### **🚀 VeriHarvest AI Module (Food Fingerprinting)**

**Role:** AI/ML Engineer  
 **Module:** **Food Authenticity Detection using Deep Learning**

## **📌 1. Overview**

This **Python-based AI model** uses **Convolutional Neural Networks (CNNs)** to analyze **food fingerprints** and verify authenticity using **image processing**.

✅ **Trains on food images** ✅ **Detects fraudulent/adulterated food** ✅ **Classifies food as 'Authentic' or 'Fraudulent'** ✅ **Saves model for blockchain verification**

## **📌 2. How to Run**

### **🔹 Prerequisites**

✅ Install **Python 3.8+** ✅ Install dependencies:

pip install tensorflow opencv-python numpy

✅ **Dataset Requirement**:

* Organize images in dataset/food\_images/ directory (Authentic & Fraudulent).

### **🔹 Steps to Execute**

1️⃣ **Train the AI Model**

python veriharvest\_ai\_module.py

2️⃣ **Test with a New Image**

result = predict\_fingerprint("food\_fingerprint\_model.h5", "dataset/test\_image.jpg")

print(f"Food Authentication Result: {result}")

## **📌 3. Testing AI Module**

* Ensure training dataset is **balanced**.
* Run inference on a **new image** and verify the prediction.
* Adjust CNN layers for **better accuracy**.