



Faculty of Computer Science and Information Technology

CAKEH CHATBOT – SMOOTHING BOOKING PROCESS

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CAKEH CHATBOT – SMOOTHING BOOKING PROCESS

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ABSTRACT

Due to the pandemic, some local bakeries are having difficulties with the face-to-face booking process. Therefore, the proposed method which is the CakeH Chatbot can assist in resolving issues that occur during the process of booking orders of cakes at the local bakery shop. This proposed system can provide the customer of the bakery a platform to book and ease the booking cake process through online. Rapid Application Development (RAD) was used to develop the chatbot. A questionnaire was distributed to gather opinions and suggestions. The proposed chatbot is developed by using Dialogflow and Flutter. At the end, Android Package Kit (APK) file format of the CakeH Chatbot application is created which can easily be installed on android devices. Lastly, CakeH Chatbot app can be used by customers to make booking orders of cakes online.

ABSTRAK

Disebabkan oleh wabak itu, beberapa kedai roti tempatan menghadapi masalah dengan proses tempahan secara bersemuka. Oleh itu, kaedah yang dicadangkan iaitu CakeH Chatbot boleh membantu dalam menyelesaikan masalah yang berlaku semasa proses tempahan tempahan kek di kedai bakeri tempatan. Sistem yang dicadangkan ini dapat menyediakan platform kepada pelanggan kedai kek untuk membuat tempahan dan memudahkan proses tempahan kek melalui dalam talian. Rapid Application Development (RAD) telah digunakan untuk membangunkan chatbot. Borang soal selidik telah diedarkan untuk mengumpul pendapat dan cadangan. Sistem yang dicadangkan dibina menggunakan Dialogflow dan Flutter. Akhirnya, format fail Android Package Kit (APK) aplikasi CakeH Chatbot dicipta yang boleh dipasang dengan mudah pada peranti android. Akhir sekali, aplikasi CakeH Chatbot boleh digunakan oleh pelanggan untuk membuat tempahan kek secara dalam talian.

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CHAPTER 1

1.1 Background

The normal process of booking a cake is undergone face to face or through phone booking with the bakery employee. Questions of order are also very important for the booking process. For instance, the date, the serving amount needed, cake, design, type, flavor and so on. With the revolution of technology which allowed customers to purchase or book things online without the need to go to the physical shop. Chatbots come into view and naturally make it possible.

In recent years, chatbots are gaining tremendously. A chatbot is a piece of software or a program that mimics human conversation through voice or text exchanges (Brush & Scardina, 2021) . A chatbot can be connected with various platforms like websites, messaging applications and mobile applications (Rana, 2022). Due to its adaptability, businesses are able to instantly offer clients help and information through the platforms of their choice. According to Drift's 2020 State of Conversational Marketing Report, it discovered that in 2020, 24.9% of customers interacted with firms via chatbots, up from 13% in 2019 (Walby, 2022). According to this data, customers are becoming more at ease and willing to interact with chatbots as part of their overall customer experience. Chatbots have enormous potential to increase user engagement for any business which could ultimately result in more conversions and sales (SPYCHALSKA, 2019). According to Facebook Nielsen study, 53% of consumers tend to buy from a business they could message in real-time (Cassidy, 2019).

1.2 Problem Statement

Due to the COVID-19 outbreak spread, lockdown went into effect around the world. As visits to physical stores were restricted, and many were running low on money, consumers went online to shop, causing online purchases to grow higher and higher (Dannenberg, P., Fuchs, M., Riedler, T., & Wiedemann, C., 2020). For example, food services industry like bakery shop was affected by the pandemic. According to Statistics Canada, there was decline of 40.0% or more in food service sector in 2020 compared to 2019 (Sood, 2021).

Besides, governmental constraints and the COVID-19 pandemic itself both had an impact on consumer behavior. Digital purchases were more prevalent among consumers of all generations during the COVID-19 issue (Jílková & Králová, 2021). International Telecommunication Union (ITU) indicated that during the COVID-19 epidemic, the number of Internet users increased from 4.1 billion in 2019 to 4.9 billion in 2021 (Chen, 2021). Besides, the booking process consumes a lot of time for both employee and customer. Therefore, the bakery wants to smooth the booking process and boost sales through a chatbot that can take booking orders online.

1.3 Scope

The proposed CakeH Chatbot mobile application target is to let the customers book their orders online through the chatbot designed. CakeH Chatbot is only compatible with Android-based smartphones, and it only works for a six-month project. The database of the bakery shop is self-created and the CakeH Chatbot is only a prototype and not for business purposes.

1.4 Aims & Objectives

There are three objectives in this proposed project:

- ✧ To study and analyze the business flow of bakery shop while providing service of booking cake through online by using chatbot
- ✧ To develop a chatbot using Dialogflow and implement it in a mobile application built with Flutter
- ✧ To analyze the opinion and feedback of the customers after using the chatbot

1.5 Brief Methodology

Rapid Application Development (RAD) is chosen to develop CakeH Chatbot application. RAD follows a cyclical process that includes four steps which are define project requirement, prototype, rapid construction and implementation (Kissflow, 2023). Figure 1.1 shows the RAD cycle in four steps.

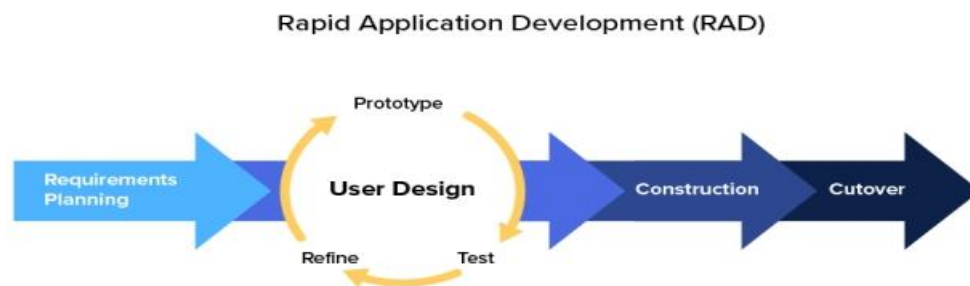


Figure 1.1 RAD Cycle

First Step: Planning Requirement.

Research has been conducted based on the bakery shop booking process, the software used to develop chatbot and platform for the chatbot. Dialogflow will be used to develop the chatbot and the Flutter will be used to build the mobile application.

Second Step: Prototype

After the planning stage is the designing of the prototype of the chatbot. Testing will be conducted on the prototype and continue with refinement of the prototype. Refinement will be repeated as the project continues.

Third Step: Construction

Actual application coding, implementation and testing take place.

Fourth Step: Deployment

The transition process takes place which is also called as cutover stage. The completed chatbot will be moved to a live production environment.

1.6 Significant of Project

The proposed mobile application is aimed to provide bakery shop with an online booking service through a chatbot. Customers should find ordering to be simpler as a result of the simplified booking process, which should also increase sales and revenue for the bakery shop. Additionally, the customer's booking portal will be accessible around-the-clock, enabling customers to quickly place their purchases whenever they want. Then, the bakery can serve a larger consumer base and increase customer satisfaction with the help of the proposed chatbot.

1.7 Project Schedule

This whole project will be done in two academic semesters. The following schedule shown in Figure 1.2 will be used as the guideline to develop the proposed project.




















		Task Mode	Task Name	Duration	Start	Finish
GANNT CHART	1		Brief Proposal Submission to Supervisor	8 days	Mon 17/10/22	Wed 26/10/22
	2		Feedback and Comment from Supervisor	2 days	Wed 26/10/22	Thu 27/10/22
	3		Resubmission of Approved Brief Proposal	2 days	Thu 27/10/22	Fri 28/10/22
	4		Full Proposal Submission	12 days	Fri 28/10/22	Mon 14/11/22
	5		Chapter 1	6 days	Mon 14/11/22	Mon 21/11/22
	6		Submission of Chapter 2	15 days	Mon 21/11/22	Fri 9/12/22
	7		Submission of Chapter 3	16 days	Fri 9/12/22	Fri 30/12/22
	8		Doing FYP Final Report	10 days	Fri 30/12/22	Thu 12/1/23
	9		Amendment and Modification Period for FYP	22 days	Thu 12/1/23	Fri 10/2/23
	10		Submission of Final Report	7 days	Fri 10/2/23	Sun 19/2/23
	11		Submission of revised structure of FYP report	7 days	Thu 30/3/23	Fri 7/4/23
GANNT CHART	12		Submission of first draft of Chapter 4	27 days	Fri 7/4/23	Mon 15/5/23
	13		Submission of first draft of Chapter 5, 6 & Abstract of paper	11 days	Mon 15/5/23	Mon 29/5/23
	14		Submission of First Draft of FYP Report & Paper	11 days	Mon 29/5/23	Sat 10/6/23
	15		Submission of Final Report, source code, installation kits, user manual and Paper for Assessment	12 days	Sat 10/6/23	Sat 24/6/23
	16		Symposium FYP	6 days	Sat 24/6/23	Fri 30/6/23
	17		Amendment and modification period for FYP	17 days	Fri 30/6/23	Mon 24/7/23
	18		Submission of Final Report	6 days	Mon 24/7/23	Sun 30/7/23

Figure 1.2 Project Schedule

1.8 Expected Outcome

A mobile app which consists of chatbot that allows customers to book cake at bakery shop is developed. The chatbot will response to people and take the order. The customer will be prompted by the chatbot to provide all relevant information, including their preferred type of cakes and desired amount. The customer can just place their entire order using the chatbot in this fashion. The customer won't have to go via the website because the chatbot would handle it for them.

1.9 Project Outline

This section describes the outline for the entire project according to the chapter.

1.9.1 Chapter 2: Literature Review

Chapter 2 is about the review done on similar existing chatbots. Specification of the existing chatbots is taken and comparisons are made by listing them in a comparison table. Then, the proposed system's specification is compared with the existing chatbots, and a discussion is made. A few technologies have been reviewed in order to build the proposed system.

1.9.2 Chapter 3: Requirement Analysis and Design

Chapter 3 discusses the methodology chosen to develop the proposed system. Rapid Application Development (RAD) is selected as the model for the development. This chapter also portrays system architecture, use case diagram, database, sequence diagram, and NLP pipeline. Besides, the design of the proposed system is included at the end of the chapter.

1.9.3 Chapter 4: Development and Implementation

Chapter 4 discusses the development of the proposed system. For instance, how to build the chatbot using Dialogflow and how to connect the Dialogflow to Flutter and Android Studio which act as the mobile application development platform. Implementation of the proposed system also conducts to fulfill the design of the proposed system.

1.9.4 Chapter 5: Testing and Evaluation

Chapter 5 discusses all the functional and non-functional testing. Besides, a questionnaire is distributed to 18 respondents to evaluate the usability of the proposed system.

1.9.5 Chapter 6: Conclusion and Future Work

Chapter 6 discusses how the proposed system accomplished the objective of this project. Besides, the limitations and future work of the proposed system are discussed at the end of this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter, three existing systems been analysed for its advantages and weaknesses. Proposed system been reviewed, and few technologies required to build the proposed chatbot been reviewed as well.

2.2 Background Study

According to iTechArt (2022), a chatbot simulates human speech by carrying out repetitive automated actions based on predetermined triggers and algorithms. A bot is designed to interact with a human using a chat interface or voice messaging in a web or mobile application. Algorithms that most widely used for building a chatbot are machine learning, deep learning, and natural language processing (NLP). NLP techniques such as tokenization, parsing, and key matching are used to process and understand human language which allow the chatbot to interact with users in a natural and intuitive way. Besides, machine learning algorithms are used to train the chatbot to recognize patterns in user inputs and generate responses based on those patterns. Moreover, deep learning techniques like neural networks or convolutional neural networks can be used to build chatbots that can understand and generate more complex language.

According to Research (2022), the global chatbot market size was worth USD 526 million in 2021 and by 2030, it is expected to reach USD 3619 million. Besides, a chatbot can engage customer interactions while requiring less intervention from human employees. The study also stated Covid-19 problem has increased demand for contact-less, customer-facing

systems that provide front-desk, concierge, and customer service operations without requiring users to interact directly with employees.

2.3 Review on Existing System

In this section, three different existing chatbots will be reviewed. The three existing chatbots are Sephora, Mandy, and TechCrunch chatbot. These existing chatbots have their unique characteristics, advantages, and disadvantages.

2.3.1 Sephora Chatbot

Sephora is a French multinational retailer of personal care and beauty products. According to recent research by Lee (2020), Sephora had built chatbots to improve its customer service quality. Through Sephora Kik Messenger chatbots, Sephora offers clients a range of services. Customers can take a quiz via a chatbot, providing some of their vital facts and after that the chatbot makes a product recommendation. Additionally, Sephora chatbot offers personalized beauty advice, product suggestions, and reviews. The Sephora bot asks questions about taste just like a live salesperson would in order to suggest the ideal product and through Sephora's Kik Messenger integration, users may buy the things they want without ever leaving the messenger.

The author stated that Sephora tried to improve its online consumer relationships by using artificial intelligence (AI). By using selfie images, Facebook's Sephora Virtual Artist chatbot enables users to test out several lipstick shades. Customers who wish to learn about makeup through video clips and tutorials can also find beneficial information there.

Personalized product recommendations and chatbot-based product ordering are the main

goals of the Sephora bot (Quoc, 2019). Figure 2.1 shows the recommendation of type of product made by Sephora chatbot when customer chosen type of product wanted to be viewed.

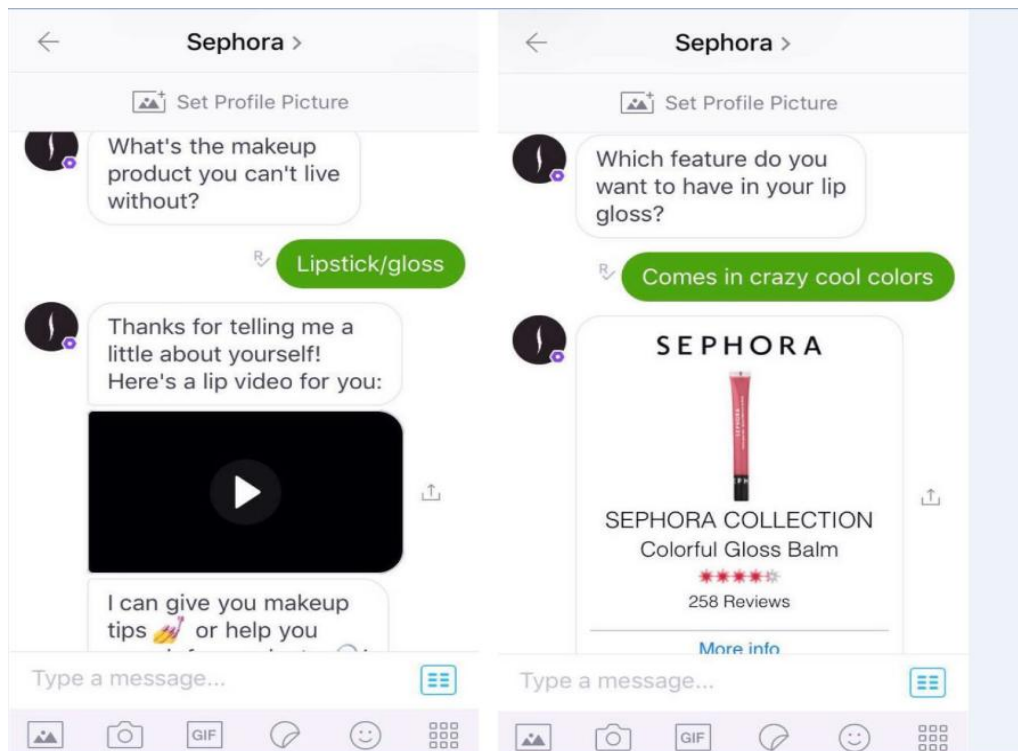


Figure 2.1 Lip gloss products being recommended through the Sephora chatbot

2.3.2 Mandy Chatbot

According to Ni et al. (2017), Mandy is a primary care chatbot system developed to help medical staff members by automating the patient intake procedure. The main objectives of Mandy chatbot are to automate the patient intake procedure to ensure that patients receive prompt, affordable, and individualised healthcare. Mandy is applied to comprehend patient symptoms, carry out a rough differential diagnosis, and produce reports. Besides, Mandy offers a humanised interface to welcome patients, comprehend their demands, and deliver insightful data to doctors for additional investigation.

The authors found that Mandy is a mobile chatbot. All algorithms are executed, and all data are processed in a web services (cloud). This indicates that all sentences generated and analysed for the patients are done so in the cloud. Mandy has access to natural language processing (NLP) modules that can assess patient symptoms, understand patients' everyday speech, and produce interview questions. Then, Mandy will generate a report for the doctor about the patient's symptoms and potential causes. The doctor can login into the e-health information management system to access the report. Mandy's system architecture consists of three sections which are the chatbot application, web service and E-Health Management System that can be used by doctors and nurses. Figure 2.2 shows the application scenario and system architecture of Mandy chatbot.

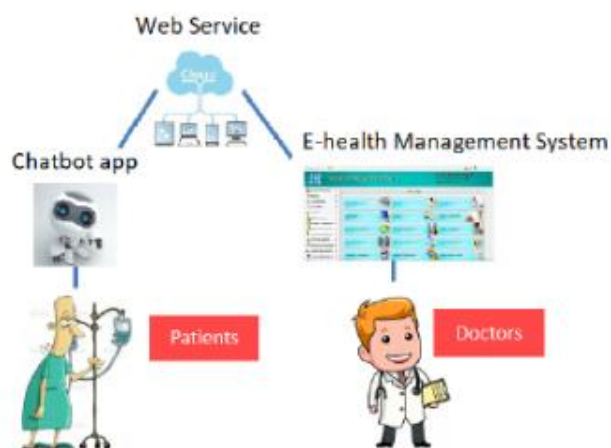


Figure 2.2 Scenario and system architecture of Mandy