



PROJECT 1: STOCK MANAGER AI AGENT

1 Title

Project Title: AI-Powered Inventory Management System

2 Abstract

This project presents an AI-powered Inventory Management System that enables conversational control over stock operations. The system integrates an AI Agent with workflow automation (n8n), Google Sheets as a structured data layer, and a real-time dashboard built using Lovable UI. Users can update, search, delete, and manage stock using natural language commands. The solution reduces manual effort, improves real-time visibility, and demonstrates scalable automation architecture.

3 Problem Statement

Inventory management in small and mid-scale businesses is often handled manually through spreadsheets. This approach leads to:

- Manual data entry errors
- Lack of real-time visibility
- No automated stock alerts
- Delayed decision-making

There is a need for an intelligent system that automates stock management while remaining simple and cost-effective.

4 Existing System

Current approach:

- Manual spreadsheet updates
- No automation
- No intelligent alerts
- No conversational interaction

Limitations:

- Not scalable
 - Prone to human error
 - Requires constant manual monitoring
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5 Proposed System

The proposed system introduces:

- AI-powered conversational control
- Automated workflow execution
- Real-time stock updates
- Dashboard visualization
- Low-stock alert mechanism

The system separates intelligence, automation, data storage, and visualization into modular layers.

6 System Architecture

Layers:

1. User Interaction Layer (Chat Interface)
2. AI Decision Layer (OpenAI Model)
3. Automation Engine (n8n Workflow)
4. Data Layer (Google Sheets)
5. Visualization Layer (Lovable Dashboard)

Architecture follows modular design for scalability.

7 Workflow Explanation

1. User sends chat message
 2. n8n workflow triggers
 3. AI Agent interprets intent
 4. Memory maintains context
 5. Appropriate Google Sheets tool executes
 6. Sheet updates in real-time
 7. Dashboard reflects changes automatically
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8 Technology Stack

- Automation Engine: n8n
 - AI Engine: OpenAI Chat Model
 - Data Storage: Google Sheets
 - UI/Dashboard: Lovable
 - Programming Logic: Workflow-based automation
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9 Prototype Screenshots

=> "We will share this with you shortly"

- n8n workflow screenshot
 - Dashboard screenshot
 - Google Sheets data view
 - Alert panel screenshot
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10 Features

- Conversational stock update
- Search inventory by name/category
- Add / delete products
- Low-stock alerts
- Category distribution charts
- Real-time data sync

11 Scalability

- Modular architecture
- Data layer can migrate to PostgreSQL
- API integration possible
- Multi-warehouse expansion feasible

12 Limitations

- Google Sheets not ideal for enterprise scale
- Basic access control
- No advanced forecasting yet
- Limited concurrency handling

13 Future Scope

- Production-grade database
 - AI-based stock forecasting
 - Auto-reorder system
 - ERP integration
 - Role-based access control
 - Multi-agent expansion (additional AI agents planned)
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14 Impact

- Reduced manual inventory effort
 - Improved operational visibility
 - Faster stock decision-making
 - Lower risk of stock-out situations
 - Cost-efficient automation prototype
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15 Conclusion

The project successfully demonstrates how AI-powered automation can modernize traditional inventory management systems. By combining conversational intelligence with workflow automation and real-time dashboards, the system provides a scalable foundation for intelligent operations management.