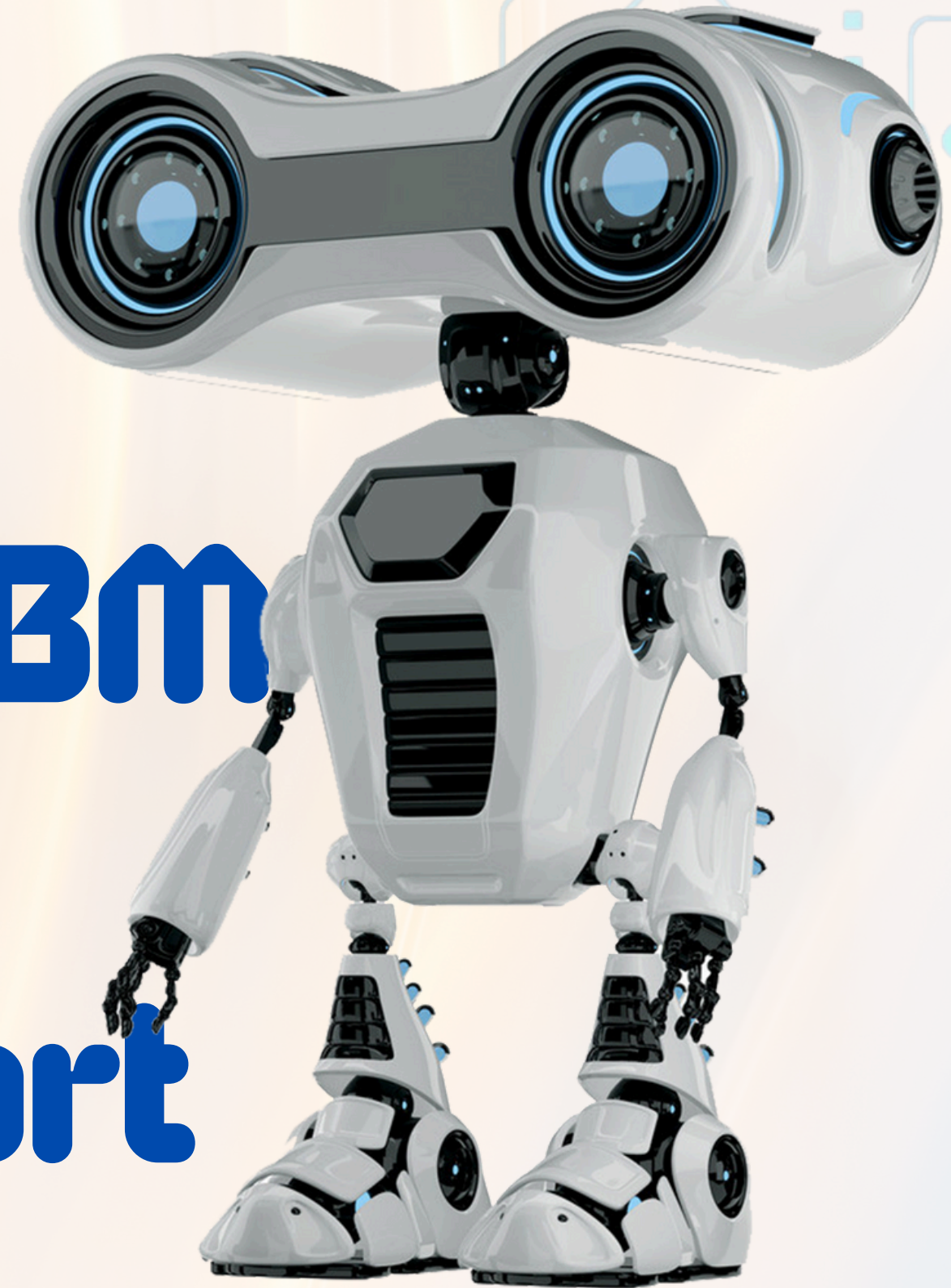


ZeroWaste AI – Generative AI Hackathon with IBM GRANITE The Future of Technology Submission Report





project title

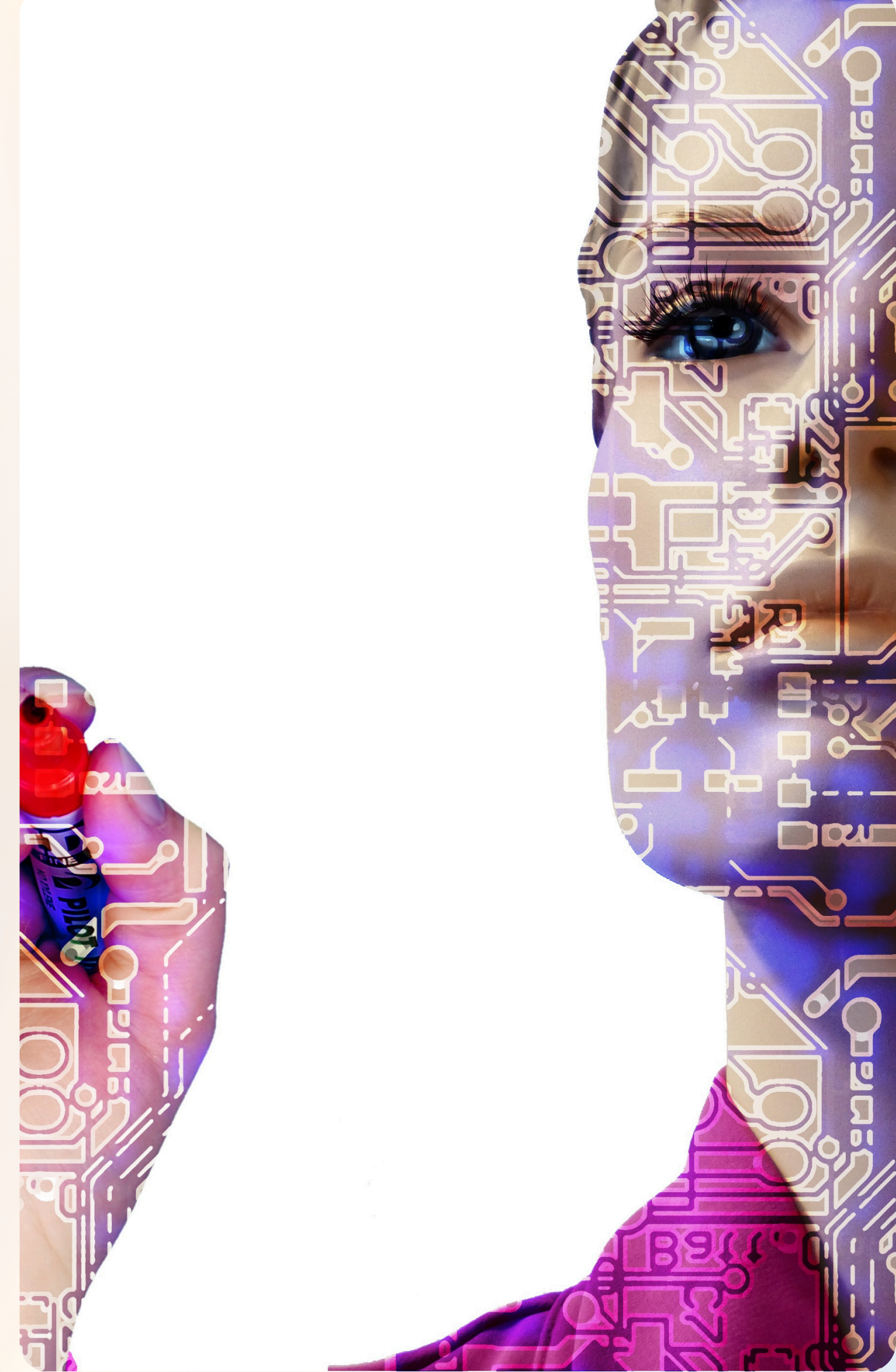
ZeroWaste AI - Smart Inventory Management & Automated Restocking System

2. Team Details

- Project Lead: Chiamaka Frances Anyakora
- <https://github.com/franceskora/ZeroWaste-AI> Repository:
<https://zerowaste-ai.onrender.com>
- Live Demo: <https://zerowaste-ai.onrender.com>

Problem Statement & Motivation

- Problem
- Businesses, especially in retail and grocery stores, struggle with inventory management inefficiencies, leading to:
 - • Overstocking, causing waste and financial losses.
 - • Stock depletion, resulting in missed sales opportunities.
 - • Manual tracking errors, leading to inaccurate forecasting.
- Solution
- ZeroWaste AI is an AI-powered inventory management system that tracks stock levels, predicts demand trends, and automates restocking by integrating with supplier APIs. The goal is to reduce waste, prevent shortages, and optimize business operations.





Features & Functionalities

Core Features

- ✓ User Authentication (Signup, Login, Logout)
- ✓ AI-Powered Demand Forecasting using IBM WatsonX
- ✓ Automated Restocking System when stock reaches a defined threshold
- ✓ Supplier Management & Order Placement API
- ✓ Sales Tracking with automatic inventory updates
- ✓ Stock Warning System with user-defined low-stock thresholds
- ✓ Downloadable Restock List (PDF Format)
- ✓ Visual Data Insights (Charts for Trends & Sales)

Tech Stack

Component Technology Used

Backend Flask, Python, SQLite

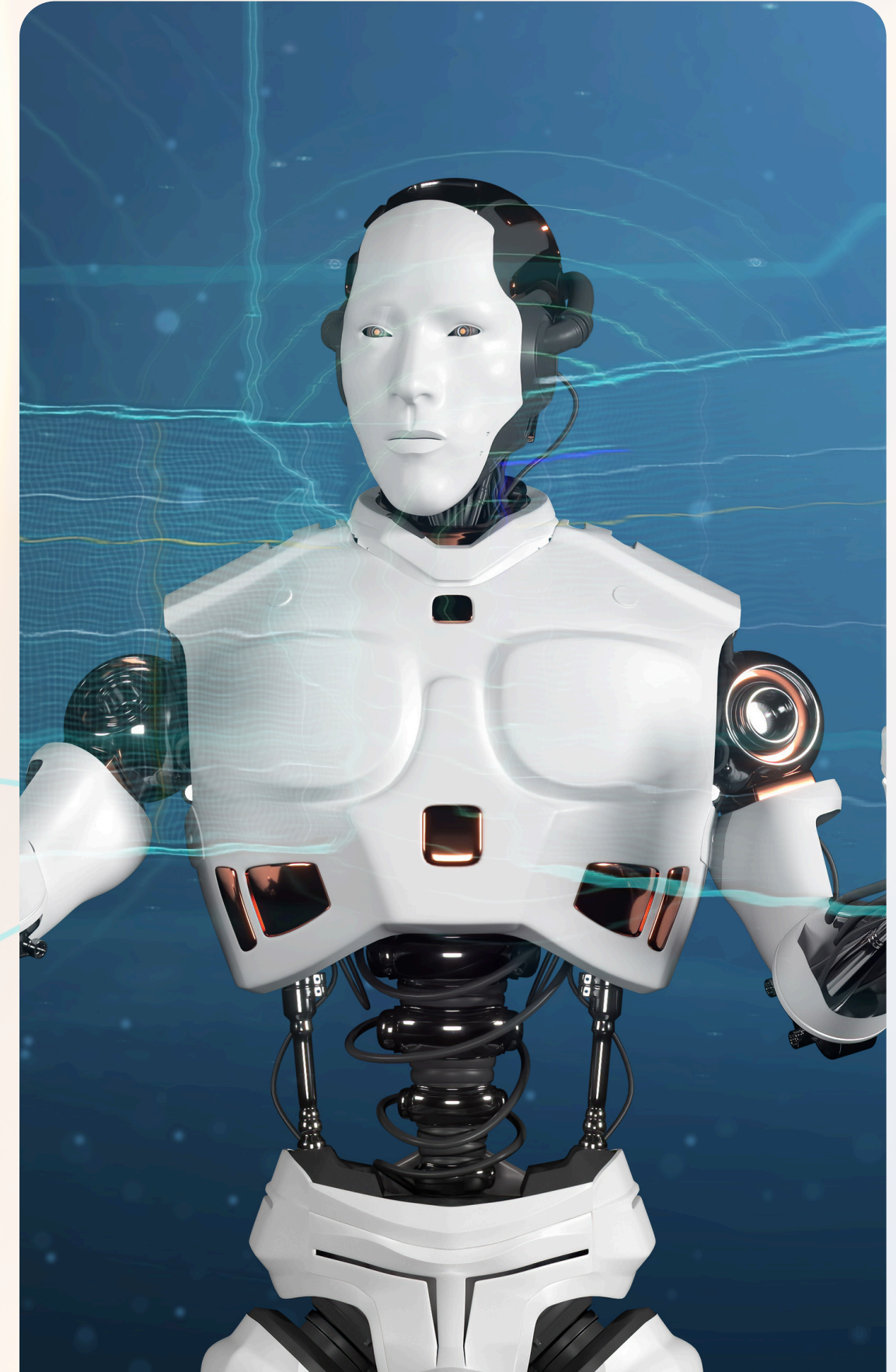
Frontend HTML, CSS, JavaScript

Database SQLite

AI Model Ibm/granite-3-29-instruct

Hosting Render (Deployed Web App)

Version Control Git, GitHub





Implementation & Development Process

❖ AI Integration (IBM WatsonX)

- Live inventory data is fed into IBM WatsonX AI, which analyzes sales trends and predicts demand for the next month.
- The AI generates insights on which products need restocking.

❖ Automated Restocking System

- Users can set a threshold for when restocking should be triggered.
- When stock falls below the set level, the system automatically places an order via the supplier API.
- Users can view past orders and track restock history.

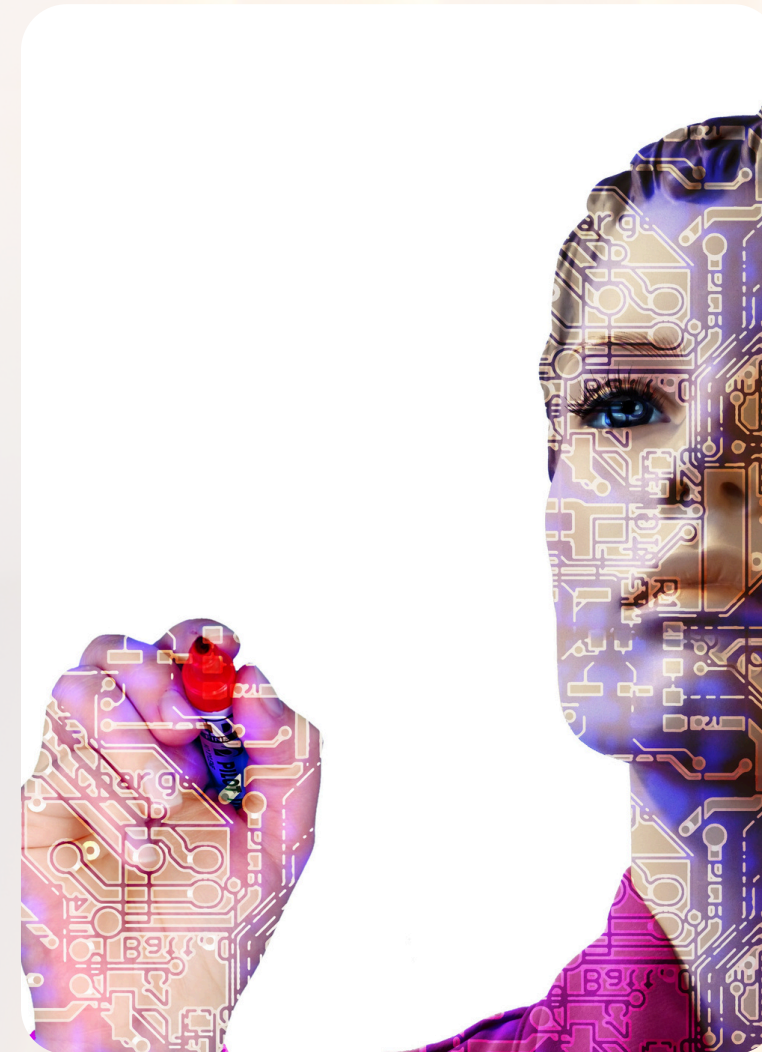
❖ Data Visualization & Reporting

The dashboard includes:

- Sales Trend Chart
- Inventory Level Chart
- Restock Prediction Chart
- Users can download a restock list (PDF) with low-stock items.

Deployment & Hosting

- Hosting Provider: Render
- Live Demo: <https://zerowaste-ai.onrender.com>
- Environment Variables Managed: .env file (excluded from GitHub)
- Database Migration: Flask-Migrate
- Production WSGI Server: Gunicorn





Challenges Faced & Solutions

- Challenge: Managing AI Predictions Accuracy
- ✓ Solution: We refined the dataset used for AI predictions and optimized the prompt variables sent to WatsonX AI.
- ➤ Challenge: Multi-User Data Management
- ✓ Solution: Implemented authentication, but future improvements will restrict inventory visibility per user.
- ➤ Challenge: Automatic Supplier Ordering
- ✓ Solution: Created a supplier order function but plan to integrate real supplier APIs for production.

Future Enhancements

- User-Specific Inventory Management – Users should only see their own inventory.
- Advanced AI Predictions – Incorporate historical sales trends to improve forecasting.
- Supplier API Integration – Connect with real-world supplier APIs for automated restocking.
- Role-Based Access Control – Define roles (Admin, Employee, Viewer) for better security.





Submission Details

GitHub

<https://github.com/franceskora/ZeroWaste-AI>

- Live Demo: <https://zerowaste-ai.onrender.com>
- Team Details & Documentation: Included in GitHub

Repo:

ZeroWaste AI is an innovative solution to optimize inventory management using AI predictions and automation. By leveraging IBM WatsonX AI, supplier API integrations, and automated restocking, the system aims to reduce waste, prevent shortages, and improve decision-making for businesses. This project demonstrates how AI can revolutionize inventory management, making it more efficient and data-driven.

Thank You!

