Safety inspection

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1. Introduction

1.1 The purpose of this document

This document serves as a comprehensive description of the system, intended to provide requirements for the development of a software product. The document is provided to all interested parties. It serves the development team as a place to gather all the requirements and specifications of the system. This document serves as the agreement between the client and the developers about the scope and detailed functionalities to be implemented.

1.2 Scope of the system

The system is designed for the general public to identify products that have been withdrawn from sale due to failure to meet standards or for more severe reasons. Users can scan a barcode through the web application, which retrieves and displays the product's status (defective or not) and other details if defective.

1.3 Definitions and abbreviations used

Software product - a complex of interconnected programs for solving a certain problem (task) of mass demand, ready for implementation as any industrial product.
Database - is an organized set of structured information or data that is usually stored electronically in a computer system.
Repository - is a centralized digital repository that developers use to make and manage changes to the source code of an application.
A barcode - is a special type of code in which a certain amount of information is encoded using alternating bars and spaces.

1.4 Links

Repository with application code
Database of defective products SK
Database of defective products EU

1.5 View the rest of the document

In section 2 we describe the situation in which the system is embedded (2.1), what functions it is to provide (2.2), what types of users it will have (2.3), what existing procedures/processes/regulations affect the system .
In section 3 we list all the requirements for the system in full.

2. General description

2.1 Perspective of the system

The application is designed to simplify safety verification of products that may be withdrawn from the market due to non-compliance with standards or potential health hazards. The main functionality of the system is the ability to scan the barcode of a product and quickly check its status in the database. If a product is withdrawn from sale, the application will alert the user. The system is primarily designed for ordinary consumers to identify products withdrawn from sale due to safety or quality concerns. Shops and distributors can also use the app to verify the status of their products before sale. Users simply scan a barcode, and the web application retrieves relevant product information from a database.

2.2 System functions

The system will allow users to scan a product's barcode with a webcam to get information about its status and other data. A search by product name is also available, with the ability to view search results. Once the barcode is scanned, the system will display all available information about the product, including its status and description.

Users can create personal accounts and log in to access personalized features. Unregistered users can search for and scan products, but only registered users can save products not found in the database to a personal list for quick access. If a product in a user’s personalized list is later marked as defective in the database, the user will receive an email notification. Both registered and unregistered users can scan products.

The system will provide support on both mobile and desktop platforms. When scanning a barcode, data will be extracted and displayed in real time. Users will receive notifications in case of scanning errors, such as incorrect barcode format or blocked webcam access. In addition to barcode scanning, the application includes a service, available to administrator users, that automatically collects product data from specific

websites through web scraping. These websites are fixed, ensuring that the information remains consistent and accurate without changes to the data sources over time.

2.3 Characteristics of users

The system supports the following types of users. There may be several different users of the same type.

2.3.1 Guest user

Guest users are unregistered users. They can browse all products in the system, scan and search.

2.3.2 Registered User

It has all the same capabilities as 2.3.1. In addition, this user can save scanned products and will receive a notification if any product in their personalized list is later marked as defective in the database.

2.3.3 User with administrator access

Administrative users have all the same capabilities as 2.3.2. In addition, this user can synchronize the database with the latest data from the fixed websites.

3. Specific requirements

1. The application must support barcode scanning via desktop webcams and mobile device cameras.

2. Guest users must be able to search products by their name

3. Guest users must be able to scan barcodes

4. The system requires access to the camera.

5. Alert users if webcam access is denied and provide instructions to enable it.

6. Notify users if the scanned barcode format is invalid or unrecognized.

7. Provide feedback if no barcode is detected after a certain time period.

8. Barcode scanning must extract and display embedded data in real-time.

9. After a successful scan, the system will display whether the product is defective or not defective.

10. Scanning a defective product will display all available information about said product.

11. Scanning a non-defective product will display an option to add it to a personalized list.

12. Guest users must be able to register via a google account.

13. Registered users must be able to log in.

14. Registered users who have logged in must have the option to add scanned non-defective products into a personalized list.

15. Registered users must be able to view the history of previously scanned products.

16. Inform users if a search returns no results instead of showing an empty page.

17. Registered users, will be notified via email if the products in the personalized list have been added in the defective product database.

18. Admin users can trigger a scraping program to retrieve product data from the web.

19. Integrate a suitable barcode scanning library or API for real-time detection.

20. Implement a data scraping service to retrieve product information from designated websites and compile the data into a database.

3.1 Non-functionality requirements

1. The user can access the system from a mobile device or computer.
2. The backend must be developed using Python as the primary programming language.
3. The system requires internet access.
4. Web scraping frameworks would include lxml, BeautifulSoup and MySQLdb (look into pandas).
5. Login will be done with google account
6. Backend: We will use FastAPI for implementing the backend of the web application.
7. Frontend: We will use Bootstrap for the frontend implementation.
8. Barcode Scanner: We will implement the barcode scanner functionality using QuaggaJS.