MINISTERUL EDUCAŢIEI ŞI CERCETĂRII AL REPUBLICII MOLDOVA
Universitatea Tehnică a Moldovei
Facultatea Calculatoare, Informatică şi Microelectronică
Departamentul Ingineria Software şi Automatică

COMANDA PERSONALIZATĂ A PRODUSELOR DE COFETĂRIE ÎN BAZA INTELIGENŢEI ARTIFICIALE. AJUSTAREA MODELULUI GENERATIV

Proiect de master

Student: _____   **Cernioglo Stanisalav, IS-221M**

Coordonator: _____   **Fiştic Cristofor, asist. univ.**

Consultant: _____   **Catruc Mariana, lect. univ.**

Chişinău, 2024

REZUMAT

Această teză de master examinează proiectarea, dezvoltarea și implementarea unei platforme moderne de comandă a produselor de cofetărie cu integrarea inteligenței artificiale pentru a îmbunătăți calitatea serviciului clienți și a optimiza procesul de personalizare a prăjiturii. Lucrarea explorează problemele actuale din sectorul vânzărilor de panificații, evidențiind problemele de comoditate și potențialele capcane în procesul tradițional de comandă de prăjituri.

Scopul principal al acestei lucrări este de a analiza industria vânzărilor de cofetărie, de a identifica problemele existente și de a propune o platformă web inovatoare pentru a rezolva aceste probleme.

Rezultatul este o aplicație web care permite utilizatorilor să selecteze cu ușurință prăjiturile dintr-un catalog sau să le personalizeze pe ale lor alegând ingrediente, design, decor, dimensiune, greutate și alți parametri. În plus, integrarea AI permite utilizatorilor să descrie tortul pe care îl doresc, iar AI generează imagini corespunzătoare. Gestionarea convenabilă a comenzilor și capacitatea de a genera rapoarte au fost, de asemenea, implementate pentru companiile de cofetărie.

Proiectul este format din patru capitole. Primul capitol conține o analiză a domeniului subiectului. Acest capitol oferă o analiză comparativă a analogilor existenți, identifică avantajele și dezavantajele acestora și, de asemenea, prezintă specificații tehnice. Al doilea capitol oferă proiectarea și modelarea sistemului, inclusiv descrierea structurală și comportamentală folosind diferite diagrame UML. Al treilea capitol este dedicat implementării sistemului, incluzând o descriere a instrumentelor utilizate, prezentarea fragmentelor de cod, clasele principale și funcțiile sistemului. Testarea sistemului joacă, de asemenea, un rol important în acest capitol. Al patrulea capitol conține documentația produsului implementat, care descrie instrucțiunile de utilizare a produsului.

ABSTRACT

This master's thesis examines the design, development and implementation of a modern confectionery ordering platform with the integration of artificial intelligence to improve the quality of customer service and optimize the cake personalization process. The work explores current issues in the bakery sales sector, highlighting convenience issues and potential pitfalls in the traditional cake ordering process.

The main goal of this work is to analyze the confectionery sales industry, identify existing problems and propose an innovative web platform to solve these problems.

The result is a web application that allows users to easily select cakes from a catalog or customize their own by choosing ingredients, design, decoration, size, weight and other parameters. Additionally, AI integration allows users to describe the cake they want and the AI generates corresponding images. Convenient order management and the ability to generate reports have also been implemented for confectionery companies.

The project consists of four chapters. The first chapter contains an analysis of the subject area. This chapter provides a comparative analysis of existing analogues, identifies their advantages and disadvantages, and also presents technical specifications. The second chapter provides system design and modeling, including structural and behavioral description using various UML diagrams. The third chapter is devoted to the implementation of the system, including a description of the tools used, presentation of code fragments, main classes and functions of the system. System testing also plays an important role in this chapter. The fourth chapter contains documentation of the implemented product, which describes the instructions for using the product.

CONTENTS

INTRODUCTION

Currently, innovation and technological solutions play an important role in various areas of our lives. The field of online trading and services continues to develop rapidly, and it is important to pay special attention to innovative approaches and the use of advanced technologies. Modern technologies make it possible to create more convenient, intuitive, and interactive platforms, which increases customer satisfaction and comfort level when interacting with a service provider. The use of the latest technologies allows us to tailor offers to the needs of each specific user. This increases the likelihood of making a purchase and increases customer loyalty. Innovative technologies facilitate the collection, processing, and analysis of data. This helps companies better understand consumer preferences, respond to changes in market conditions and make informed business decisions.

One promising area where significant changes can be made is in the cake ordering process. In this regard, creating an innovative platform for ordering cakes using artificial intelligence becomes an urgent task.

The purpose of this work is to conduct an analysis and study of the sales of cakes and confectionery products in order to identify existing problems and limitations. Based on the data obtained, it is planned to develop a web platform that will provide users with ample opportunities to order cakes, both from the proposed catalog and with the possibility of complete customization, including the choice of filling, design, decor, size, weight and other parameters.

However, the key feature of this platform will be the use of artificial intelligence to simplify the ordering process and bring users' culinary fantasies to life. A special function based on machine learning algorithms will allow users to describe their preferences and wishes, and artificial intelligence will create an image of a cake that fully matches their description. This unique solution will make the process of selecting and ordering cakes not only convenient, but also fun for customers.

To determine the functionality required by the application, a domain analysis will be carried out. Existing analogs on the market will be analyzed to identify their advantages and disadvantages, and based on this information, application requirements, tasks and goals will be determined. An information system will also be designed, its behavioral and structural description using UML diagrams. Next, the implementation of the system and the technologies and tools used for this will be described, and the system will also be tested. The final chapters will present documentation of the implemented product.

BIBLIOGRAPHY

1. COOKIES.MD: Confectionery with soul, [cited 19.09.2023]. Access: https://cookies.md/

2. CIAOCACAO.MD: Sweet reason for joy, [cited 22.09.2023]. Access: https://ciaocacao.md/

3. VANILLE.MD: Dessert café, [cited 20.09.2023]. Access: https://vanille.md/

4. TUTORIALSPOINT: System Analysis & Design - System Design, [cited 28.10.2023]. Access: https://www.tutorialspoint.com/system_analysis_and_design/system_design.htm

5. UML: INTRODUCTION TO OMG'S UNIFIED MODELING LANGUAGE, [cited 30.10.2023]. Access: https://www.uml.org/what-is-uml.htm

6. IBM: Communication diagrams, [cited 31.10.2023]. Access: https://www.ibm.com/docs/en/rsm/7.5.0?topic=uml-communication-diagrams

7. RUMBAUGH, J., JACOBSON, I., BOOCH, G. The Unified Modeling Language Reference Manual, (2nd Edition). Addison-Wesley Professional, 2004. ISBN 978-0321718952

8. DOCS.MICROSOFT: What is Visual Studio, [cited 01.11.2023]. Access: https://docs.microsoft.com/en-us/visualstudio/get-started/visual-studio-ide?view=vs-2022

9. DOCS.MICROSOFT: A tour of the C# language, [cited 03.11.2023]. Access: https://docs.microsoft.com/en-us/dotnet/csharp/tour-of-csharp/

10. Dall-E 3 neural network: how to use AI from OpenAI to generate pictures, [cited 15.11.2023]. Access: https://journal.tinkoff.ru/dalle-3/

11. OpenAI: API reference – Create image, [cited 20.11.2023]. Access: https://platform.openai.com/docs/api-reference/images/create