Group 4 SRS

Robot librarian SRS

10th November 2021

1 Introduction

1.1 Preface

This is a software requirement specification document for the robot librarian project.

The project is a requirement for the software engineering course at the college of computer in AlQassim university.

This is the first version of the document, any future variations and versions will be mentioned here.

1.2 Purpose

The robot librarian will serve as an interface for robots' companies, it can be used to allow their robots to :

- Sort books.
- Lend books.
- Return lent books.
- Find and bring books for local reading.
- Clean dust off of books.

1.3 Glossary

This section will be updated once the rest of the SRS is finished.

1.4 Document content

This section will be updated once the rest of the SRS is finished.

2 User Requirements

2.1 User requirement definitions

2.1.1 Robots shall organize returned or new books according to genre then name using Barcode.

2.1.2 The customer can request to borrow a book through automated means, and be able to know the books available, and find books through title, author(s), or genre.

2.1.3 books must be dusted regularly.

2.2 User requirement specification

2.2.1 There must be a database for books, using barcodes generated using ISBN as a unique ID, and containing title, genre, version and production year.

2.2.2 There must be barcodes for genres and subgenres, in order to organize books through genre, then sub-genre, then shelf number.

2.2.3 There must be designated extra temporary shelves, with name "temporary" as the genre and "extra" as sub-genre.

2.2.4 If the extra shelves have a book, the librarians must be notified, so as to either expand the needed genre/sub-genre or cull it.

2.2.5 The robot will have to organize books according to the title alphabet after finding the genre.

2.2.6 In case the book must be placed in between two books that already are placed,
the robot will have to safely shift the books that come after the held one spot until meeting a free spot, then put the held one in the correct position.

2.2.7 In case the shelves designated for the genre are full, the book will then be placed in the extra temporary shelf and send notification of doing so to librarians notification center.

2.2.8 Using the robot functionality, put the book on the shelf after finding the right spot.

2.2.9 There must be a user interface for the customer.

2.2.10 The commands the customer can issue using the user interface are:

a: Borrow book: which will ask for the customer to log in, if the customer did not register or have forgotten his/her details, he/she will be redirected towards the help desk with human employees.

b: Return book: which will open a tray and request the customer to put the book in there, then automatically process the return using ISBN (use ISBN to find customer account and process "return success").

c: Find if book is available: Customer can use title, author, genre or ISBN to find a list of books with specified filters, information on each book includes: title, author, version, genre and year.

d: Request book for local reading: which will run the same process of finding books, then after that the bot will lead a customer to a free reading table, then retrieve the book and give it to the customer.

2.2.11 Every day, the bots will use their dusting functionality at the beginning of work hours, cleaning books and shelves of dust.

2.2.12 The process goes like this:

a: At the start of work hours, X amount of bots are assigned cleaning duty.

b: The number of bots will be assigned by the librarians and should be easily changeable.

c: The software will divide the number of shelves (taken from the database) by the number of cleaning bots, then be assigned the result as shelves to clean.

d: The software will then assign each bot to the shelves starting from the shelf with the number (amount of shelves already assigned)

and ending with the shelf with the number (amount of shelves already assigned + the result of the division shelves/bots), this new stopping point is the starting point assigned to the next bot.

3 System Requirements Specification

3.1 Functional Requirements

3.1.1 User Interface functions

3.1.1.1 Find book:

A: Ask for the customer to type in any of the following:

- Book title

- Book author
- Book genre
- Book ISBN

B: Return any book that matches the search criteria, along with all of its information (title, author, version, genre, ISBN and year).

C: Provide the following options: Borrow book, Request for local reading, Return to main menu.

3.2 Non-functional requirements

3.2.1 Database requirements

The program must have an already existing database for the following:

- Library bookDataBase having ISBN as the ID, and containing books' titles, authors, years, genres and versions as data.
- Library shelfDataBase having the shelf genre barcode named as (shelfGenreBC) as the ID, containing subgenre barcode and number of shelves as data.

3.2.2 Robot functionality interface

A programming interface for the robot functionalities provided by the robotics company.