle-unhealthy-food-controversy-looking-back-at-the-maggi-noodles-crisis-in-india-1810003-2021-06-02