

## PROBLEM STATEMENT

Food fraud and contamination remain critical challenges despite blockchain-based tracking systems. Existing solutions rely on static data, making them vulnerable to tampering and delayed contamination detection. VeriHarvest integrates AI, IoT, and blockchain to create a real-time, fraud-proof food verification system. Through dynamic trust scoring, self-executing smart contracts, and real-time fingerprinting, it ensures authenticity, safety, and consumer confidence.

## IDEA DESCRIPTION

VeriHarvest is an advanced food authentication and safety platform that transforms the way food quality and trust are managed. Unlike traditional blockchain-based traceability systems that rely on static data inputs, VeriHarvest continuously monitors, verifies, and responds to potential risks in real time.

**Key Features & How It Works:**

- AI-Driven Food Fingerprinting & Authentication** Uses hyperspectral imaging and AI-based pattern recognition to create a unique digital fingerprint of food products. Verifies authenticity at every checkpoint (from farm to consumer) by cross-checking against the blockchain ledger. Detects potential fraud (e.g., adulteration, mislabeling, or substitution) instantly.
- IoT-Powered Real-Time Monitoring & Smart Labels** Integrates with IoT sensors (temperature, humidity, gas sensors) embedded in packaging or storage units. Ensures compliance with storage and transportation conditions (e.g., cold chain monitoring). Consumers can scan smart labels (QR codes/NFC tags) to verify food origin, quality, and freshness.
- Blockchain-Based Traceability & Smart Contracts** Uses immutable blockchain records to store and track each step in the food supply chain. Smart contracts automatically trigger alerts and actions if food safety standards are breached. Prevents tampering or manipulation of food history, ensuring end-to-end transparency.
- Dynamic Trust Scoring & Fraud Prevention** AI assigns a dynamic trust score to every food item based on factors like supply compliance, real-time quality checks, and past fraud. Food with low trust scores is flagged for additional checks or rejected before reaching consumers.
- Consumer & Regulatory Dashboard** Regulators can access a real-time dashboard showing food safety compliance, flagged risks, and fraud alerts. Consumers can verify authenticity, origin, and freshness before purchasing via a mobile app or web portal.

**Why VeriHarvest is a Game-Changer:**

- Fraud-Proof** Combines AI and blockchain to create tamper-resistant food authentication.
- Real-Time Safety Monitoring** - Unlike static traceability, VeriHarvest continuously verifies food quality.
- Automated Compliance** - Smart contracts enforce safety rules dynamically, reducing human intervention.
- Consumer Confidence** - Provides transparent and verifiable food safety data to consumers.
- Scalable & Industry-Ready** - Can be integrated with farmers, suppliers, logistics, retailers, and regulators.