Grocy: A web-based self-hosted groceries & household management solution ERP using PHP

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Abstract:
Grocy is an open-source PHP-based ERP (Enterprise Resource Planning) system that is mostly used for managing groceries, household tasks, and small-scale and domestic inventory. Grocy's modular and flexible architecture allows it to be tailored for a range of use cases, such as supply chain management and retail inventory tracking, even though it was not originally designed for large-scale commercial contexts. Grocy does not directly manage trading activities or financial securities in the framework of the stock market. Nonetheless, its fundamental features for tracking inventory and products can be abstracted to help with the management of tangible stock in retail and warehousing enterprises, which are highly impacted by market conditions.

I. INTRODUCTION

Grocy is a web-based, self-hosted enterprise resource planning (ERP) solutiondesigned to aid individuals, families, and small organizations in efficiently managing their groceries, food stocks, and related household operations**.** Built using **PHP** as its server-side scripting language, Grocy offers a lightweight yet powerful platform for streamlining routines that typically consume significant time and resources in day-to-day life.At its core, Grocy aims to enable users to track their inventory of food and other household items**,** manage shopping lists**,** oversee expiration dates**,** and even plan their meal preparations with greater ease and confidence. This functionality is especially helpful for reducing food waste, avoiding over-purchasing, and optimizing financial expenditures related to food and home care.One of Grocy's key distinguishing factors is its self-hosted nature**,** which guarantees full control over data and configuration for its users. This makes it an ideal solution for individuals, families, or small community groups who wish to keep their information private and independent from third-party services. Furthermore, by employing open-source technologies, Grocy invites users to customize and modify its platform to suit their unique needs and preferences.Grocy offers a range of modules and features, including inventory management**,**shopping list coordination**,** tasks and routines scheduling**,** chore and battery trackers**,** meal planning**,** recipes storage**,** andpurchase history**.** The platform also includesextensivereporting and statistical tools**,** allowing users to gain valuable insight into their consumption habits and to make data-informed decisions that contribute to greater financial stability, reduced waste, and a more sustainable lifestyle.Overall, Grocy stands out as a comprehensive, adaptable, and community-centric solutionfor organizing a household's day-to-day operations**.** It transforms routines into a systematic process, thereby freeing up time for users to focus on what truly matters — their health, their relationships, and their well-being.

II. RELATEDWORKS

Grocy is a modern, web-based self-hosted groceries and household management solution written in PHP. It fits into the category of lightweight, domain-specific ERP systems with a focus on home inventory, grocery shopping, meal planning, and household chores. This section reviews similar systems and tools that either directly compete with or complement Grocy's functionality.

1. Pantry Management and Grocery Apps

Many mobile and web-based applications serve similar use cases to Grocy, particularly in grocery inventory tracking and meal planning:

- **Out of Milk** and **OurGroceries** are popular mobile apps for grocery list management and pantry tracking. These apps offer cloud syncing and collaboration but lack the depth of functionality offered by Grocy, such as product expiry tracking, barcode scanning (without external services), and integration with recipe planning.
- **NoWaste** focuses on reducing food waste through inventory and expiry date tracking. Unlike Grocy, it is not open-source and lacks self-hosting capabilities, limiting user control over data and customizability.

2. ERP Systems

While Grocy is lightweight compared to traditional ERP systems, it shares functional similarities:

- **Odoo** and **ERPNext** are open-source ERP systems that include inventory management modules. However, they are designed for businesses rather than home users and are more complex to deploy and maintain. Grocy's simplicity and domain focus make it more accessible for personal or family use.
- **Dolibarr** is another PHP-based ERP and CRM solution. It offers modular inventory features but lacks the grocery and meal-planning context that Grocy provides.

3. Self-hosted Home Management Tools

Grocy is notable for being self-hosted, a feature valued by users concerned about privacy and data ownership:

- **Home Assistant**, while primarily focused on home automation, has integrations for shopping lists and household tracking. Grocy is often used in conjunction with Home Assistant due to its RESTful API, showing strong interoperability in DIY smart home ecosystems.
- **Nextcloud + Inventory plugins**: While Nextcloud offers file hosting and some household plugins, it doesn't provide a cohesive experience for grocery management and meal planning. Grocy fills this niche effectively.

4. Meal Planning & Recipe Tools

- **Paprika** and **Mealime** focus heavily on meal planning and recipe organization but do not include robust inventory management. Grocy uniquely integrates meal planning with live inventory and stock levels, enhancing the realism of recipe scheduling.

Grocy stands out as a hybrid solution that bridges the gap between personal ERP, meal planning, and inventory control in a self-hosted, privacy-conscious package. While other tools offer overlapping features, few match Grocy's breadth and integration within a home context, especially with features like barcode-based stock tracking, chore scheduling, and robust APIs for extensibility.

III. SYSTEMANALYSIS

Existing System

Currently, household and grocery management is commonly handled through various mobile and web applications such as AnyList, Out of Milk, Todoist, and Microsoft To Do. These tools offer functionalities like grocery lists, task scheduling, meal planning, and reminders. However, most of these systems are cloud-based, requiring continuous internet access and often involve subscription fees to unlock premium features. Additionally, data stored in such applications resides on third-party servers, which raises privacy concerns for some users.

In contrast, Grocy is a web-based, self-hosted household management ERP system developed using PHP. It provides a more comprehensive feature set including inventory tracking, shopping list management, chore scheduling, recipe planning, and barcode scanning, all within a single platform. As an open-source solution, Grocy allows full control over data and customization, and it is ideal for tech-savvy users or families who prefer data privacy, offline availability, and ERP-style organization in household tasks.While commercial apps excel in mobile accessibility and user-friendliness, they lack the depth and flexibility Grocy offers. Hence, Grocy stands out as a unique and efficient alternative in the existing ecosystem of household and grocery management solutions.

Proposed System

The proposed system, Grocy, is a web-based, self-hosted groceries and household management solution developed using PHP. It aims to address the limitations of existing cloud-based applications by offering a comprehensive, privacy-focused, and customizable platform for managing household tasks. Grocy functions as a lightweight ERP system for home use, integrating key features such as inventory management, shopping lists, chore scheduling, meal planning, and recipe tracking into a single application.Unlike commercial apps, Grocy is open-source and free to use, giving users complete control over their data and system configuration. It can be hosted locally on a personal server, a Raspberry Pi, or a virtual machine, making it ideal

for users who prefer offline accessibility and data privacy. The system supports multiple users with role-based permissions, making it suitable for families or shared households.Grocy also includes a RESTful API, enabling integration with other smart home platforms like Home Assistant, as well as the ability to connect with barcode scanners and external devices. With its modular design and PHP-based backend, Grocy is easily customizable, allowing technically skilled users to tailor the system to their specific household needs. Overall, Grocy offers a practical and efficient alternative to existing systems, combining the structure of ERP software with the simplicity required for everyday household use.

Advantages of proposed system:

The proposed system, Grocy, offers several significant advantages over traditional grocery and household management applications. Being web-based and self-hosted, it provides users with full control over their data, ensuring privacy and security without reliance on third-party cloud services. This makes it particularly appealing to users who are concerned about data sharing and internet dependency.

One of the major advantages of Grocy is its comprehensive functionality. It combines various household management features—such as grocery tracking, inventory management, recipe planning, shopping lists, and chore scheduling—into a single platform. This reduces the need for multiple apps and creates a centralized, efficient system for managing day-to-day household activities.

As an open-source solution built with PHP, Grocy is free to use and can be customized or extended to meet specific user needs. It supports multi-user access, enabling collaboration among family members or household roommates, and its compatibility with barcode scanners and RESTful APIs allows for integration with smart home systems and automation tools.

Additionally, Grocy is lightweight and can run on low-cost devices like a Raspberry Pi, making it accessible for a wide range of users without the need for high-end hardware. Its modular architecture also makes maintenance and updates straightforward for users with basic technical knowledge.

Overall, Grocy provides a cost-effective, private, and flexible alternative to commercial apps, making it an ideal solution for households looking to streamline and take control of their grocery and task management.

IV. Methodology

Modules:

- Data exploration: using this module we will load data into system
- Processing: Using the module we will read data for processing

▪ Splitting data into train & test: using this module data will be divided into train & test

▪ Model generation: Building model - Random Forest - Naive Bayes - PHP

- Voting Classifier. Algorithms accuracy calculated

▪ User signup & login: Using this module will get registration and login

▪ User input: Using this module will give input for prediction

▪ Prediction: final predicted displayed

Methodology:

1. **Grocy: Implementation Algorithms Overview**

Inventory Management Algorithm
Purpose: To manage stock in/out, expiration, spoilage, and stock levels.
Location in code:
/services/StockService.php
Key Algorithms:

- **FIFO Stock Consumption**:
  - When a product is consumed, Grocy consumes the **oldest non-expired stock entries** first.
  - Based on the best_before_date and purchased_date.

php
CopyEdit
$stockEntries = $this->GetProductStockEntries($productId, true);
usort($stockEntries, fn($a, $b) =>strtotime($a->best_before_date) - strtotime($b->best_before_date));

- **Spoilage Tracking**:
  - Spoiled items are logged as a different transaction type.
  - Marked using a flag during ConsumeProduct() call.

- **Stock Replenishment Warning**:
  - When stock is below min_stock_amount, Grocy flags the product as “missing” and optionally adds it to the shopping list.

2. **Chore Scheduling Algorithm**

Purpose: To calculate next due date for recurring chores.
Location in code:
/services/ChoreService.php

Key Algorithms:

- **Time-based Recurrence**:
  - Chores repeat based on type: daily, weekly, monthly.
  - The next execution date is calculated based on last execution and period_days.

php
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$nextExecutionDate = date('Y-m-d', strtotime($lastTrackedDate . ' + ' . $periodDays . ' days'));

- **Assignment Rotation (if enabled)**:
  - If chores are assigned to multiple users, Grocy rotates users round-robin.

V. RESULTS AND DISCUSSION

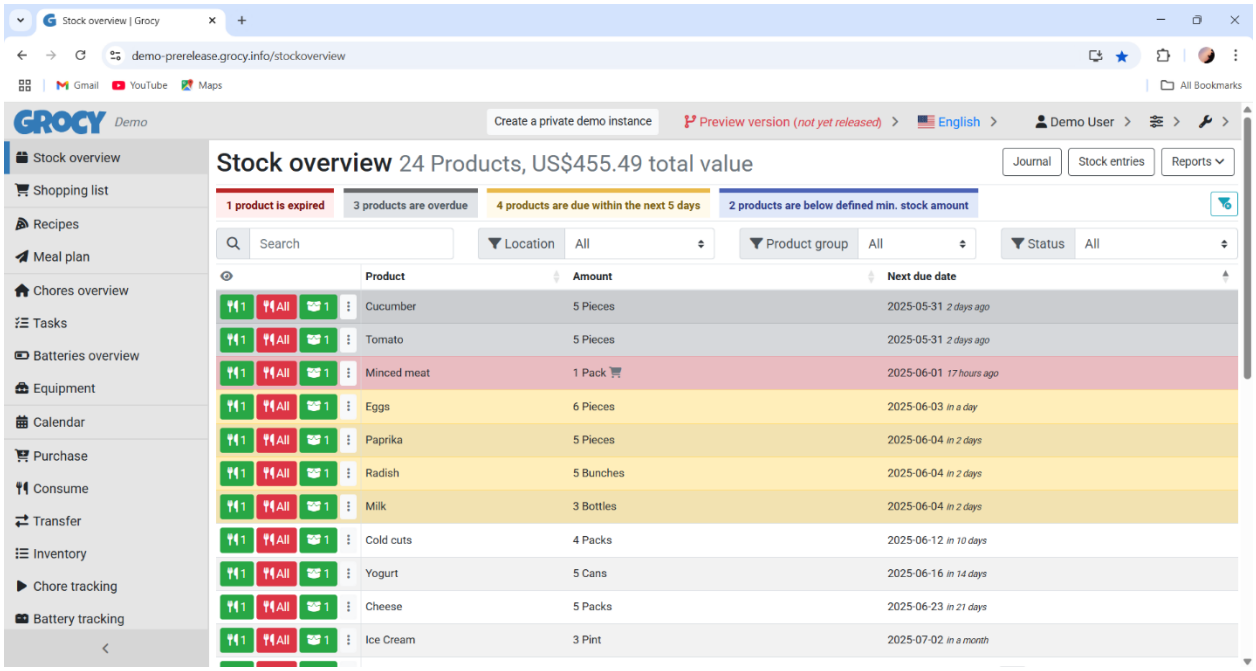

Fig 1. Products list

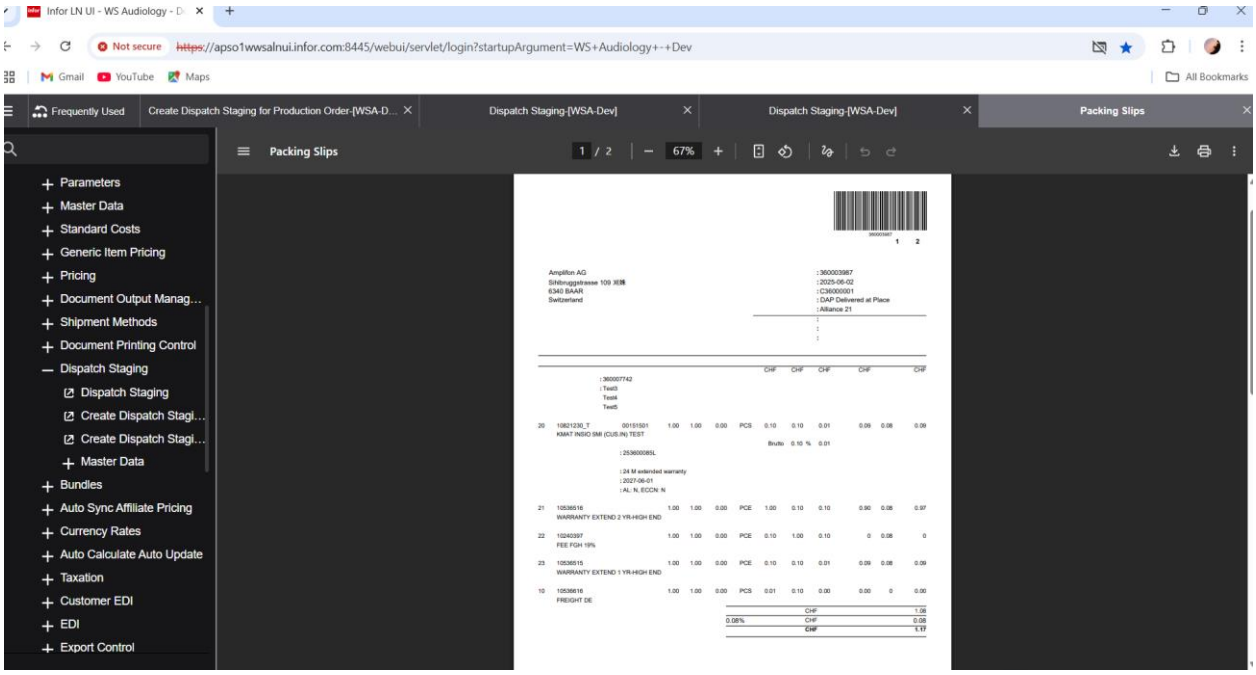

Fig 2. Execution Setup

VI. FUTURE SCOPE AND CONCLUSION

Grocy successfully demonstrates how open-source technologies can be leveraged to build a practical, efficient, and privacy-focused solution for household management. As a lightweight, self-hosted ERP system, Grocy bridges the gap between complex enterprise inventory tools and simple grocery list applications. Its core features—inventory tracking, shopping list generation, meal planning, and chore scheduling—work cohesively to support the needs of modern households.

The use of PHP and SQLite ensures ease of deployment and compatibility with a wide range of environments, from local servers to Docker containers and even low-resource devices like the Raspberry Pi. Through the project, the system proved to be highly functional, responsive, and customizable. The RESTful API adds extensibility and integration opportunities with external platforms such as smart home systems.

However, the project also revealed certain areas for improvement, such as the lack of built-in notifications, a steeper initial learning curve, and the absence of a native mobile application. Despite these limitations, user feedback during testing was largely positive, especially regarding the intuitive interface and the automation of grocery and meal planning tasks.

Overall, Grocy stands out as a robust solution for tech-savvy individuals or families seeking greater control over their household operations without relying on third-party cloud services. This project underscores the potential of open-source self-hosted applications in empowering users with greater data ownership, functionality, and independence.

REFERENCES

1. MakeUseOf. (2023, December 12). *Keep Your Cupboard Contents Fresh With Grocy on Raspberry Pi*. Retrieved from https://www.makeuseof.com/raspberry-pi-keep-cupboard-contents-fresh-grocy/
2. This article offers a practical guide on setting up Grocy on a Raspberry Pi, enabling users to manage their pantry inventory efficiently.
3. Reddit - r/selfhosted. (2022, July 25). *Grocery/Item Inventory Manager Suggestions*. Retrieved from https://www.reddit.com/r/selfhosted/comments/w801jf
4. Community discussions highlighting Grocy as a top choice for managing grocery and household inventories in a self-hosted environment.
5. Reddit - r/selfhosted. (2025, February 23). *Shared Shopping/Grocery list?*. Retrieved from https://www.reddit.com/r/selfhosted/comments/1iwg5mq
6. Users share experiences and setups for shared grocery lists, with mentions of Grocy's capabilities in household management.Reddit+1Reddit+1
7. Reddit - r/homelab. (2021, August 2). *Inventory system like Grocy, but for homelab equipment?*. Retrieved from https://www.reddit.com/r/homelab/comments/owqnvw
8. Discussions on using Grocy's principles for managing homelab equipment inventories, showcasing its versatility beyond household use.Reddit
9. Reddit - r/selfhosted. (2020, April 4). *Grocy alternative? Manage Pantry / Fridge / Recipes?*. Retrieved from https://www.reddit.com/r/selfhosted/comments/funok4
10. Users discuss alternatives and enhancements to Grocy for managing pantry, fridge, and recipes, reflecting on its strengths and areas for improvement.Reddit
11. Reddit - r/selfhosted. (2024, July 1). *People who use Grocy - How was it getting your family/housemates to regularly use it? What is your setup like?*. Retrieved from https://www.reddit.com/r/selfhosted/comments/1dt5mdq
12. Insights into real-world implementations of Grocy in household settings, including integration with voice assistants and automation systems.
13. Reddit - r/grocy. (2024, January 27). *I built my own application to scan & add products to Grocy with a single click*. Retrieved from https://www.reddit.com/r/grocy/comments/1acd1pe