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i-JaMCSIIX 2023

EXTENDED ABSTRACT BOOK

Publication Date: 30 March 2024

ISBN: 978-967-15337-0-3

https://jamcsiix.uitm.edu.my

i-JaMCSIIX 2023

INTERNATIONAL JASIN MULTIMEDIA & COMPUTER SCIENCE INVENTION AND INNOVATION EXHIBITION (I-JaMCSIIX) 2023

EXTENDED ABSTRACT

ISBN: 978-967-15337-0-3
i-JaMCSIIX
Universiti Teknologi MARA Cawangan Melaka Kampus Jasin 77300, Merlimau, Melaka

Web: https://jamcsiix.uitm.edu.my

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BTF CAKE RECOMMENDER AND MANAGEMENT SYSTEM BY USING RULE-BASED

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***Abstract*—The rise of online bakery management rapidly opens the opportunity for system developers to build better than just a management system. BalqistheFoodie is a homemade baker based in Bukit Siput, Segamat Johor, specializing in custom-made cakes of different sizes. BalqistheFoodie primarily receives customer orders via WhatsApp and sells products online via Instagram. The sale will be recorded in a notebook alongside the product's demand and the customer's information via WhatsApp business. The current business process has led to some problems for BalqistheFoodie, such as missing data due to manual record keeping, the owner of BTF spending time manually checking ingredients, and the lack of recommender features. This project aims to develop a web-based recommendation system that will help BTF's owner increase sales by suggesting cakes. BalqistheFoodie requires a computerized recommendation system to aid in reducing and mitigating the issues that the business has been experiencing. Rule-Based is one of the techniques used for this recommendation, which attempts to suggest the collective data of ingredients for baking a cake. Afterwards, rules were implemented based on the inventory's recommended quantity of available ingredients. This system's output is a list of products well-matched to the customer's choices. The owner of BTF can make recommendations without manually reviewing each one. Although a few limitations have been identified, the objectives have been met. As for future enhancement, including a payment gateway with multiple payment options and a feature for sales forecasting is recommended.**

Keywords—rule-based system, knowledge discovery, intelligent system

I. INTRODUCTION

BalqistTheFoodie (BTF) is owned and operated by the home baker Balqis Binti Radzuan in Bukit Siput Segamat, Johor. She sells customised cakes in different sizes. The products given may vary in size, flavour, and appearance, such as Burn Cheesecake, Vanilla Sponge Cake, Pandan Gula Melaka, Chocolate Moist Cake, and Rainbow Cake. Additionally, for a bespoke cake, customers have the choice of ingredients and design: minimalist, illustration, vintage, and floral cake design. The BTF can accept bookings of cakes and dessert orders online. The cakes and desserts are available for self-collect and delivery only. Currently, Instagram is used by BTF for social media. The ordering process was done manually through WhatsApp Business, and customers needed to list the information required to order a cake. As the owner of BTF, some might have conflicts in managing customer's orders due to different preferences to order cakes such as different ingredients, toppings, and designs. As a customer, ordering customised cakes can be complicated, as specific design preferences, flavour, preferences, measurements, and other details must be communicated and confirmed accurately. Miscommunication or misunderstanding can result in errors in the final product, leading to dissatisfied customers and possible financial losses for the cake owner. Furthermore, the notebook is a tool for recording sales, costs of ingredients, and recipes are essential for cake owners to maintain financial records, track profitability, and have a reference for future orders. Upon receiving orders, the owner keeps order information in WhatsApp Business to track their order and in a notebook. With a management system, the orders are nicely stored in the database without losing any data, and the owner does not need to chat with every customer.

II. MATERIALS

A. Materials

The software used in this project is PyCharm community and data are kept in MySQL Workbench 8.0 CE. The data and recipe are collected from the owner of BalqistheFoodie.

III. METHODS

The methods and approach for this project entitled BTF Cake Recommender and Management System by using Rule-Based are System Development Life Cycle (SDLC) which is divided into four phases which are requirement gathering, analysis, design, and implementation. Each of these phases contains activities that must be completed for the following step to be completed and the fulfilment of the requirement is met.

A. Design of the methodology

The methods and approach for this project entitled BTF Cake Recommender and Management System by using Rule-Based are described in this part. The methodology is a set of detailed instructions that followed when doing tasks associated with the system development life cycle. This chapter also explains the System Development Life Cycle (SDLC), which is divided into four phases which are requirement gathering, analysis, design, and implementation.

B. Methods

To develop the recommendation system, there need set up rule and it will show in design rule-based architecture. In rule-based design, "if-then" statements are frequently used to demonstrate the logic. The antecedent (if-part) and the consequent (then-part) are the two components of each rule. A rule-based expert system comprises a user interface, knowledge base, and inference engine. An inference engine searches a knowledge base, a type of database, for matches between the input and the criteria. A knowledge base is a collection of facts and rules. It is developed using knowledge supplied by a human expert. The inference engine is essential for processing the rules and producing recommendations. For instance, rule definition is required to specify a set of rules that determines how cakes are suggested based on different criteria, and this project uses cake ingredients from BTF. The circumstances of each rule will be assessed based on the availability of ingredients and the ingredients necessary to make a cake. The input data will cause the appropriate rule recommendation to be made if the rule's conditions are satisfied. Through the user interface, the buyer is shown the recommended cakes based on that.

IV. RESULTS AND FINDINGS

The effectiveness of the rule-based technique in providing precise and customised cake suggestions is demonstrated by quantitative data. While pointing up areas that still need work, user testing and feedback highlight how well the system meets user expectations.

A. Results

ingredient_id	ingredient_name	available_quantity	unit
1	Cream cheese	50	g
2	Icing sugar	200	g
3	Flour	100	g
4	Egg	10	pcs
5	Whipped cream	500	g
7	Sugar	500	kg
8	Salt	500	g
9	Oil	100	ml
10	Milk	200	ml
11	Cake flour	200	g
12	Butter	300	g

View Cake Recommendation: Fig. 1 shows list of data ingredients and the recipe of cakes. These systems will suggest a cake based on the available quantity of ingredients using the Rule-Based. This is sample of data ingredients that enough to recommend a cake. For example, the ingredient id ‘4’ for the ingredient name ‘Egg’ and available quantity ’10 pcs’ to recommend vanilla sponge cake. Then, the ingredient id “2” for the ingredient name “Icing Sugar” with available quantity ‘200 g’ and lastly the ingredient id ‘7’for the ingredient name ‘Sugar’ with available quantity 500 kg.

Fig. 1.List of ingredients

Recipe Cakes

Size 8 inch:

(Burn Cheesecake= Cream cheese 250g, Icing sugar 60g, Flour 5g,2 egg, Whipped cream 150g)

(Vanilla Sponge Cake = Egg 4, vanilla Essence 1tsp, 120g sugar, 120g Flour,1 tsp salt,30g oil, 40g milk, 1/2 tsp vanilla)

(Pandan Gula Melaka = Cake Flour 200g, Butter 125g, Salt 1 tsp, Essence 1 tsp, Caster Sugar 160g, Egg 2, Coconut Milk 75g, Water 25g, Juice Pandan Leaves 2 tsp, Malacca sugar 50g, Sugar 1tsp)

(Chocolate Moist Cake =Flour rises itself 25g, Egg 2, Sugar 200g, Vanilla 15g, Milk 125ml, Oil 83ml,83ml water, 1 tsp coffee, 1 tsp baking soda)

(Rainbow Cake =Unsalted butter 250g, Sugar 225g, Egg 3, Vanilla 1tsp, Baking powder 2 tsp, Whole Milk 50g, Rainbow Coloring 6 tsp)

Fig.2 recipe vanilla sponge cake, the quantity of egg 4 pcs is required, recipe Burn Cheesecake is required icing sugar 60 g and sugar is required 225g. The product vanilla sponge cake, burn cheesecake and rainbow cake will be suggested for customers because the available quantity is enough.

Fig. 2.Recipe Cakes

Fig.3 the product vanilla sponge cake, burn cheesecake and rainbow cake will be suggested for customers because the available quantity is enough.

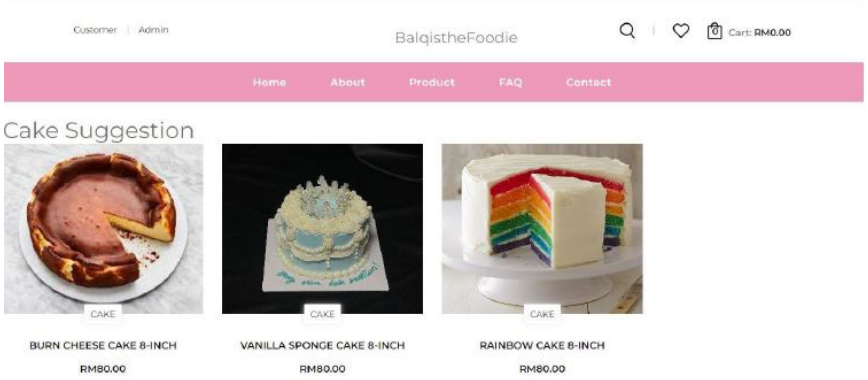

Fig. 3.Cake Suggestion

V. CONCLUSIONS

Based on the studies and research conducted in this project, the project is basically about the recommendations cake and management system using Rule Based. This technique is based on the ingredients of cakes that customers choose and will display the cake as the outcome of the recommendation system. The main goal of this project is to increase the business owner's sales. Having accomplished all three objectives, the project has been concluded successfully. The objectives that have been achieved for this project are to gather data and analyse ingredients of cake for BalqistheFoodie, to design a system for BalqistheFoodie, to develop recommender and management system for BalqistheFoodie by using rule based.

ACKNOWLEDGMENT

Alhamdulillah, praise, and gratitude to Allah for His Almighty might, and his immeasurable gratuities allowed me to complete this project within the allotted time frame. My supervisor, Dr. Nur Suhailayani binti Suhaimi, who made this effort possible, deserves special mention and my sincere appreciation. I was able to complete this project with the help of her constant direction and advice. Thank you for taking the time to help me every time I can't discover the solutions on my own. Special appreciation also goes to BalqistheFoodie for providing the information together with the procedures for workflow.

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i-JaMCSIIX 2023

PUBLISHED BY:
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Kampus Jasin
77300 Merlimau, Melaka

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