SNS
Inventory Management System with Barcode and QR Code Integration

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Abstract

The project aimed to improve the inventory management experience for small and large scale enterprises by implementing the application as a Progressive Web App (PWA) with functionalities such as scanning of bar and QR codes or pin point the warehouse based on the user's geolocation. We successfully designed a responsive and intuitive application with the most vital functionalities that is accessible on multiple devices. We learned about the restrictions and strengths of PWA as well as the process of integrating into a complete application. It will help future researchers to better design and integrate this technology in their projects.

1 INTRODUCTION

1.1 Problem characteristics

Inventory management is a key element in the efficient operation of many companies, especially in industries related to logistics, trade and manufacturing. This issue becomes particularly relevant in the context of growing expectations of process automation and minimization of errors resulting from manual management.

1.2 Goal

Our goal is to create a tool that will help companies track and manage resources more efficiently. The main technical assumption was to create an MVP (Minimal Viable Product) version of the PWA application, i.e. one that has CRUD functions to manage warehouses, inventory, product availability and assigned product categories. The application's functionality has been expanded to include a QR code and barcode scanning module. Another feature is the implementation of geolocation, which is designed to speed up warehouse identification based on user location.

1.3 Business and technical benefits

In the business context, the project aimed to increase the efficiency of inventory management, reduce the time required to handle warehouse processes and minimize errors resulting from manual operations. On the other hand, the key technical task was to create an intuitive and functional tool that could be easily integrated with existing enterprise systems, as well as used on both mobile devices and computers.

2 RELATED WORKS

2.1 Description

TBD

2.2 Tech Stack

TBD

2.3 Project assumptions

At the beginning of the project we set multiple restrictions and assumptions to limit the scope and guide the development in the right direction.

We set out to create a simple and intuitive application to allow users across all skill levels to successfully use our application. Thanks to the PWA technology we wanted to achieve an application that is available on multiple devices with simple installation and a native feel.

We decided to limit the scope and support only a single company owning multiple warehouses. Those warehouses can contain items shared between them and have individual stocks. There will not be a registration form - each employee in the company will have to be manually added by the administrator.

3 RESULTS

3.1 Summary

The implementation of the project proceeded as planned and was successful. We managed to include all important functionalities, and comprehensively tested the usability and ease of use of PWA technology.

3.2 Functionalities

- CRUD operations, i.e. Create, Read, Update, Delete, allowing full modification of data stored in the database,
- Ability to scan barcodes and QR codes in an intuitive way to quickly access a specific product in stock,
- Inventory management across multiple warehouses,
- Management of users and their access to functionalities offered by the system layer,

3.3 Business goals

TBD

4 CONCLUSIONS

In summary, the application we designed is intuitive to use and provides the basic functionality required by warehouse workers. It will allow for more efficient and simpler inventory management.

Thanks to PWA technology, it is accessible on both mobile devices and computers, supports installation and quick and easy access in conditions of limited internet access.

What matters to a technological audience is that we have tested the capabilities of PWA technology and proved that it is viable for developing applications for multiple devices while maintaining a single code base.

5 FURTHER RESEARCH

For further development of the project, it would be important to consider what other functionality might be useful for warehouse workers and managers, such as:

- optimization of the layout of items in the warehouse,
- use of geolocation to determine the shortest route to the desired section in the warehouse,
- calculation of the route and cart capacity requirements to complete an order from the warehouse,
- expansion of the application to a commercial version that can support multiple companies in a comprehensive way,
- and much more.

6 ACKNOWLEDGMENTS

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REFERENCES