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RESEARCH ARTICLE

CAMPUS ONLINE FOOD ORDERING SYSTEM USING CHATBOT IN UNIVERSITI SAINS ISLAM MALAYSIA

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Abstract

Nowadays, people prefer to order food online since it is more convenient, especially university students who typically have a full schedule of assignments, courses, and club activities. Customers will find that placing their orders online and picking them up at the stand will be the most convenient and time-saving option. The aim of this study is to developed a campus-wide online food ordering system using a chatbot called FoodieRunBot that delivers food orders to faculty, staff, and students at Universiti Sains Islam Malaysia (USIM). In order to save time and effort, customer service needs to be automated. Throughout the shopping process, this chatbot might help the customer. FoodieRunOwner was created in order to assist stall owners in viewing and deleting orders from their stalls. The waterfall method is being used for this project to ensure sure the system development goes according to schedule and without hiccups. The four basic phases in this methodology are planning, requirements gathering, design, implementation, testing, and maintenance. Additionally, it helps entrepreneurs in USIM with better system-wide revenue development, customer engagement, and product promotion. Students at USIM were given a Google Form survey to complete in order to evaluate the system using the user acceptance test methodology. The results show that the system function has fully achieved all of its goals and specifications. Most of them agree that all of the issues associated with conventional ordering systems in USIM have been fixed with FoodieRunBot.

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Introduction:-

Everything has now been automated as a result of technology advancements. It is very difficult for any firm to succeed in the modern era without utilizing the use of technology. Technology has had an impact on the food and beverage business as well (Akanbi & Afolabi, 2016; Brown, 2021). Fast food restaurants are skilled at staying current, thus they employ an online meal ordering system. It makes ordering food easy for their clients and gives a great experience with speedy service. When it comes to university students, spending money on fast food might put them over their budget due to the incredibly expensive pricing. They will dine at the university canteen because it is cheaper than fast food. However, campus canteens such as Universiti Sains Islam Malaysia (USIM) continue to use the conventional method of ordering at the counter. There are several campus canteens at USIM, and the majority of them continue to serve traditional orders. As a result, different challenges that are bothersome to customers arise. The canteen is always crowded at the same time, especially during peak hours like lunch. When a large number of customers visit the canteen and need to place their order at the counter, a long line forms (Akpan & Ekpenyong, 2018; Anthonia, 2020). Customers also have to wait for their meals, wasting valuable recess time. This shows that the manual ordering approach for food is inconvenient and inefficient. Additionally, traditional ordering techniques take longer than online ordering systems. This is due to the fact that, as previously stated, customers must wait in line to place an order and pay. Because they need to engage with other businesses as soon as possible, consumers like to save time (Lau & Ng, 2019). Given that everyone is busy with courses and other duties, it would be ideal to have a system that reduces the amount of time required to order lunch at USIM. Furthermore, confusion is unavoidable during peak hours due to the busy and noisy setting. Customers and cashiers have difficulty comprehending what the other person is saying, which leads to errors in accepting customer orders (Siew, 2019). This scenario occurs regularly and cannot be avoided because humans are prone to make mistakes. Until recently, ordering food had improved because orders could be placed over the phone with the servers. However, there are some disadvantages to this system, including the difficulties of clients having a tangible copy of the menu, the lack of visible proof that the order was correctly made, and the requirement for the canteen to have a staff answering the phone and receiving orders. When there are too many orders coming in at the same time, personnel may ignore consumers' orders. As a result, the consumer must call the staff again to reconfirm the order. Furthermore, server response times can be poor at times, forcing customers to wait. It is inconvenient since clients must wait in a large line to order meals. This is exacerbated during peak hours, such as lunchtime, when everyone goes to the cafe at the same time. It also takes a long time to make the dinner, making consumers wait for a longer period of time. Until recently, it had improved because orders could be placed over the phone with the waiters. When there are too many orders at once during busy times, this causes workers to make mistakes and then neglect instructions.

Literature Review:-

Online Ordering System

The majority of businesses have been impacted by the recent global coronavirus pandemic issue. Economic sectors were seriously impacted by the coronavirus outbreak, and most companies are currently experiencing financial difficulties. All business sectors have been impacted by the Covid19 pandemic's significant changes to the nature of traditional business (Bartik et al., 2020). The majority of people move away from interpersonal relationships as a result of this global threat. E-commerce has been rising in popularity since every company wants to keep up with technology advancements (Mohamad, 2021). Online services are currently being utilised by the food and beverage business to attract in more consumers. To make it easier for consumers to place orders, some restaurants have begun to utilise online ordering platforms. Ordering and purchasing have been made simpler by this online ordering. To place an order, users only require a device with an internet connection.

Customers like the ease of use of the online ordering procedure. Customers may utilise the internet to search for restaurants that they prefer (Anthonia, 2020). They have two alternatives for getting their food: pick-up or delivery. If customers choose delivery, the restaurant's delivery worker will bring the food to their home. Customers who want to pick up their food can do so at the restaurant. It is more convenient for customers to pick up their meals from the restaurant because they will not be charged delivery fees (Yeoh, 2021). Payments can be made via cash, credit card, or online banking.

This system's adaptability is its main strength. Customers may order food from any location and at any time (Anthonia, 2020). To place orders, customers are only required to connect to the internet via a mobile device or a laptop. They are not required to go into the restaurant to place their order. They do not have to spend time in queue at the restaurant anymore. As a result, the customer saves time. They shouldn't have to worry about waiting for their

meals to be cooked and prepared. Working people are helped by it because they are too busy with their employment to visit a restaurant or canteen.

The same applies for university students who feel rushed for time and consequently miss lunch. As a consequence, when they get at the cafeteria, the food has been finished. As a result, an online meal ordering system must be developed to help customers in ordering their meals. The online ordering system can display a list of menus that are still available. They are able to choose from the campus's several cafeterias. It broadens the alternatives so that customers can choose meals based on their own preferences.

Buy-Online-Pick-Up-In-Store (BOPIS) Service

BOPIS is an acronym for "purchase online and picks up in-store." This type of business strategy enables customers to shop and place orders online and then pick up their items in a physical store on the same day (Brush, 2019). BOPIS, commonly known as click-andcollect, represents the whole online retailing trend. This trend enables clients to make purchases through channels, including mobile, in-store, and online platforms.

BOPIS enables consumers to combine the simplicity and convenience of online purchasing with the speed, security, and extra convenience of picking up their orders instore. According to Brush (2019) BOPIS also enables businesses to rethink their customer experience and adapt it to the contemporary digital and mobile environment, thereby drawing customers to their physical stores and creating opportunities to make additional sales, deepen customer engagement, and boost brand loyalty.

The BOPIS facility benefits both retailers and consumers. Customers who choose the BOPIS service are exempt from shipping fees and can receive their goods immediately (Jin et al., 2018). Plus, BOPIS is even more convenient because customers can order from the comfort of their own homes. Then, they can drive to the store to pick up their purchase and go about their day.

Existing System

Studies have been conducted by studying Malaysia's current Buy-Online-Pick-Up-In-Store (BOPIS) Service system. In this study, a number of existing systems have been chosen. The system's objective is to make it possible for customers to order meals online and pick them up when they're ready.

Foodpanda

Foodpanda is one of the food deliveries services available in Malaysia. Foodpanda is very well-known because it was the first-ever food delivery to launch in Malaysia. It has widened its market value over time. The system is available as both an online and mobile application. The application provides a varied range of meals thanks to over 700 partnerships with Malaysian businesses (Yellow Bees, 2021). Customers must first enter their address before choosing a menu from a list of available restaurants. By filtering the search result, customers can choose their food based on their preference.

Furthermore, Foodpanda provides real-time status updates that allow customers to track and check the status of their orders. On another hand, Foodpanda also give their customers option to pick up their own meals at the stalls (Hui, 2020). In addition, Foodpanda eases their user by suggesting their past order and allowing them to reorder the same item again. Hence, they do not have to go through all the restaurants or menus available to find the same item. Foodpanda accepts cash, credit cards, and internet banking as payment methods (Tan, 2021).

Grabfood

Grabfood is one of the main food delivery services in Malaysia. Grabfood, formerly known as Grab, was founded in 2012 in Singapore by Anthony Tan and Hooi Ling Tan. Initially, it operated as a taxi-hailing service. Currently, Grab provides several services, including GrabFood, GrabCar, and GrabExpress. With their GrabFood service, they deliver gratification equivalent to Foodpanda. GrabFood is accessible in eight Southeast Asian countries.

Customer may also earn GrabRewards to redeem rewards when they pay with GrabPay. Since GrabFood offers GrabPay, it is simple to use. GrabPay may be used at any merchant that accepts e-wallet payments (Tan, 2021). Therefore, it helps customers to become cashless. Its delivery radius is between 7km and 10km. The delivery fee is RM5 and above. GrabFood accepts online payment or GrabPay and cash on delivery (COD), but it is only available

in a few cities. Grabfood also allow their customers to choose to pick up option which need the customer to pick up their food themselves. However, self- pick-up service is limited to specific service areas currently.

McDonalds

McDonald's was founded in California in 1937 by brothers Richard and Maurice McDonald. Forty-three years later, in December 1980, Malaysia welcomed the largest fast-food franchise in the world. The first McDonald's restaurant in Malaysia was opened by Golden Arches Sdn Bhd, which had been granted permission to do so by McDonald's Corporation (UKEssays, 2018). There are currently over 320 restaurants in Malaysia.

Customers can choose to have their food delivered or picked up via the McDonald's mobile app, which offers them access to both ordering options. When a customer chooses to pick up their order, the stall will immediately begin preparing the food for them after they have made their payment. It demonstrates how quickly their service can be completed. In addition, Mcdonald's only accept online payment via Debit (ATM) or Credit Cards.

Table 1:- Comparison of Existing Systems.

Features	**System**		
	Foodpanda	**Grabfood**	**McDonald's**
User	Customer/seller	Customer/seller	Customer
System platform	Web and mobile	Web and mobile	Mobile application
Notification	Yes	Yes	Yes
Ordering Method	Delivery and pick-up	Delivery and pick-up	Delivery and pick-up
Payment	Cash, credit card and	Cash, debit card, credit in app e-wallet	Cash, debit card, credit in app e-wallet
Chatbot	Yes	No	Yes

Based on the findings shown in Table 1, it can be observed that all the systems examined in the study offer access to both consumers and sellers as users. However, it is noteworthy that McDonald's stands out as an exception, as it just gives access to customers. Both Grabfood and Foodpanda provide users with smartphone and web-based applications for their food delivery services. In contrast, McDonald's just offers a mobile application for its customers to access its delivery services. Each individual system is equipped with its own chatbot, all of which offer a Buy Online, Pick Up In Store (BOPIS) option, enabling customers to collect their purchases at the restaurant independently. Foodpanda offers many payment options, including cash, credit card, and online banking. Both McDonald's and Grabfood provide many payment options, including cash, debit cards, credit cards, and online banking. Nevertheless, Grabfood provides an additional advantage through the utilisation of e-wallet payment.

While there are many benefits to using online ordering and delivery systems for meals, there are also certain drawbacks that must be avoided. First off, food is typically twice as expensive as the norm. On several meal delivery apps like Foodpanda and GrabFood, customers could observe price variations. The delivery fees for the same restaurant, for instance, may vary, ranging from RM1 to RM2, even if the distances are the same (Kwok, 2022). Customers could discover that ordering meals online is more expensive than dining out.

Furthermore, delivery services such as Foodpanda and Grabfood gather huge commission fees from vendors ranging from 25% to 30% (Saini & Gupta, 2017; SoyaCincau, 2021). Due to their large client base, they charge a 30% commission fee from restaurants. It's a major issue for businesses as they have to split their profits with the delivery service. Customers do not need to be worried about additional commission fees from food delivery apps when using FoodieRunBot. It also keeps sellers from suffering unnecessary costs as FoodieRunBot only uses pickup options. Furthermore, the technology was developed to make life easier for both USIM personnel and students. The USIM campus has every available stall. Students may purchase lunch at a lower cost compared to they would pay at Grabfood, Foodpanda, or McDonald's as the food prices at USIM stalls are lower. Customers are able to conveniently pick up the meal after placing an online order. Furthermore, customers do not have to wait long for their meals because they are prepared quickly after they place their orders.

Weaknesses of existing system

While online food ordering and delivery systems have a variety of advantages, certain disadvantages are unavoidable while using such systems. First, food prices are usually twice the average price. Customers may notice price differences on various food delivery apps such as Foodpanda and GrabFood. For example, even though the distances are the same, the delivery charges for the same restaurant may vary, ranging from RM1 to RM2 (Kwok, 2022). Customers may find that the cost of food delivery exceeds the expense of dining.

In addition, delivery services like Foodpanda and Grabfood receive a huge quantity of commission fees from the vendor roughly 25 per cent to 30 per cent (SoyaCincau, 2021). Due to their enormous consumer base, they seek a commission fee of 30 per cent from restaurants. It's a big hassle for sellers as they must share their revenues with the delivery service.

With FoodieRunBot, customers do not need to be concerned about additional commission fees from food delivery applications. It also prevents vendors from spending needless expenses, as FoodieRunBot solely utilizes pickup alternatives. In addition, the system is designed to make life easier for USIM employees and students. All available stalls are located on the USIM campus. Students can obtain lunch at a lower price than they would at Grabfood, Foodpanda, or McDonald's since the food prices at USIM stalls are more affordable than those restaurants. Therefore, customers may conveniently pick up the food after placing an online purchase. In addition, guests do not have to wait a long time for their meal because it is prepared shortly after they place their orders.

Overview of Telegram Chatbot

Chatbots are becoming growing in popularity (Wouters, 2020). A Telegram chatbot is an automated conversational buddy. It allows humans and computers to communicate. Users on Telegram are now communicating with a computer rather than a human. Furthermore, the chatbot will respond automatically based on what people say or ask. In recent years, chatbots have gained popularity in a wide variety of areas, including advertising customer support, teaching, healthcare, documenting and conserving cultural history, and even the entertainment business (Adamopoulou & Moussiades, 2020).

A chatbot enables firms to offer products directly to customers. Customers are able to pay for goods through the chatbot. Another way to make more money is to promote products or services using the chatbot. Chatbots can also be utilised at any time as they are available around all of the time (Abdulwahab & Al-Adaileh, 2017; Hamad et al, 2020). With the assistance of a chatbot, a business may quickly respond to a user's question, which is essential for improving the quality of the business. Telegram is similar to WhatsApp. However, it offers more features. Furthermore, these features make it the most formidable rival to the WhatsApp messaging software. Its features include an instant messaging service, no file-sharing size limit, and new Telegram Bots and Channels (Sharma, 2019).

There are a lot of bots that give information about a wide range of topics on the market right now. The first example of a Telegram robot is the Eddy Travel bot. It helps people find the best deals on flights, hotels, and other places to visit. This is one of the most-used travel-related Telegram bots (Akanbi & Afolabi, 2016; Nazarenko, 2021). A bot is something like Smokey bot. This bot uses the user's location to predict air pollution levels and gives information about smog, high-risk places, and how to live and reduce air pollution (Akanbi & Afolabi, 2016; Nazarenko, 2021). People who care about the world or their health will find this tool very useful.

Security element in Telegram chatbot

Customers expect assurance that their data is secure with the business, given widespread security concerns caused by technological advances (Hamad, 2020). The primary categories of security challenges are threats and vulnerabilities. A vulnerability is a known flaw of an asset that one or more attackers can exploit. A threat is an incident that could endanger a system or organization (Watts, 2020). There are few options for addressing the security issue within the chatbot's system.

Authentication

When logging onto Telegram, users will be required to perform two-factor authentication. Authentication and authorization are essential here to make sure a user's credentials are legitimate and secure (Hasal et el., 2021). Most authentication credentials include a username, system ID, phone number, certificate, and password. Two-factor

authentication is a method of strengthening the security of a user's data and communications by requiring the user to verify their account information in more than one way, such as through email and text message.

For the system, when the FoodieRunBot chatbot account is created by the BotFather bot for the campus online food ordering system, Telegram will provide a unique token that the bot can use to verify API requests. The Telegram API is utilized for user interaction and message reception. The Bot API of Telegram has a token-based authentication system. A token is a string or line consisting of letters and numbers. The token is used for the bot authentication and sending requests to the Telegram server (Omer, 2020). Therefore, it is essential to safeguard the bot's token and not disclose it to anyone. This ensures that only authorized parties can interact with the chatbot via Telegram.

Password Hashing

Hash functions are commonly used in password management to secure the storage of passwords in a database. When a user sets a password, the plaintext password is passed through a hash function, which generates a unique fixed-size string known as a "hash." This hash is then stored in the database instead of the plaintext password. When the user attempts to log in, the entered password is passed through the same hash function, and the resulting hash is compared to the stored hash. If the two hashes match, the password is correct, and the user is granted access (Kamal, 2019). This method helps to ensure the security of stored passwords by making it difficult for an attacker to determine the original password if the database is compromised.

Methodology:-

The proposed Campus Online Food Ordering System utilising Chatbot will be developed using the Waterfall Software Design Life Cycle (SDLC) approach. SDLC is a method for developing high-quality, low-cost software in the smallest amount of time. It provides a well-structured step-by-step process that enables businesses to quickly generate high-quality, well-tested, and ready-to-use software (Khan et al., 2022). Within a software organization, SDLC is a process that is followed for a software project. Each step has a huge impact on the characteristics of software quality (Khan et al., 2021). It is a detailed strategy that explains how to build, maintain, replace, and change or improve certain software. The life cycle is a mechanism for enhancing software quality and the development process as a whole. SDLC is a simple diagram for each activity involved in creating a software program. A good software life cycle model can assist an organization not just in the development of software, but also in the planning, organizing, staffing, coordinating, and directing of other software development operations (Gupta, 2021). This helps to eliminate any waste of time, cost, and energy and also improves the development process efficiency. It is important to monitor the process as it can ensure that the project stays on schedule and is a wise investment for the business.A linear-sequential life cycle model is the waterfall model. It is easy to understand and put into practise (Creation, 2022). In a waterfall model, there is no overlap between the steps; each one must be finished before the next one can start. Phases of requirements, design, implementation, testing, and maintenance were all involved.

Figure 1:- Waterfall Methodology.
Source: (Adobe Experience Cloud Blog)

Requirement analysis is the procedure of comprehending design, function, and purpose requirements, and it entails gathering crucial data. A requirement document is a compilation of the system's requirements that is kept on file (Aishah et al., 2021). This offers more direction for the system's design and development processes. Online surveys and research have been done to gather all pertinent data regarding the destination system during this phase.

Results:-

Requirement

In requirement analysis, the system's requirements are gathered and documented in a requirement document. During this phase, online research has been conducted to gather all the relevant information about the destination system.

Based on observations at USIM, Telegram is one of the most widely used mediums by students and lecturers. Lecturers also use Telegram as a medium to share their notes and classes. In addition, there is a service in the telegram that implements an e-hailing service to facilitate students who do not have transportation. The service is well known, but it does not use telegram chatbots to operate. However, USIM has no services like the proposed system

From November 24 to November 27, 2022, an online survey was performed using Google Forms. The online poll received 43 responses from USIM students from different faculties and academic years. As shown in Figure 2, the percentage of students who consider the traditional ordering approach is time-consuming is 93% and 7%, respectively. This result indicates the majority of people believe it is time-consuming as the old technique requires them to order at the counter, consuming more time.

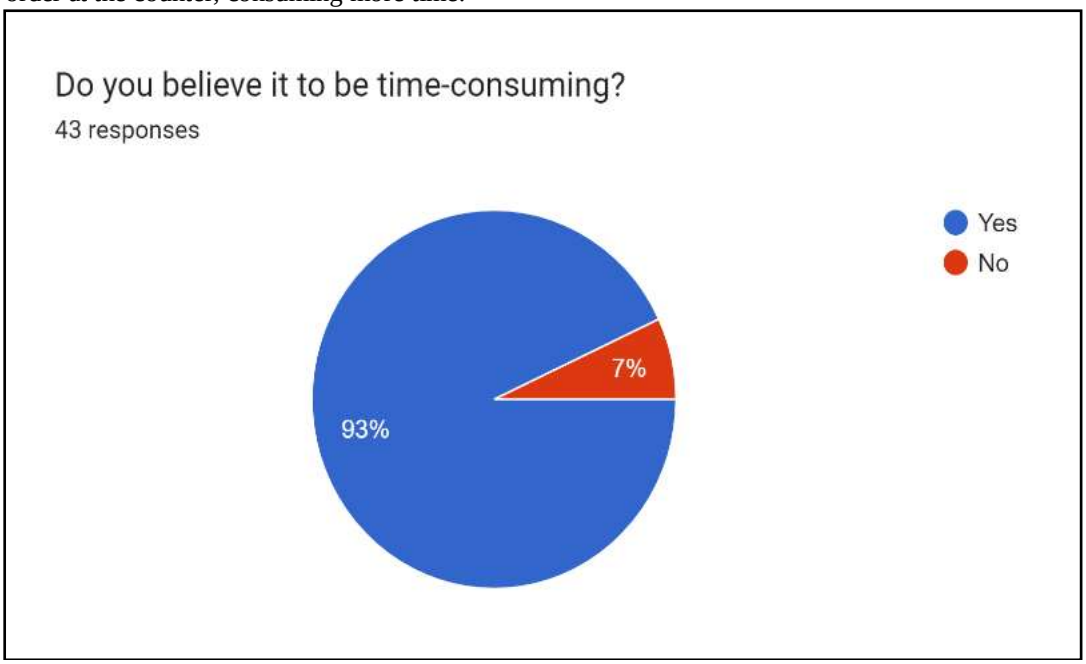

Figure 2:- The percentage of students believe that traditional ordering is time consuming.

As depicted in Figure 3, 88.4% of the 43 survey respondents said they have waited in a long line for an extended period to place a meal order. This indicates that most respondents have had poor experiences with the traditional method of placing an order.

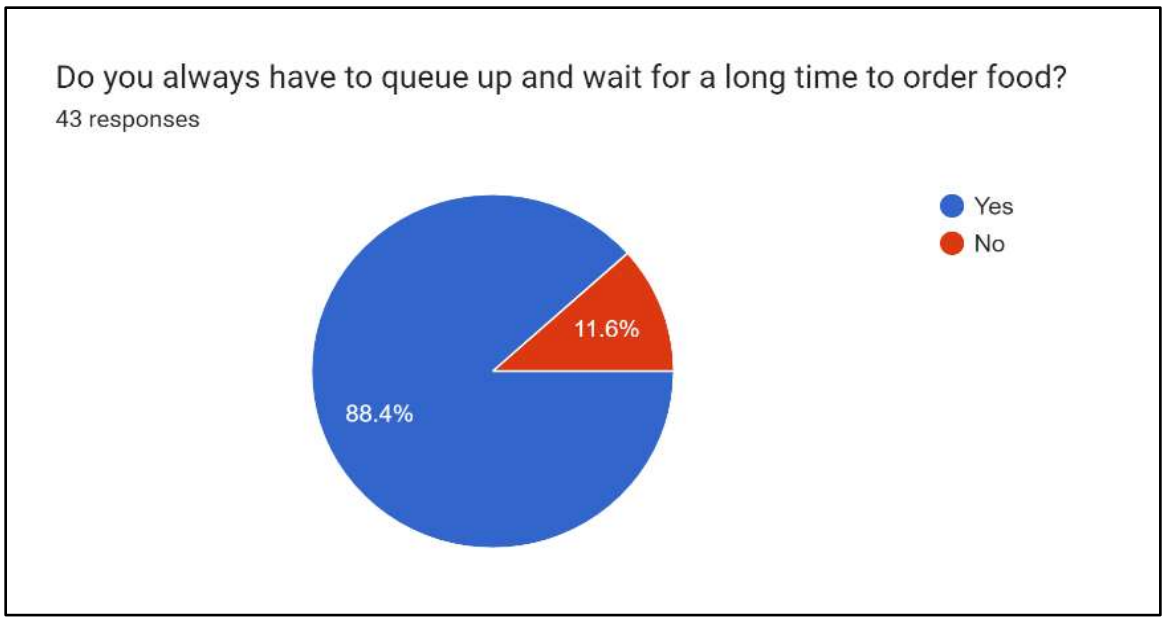

Figure 3:- The percentage of students who always queue up and wait for a long time to order food.

Figure 4 demonstrates that among 43 respondents, 97.7% said they had heard about the Telegram chatbot. This shows that respondents are aware of the current technology development.

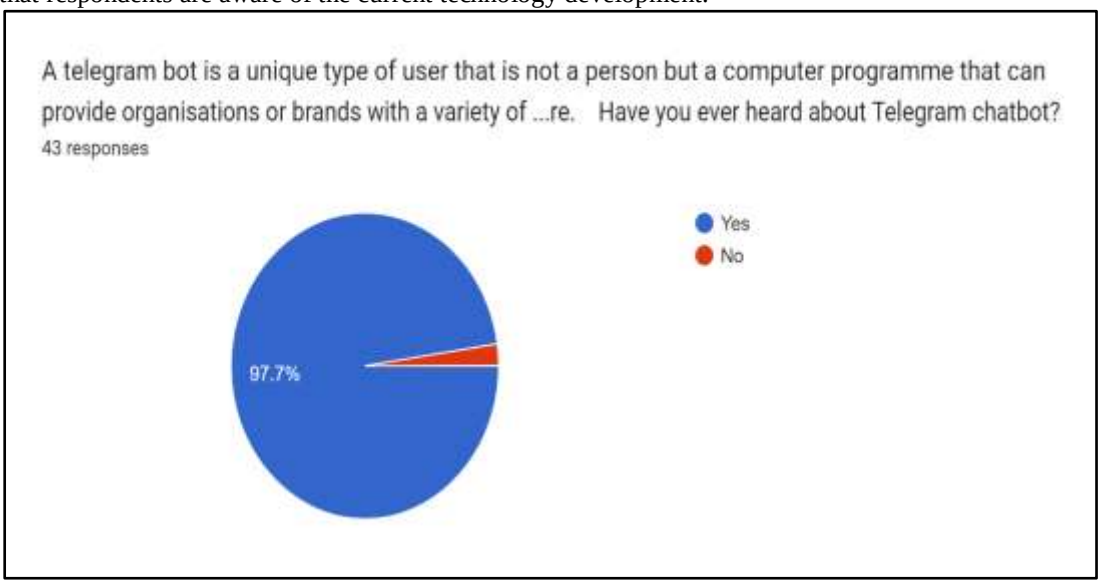

Figure 4:- The percentage of students' who have heard about Telegram.

Figure 5 demonstrates that, of the 43 respondents surveyed, the percentage of respondents who have used any Telegram services and have not is 76.7% and 23.3% respectively. This shows that majority of them are familiar with the Telegram chatbot and have used it previously.

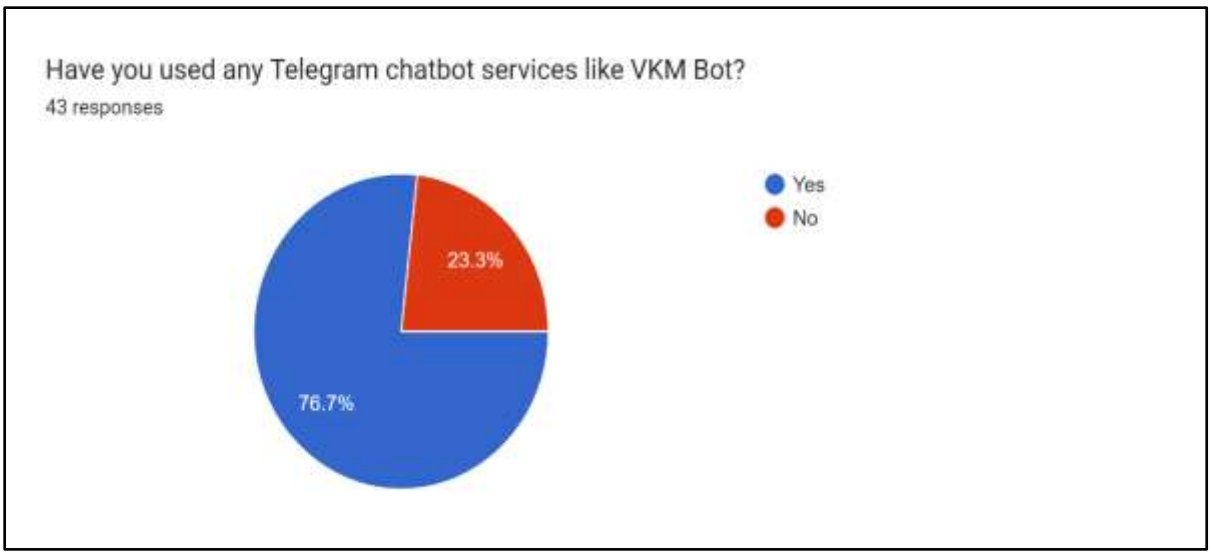

Figure 5:- The percentage of students who have used any Telegram chatbot service.

Figure 6 shows that among 43 respondents, 90.2% of respondents find the Telegram chatbot user-friendly while 9.8% find it not. It demonstrates respondents are aware that the benefits of the Telegram chatbot, which facilitates their use of it.

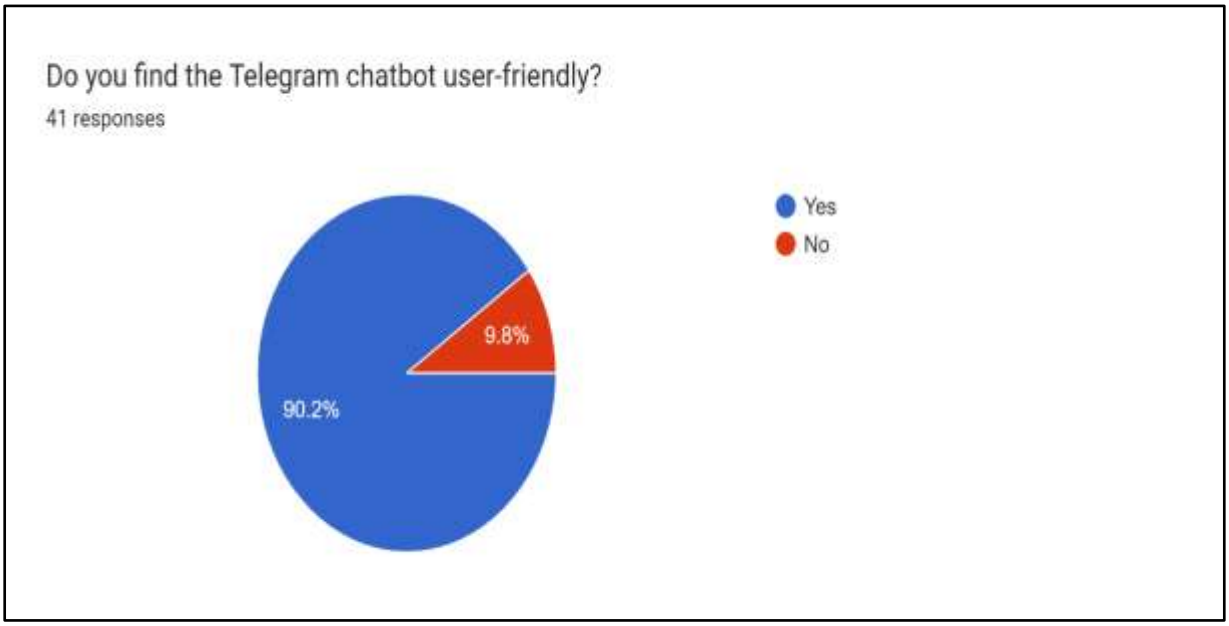

Figure 6:- The percentage of students find Telegram chatbot user-friendly.

Figure 7 demonstrates that all 43 respondents think it is more convenient to place an order and pick up their orders. It shows that it is acceptable to develop a system in USIM that enables users to order food online and pick it up when it is ready. It is convenient and saves a lot of time.

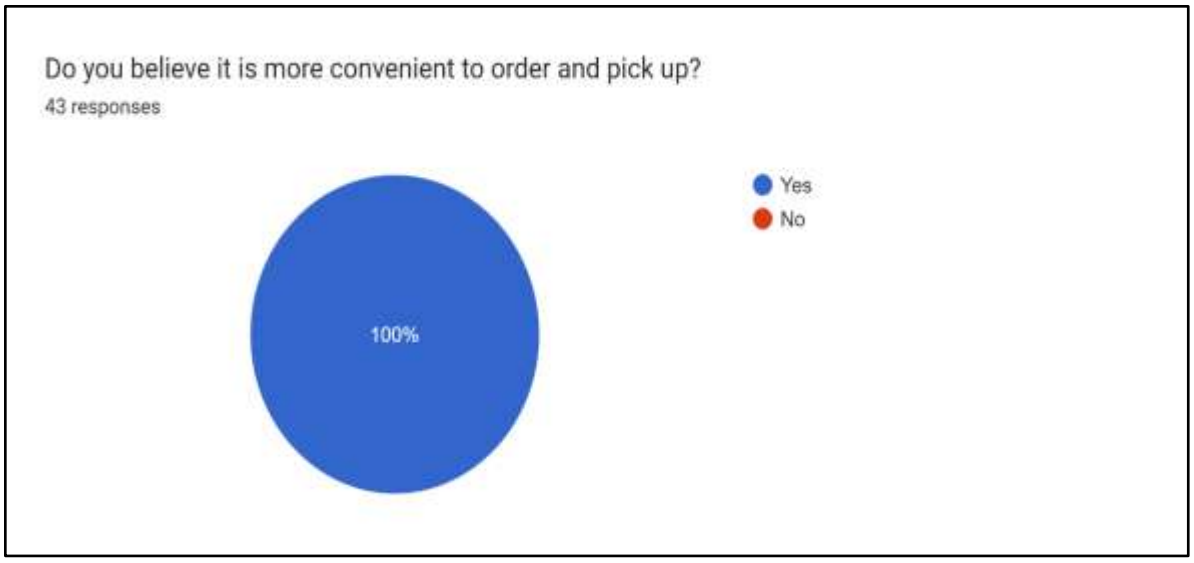

Figure 7:- The percentage of students who believe it is more convenient to order and pick up.

Design

The purpose of the design phase is to produce a concrete solution concept based on the criteria, tasks, and approaches outlined in the previous phase. This phase involves the framework design. This phase generated a description of how the application should be designed and implemented (Kramer, 2018). During the design phase, the goal is to generate a concrete solution concept that is based on the criteria, tasks, and techniques that were described in the earlier phase. Included in this phase is the framework design. The outcome of this phase is a description of how the application should be designed and implement (Kramer, 2018). Before moving on to the next phase, each of the designs will first be implemented into a prototype.

Context Diagram

The context diagram is a data flow diagram level 1 that depicts the limits and scope of a system. Typically, it depicts the entities and processes involved in the system to be redesigned, illustrating the transition from one process to the next. In Campus Online Food Ordering System using Chatbot, it is possible to determine how this system operates. Customers are a key component of the system. Figure 8 represents a context diagram in which clients provide the needed actions, select the canteen and food according to their preferences, and then place an order and make payment.

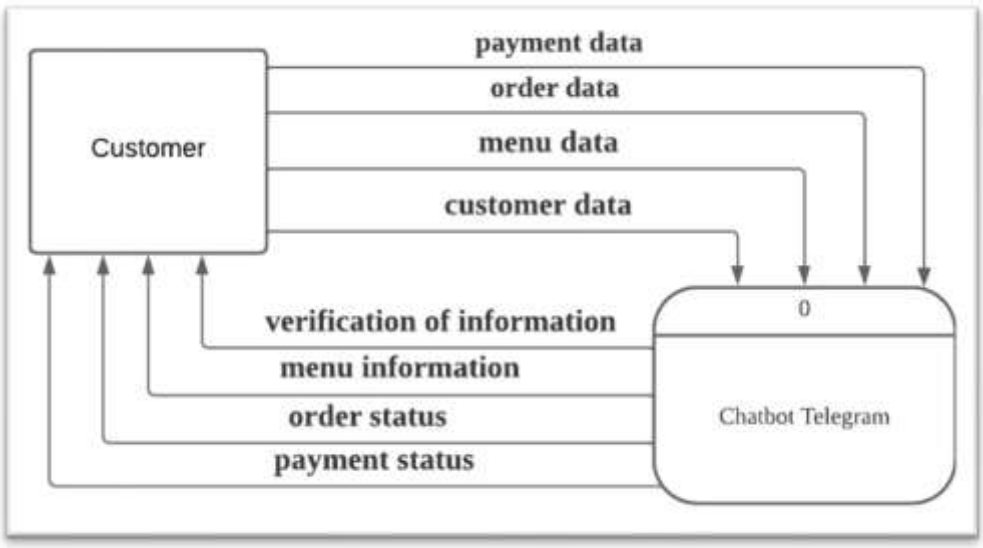

Figure 8:- Context Diagram of the system.

Interface Design

Customers are able to choose their favourite and most appropriate restaurant depending on their meal preferences. The bot will automatically display greetings and the canteen option to users. There will also be "Checkout" and "Start Again" buttons. Users can begin their meal orders by selecting the "Students Mall" or "Medan Selera FEM" option buttons, as indicated in Figure 9. FoodieRunBot is shown in Figure 10 providing a list of available canteen booths. Figure 11 shows that the list includes food images and names that help customers in their selecting process.

Figure 9:- List of Canteens.

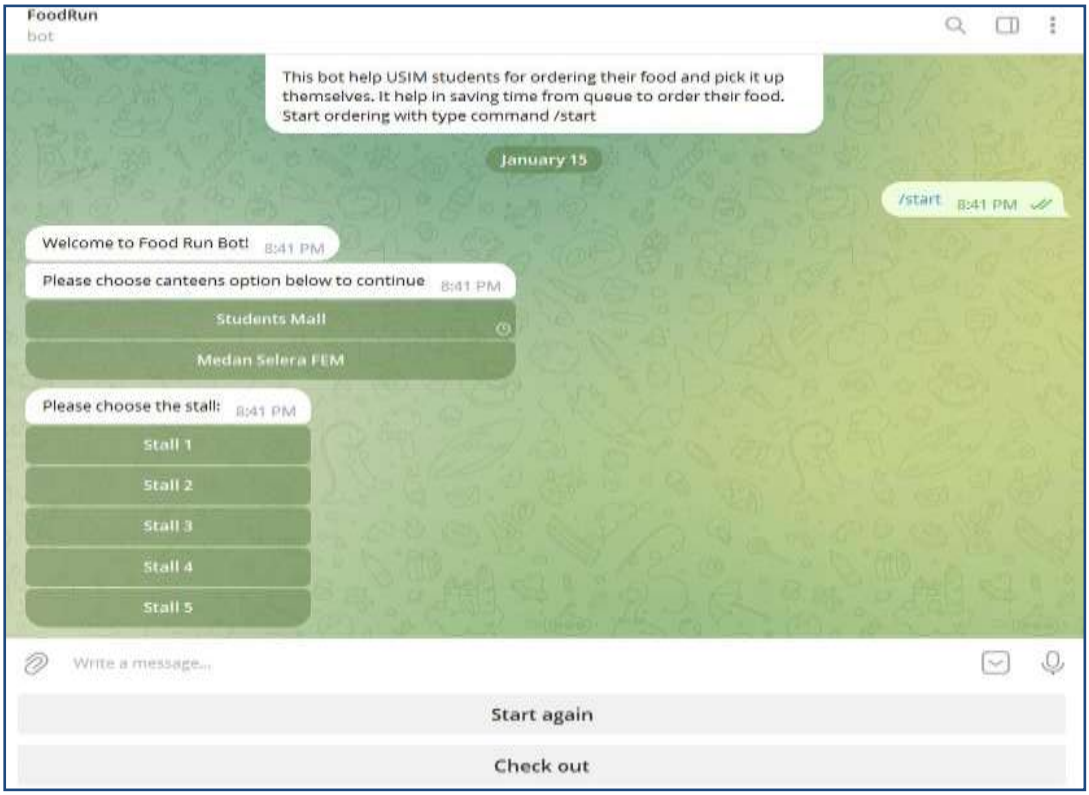

Figure 10:- List of stalls in the canteen.

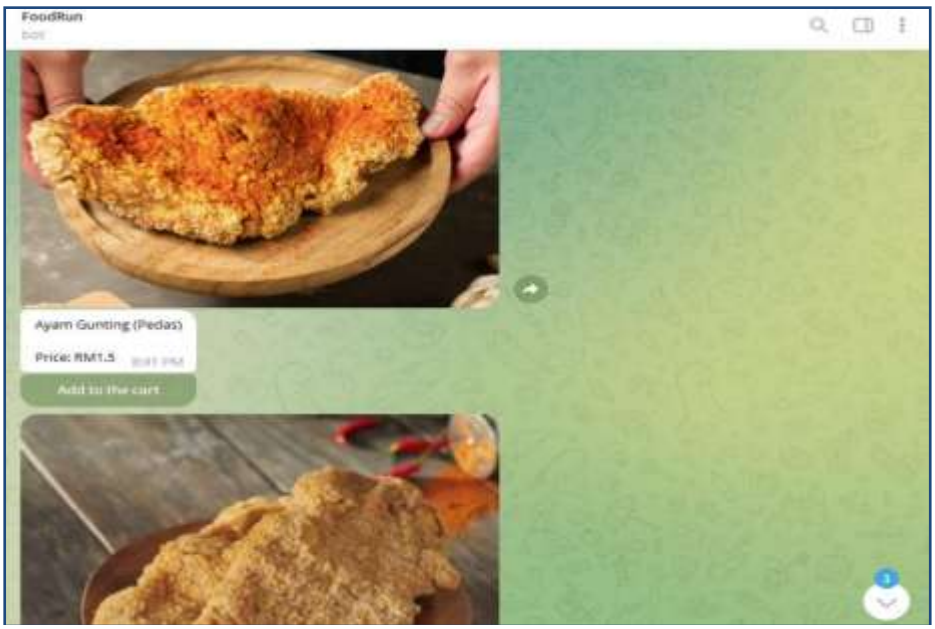

Figure 11:- List of menus in the stall.

The process of adding an item to a cartis. When a consumer chooses to add their favourite menu to their shopping basket by clicking the "Add to cart" button, they will see a notification stating that the menu has already been added to the shopping cart.

The user's order summary and payment amount will then be displayed during the checkout process. Following that, customers must either click the 'Confirm Order' button to confirm their order or click the 'Edit Order' button to remove their order and start a new transaction.

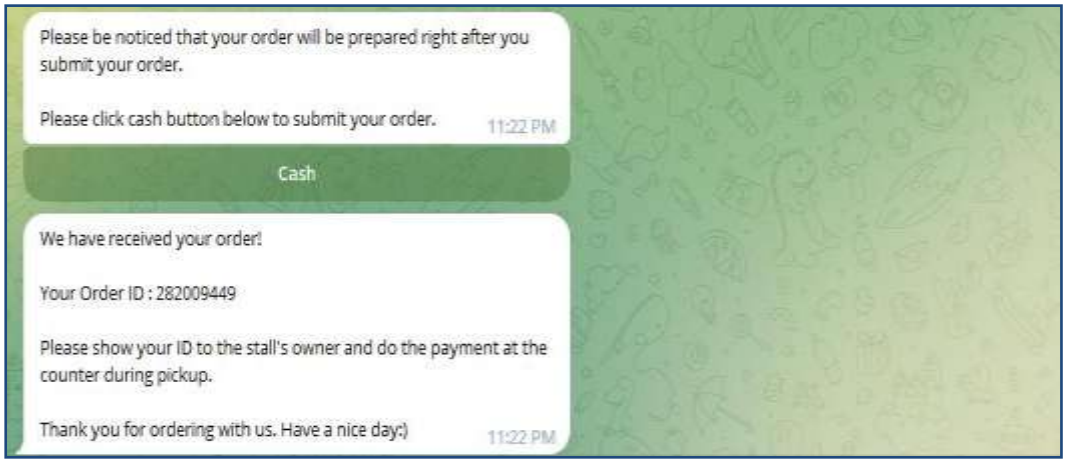

Figure 12:- The confirmation of order and payment.

After the user has finalised their order, FoodieRunBot will display a message informing them that their food will be prepared immediately after they click the 'Cash' button to submit their purchase as shows in Figure 12.

Implementation

Authentication is a security element of the FoodieRunBot and FoodieRunOwner systems. A Telegram chatbot authentication function is a piece of code that checks a Telegram chatbot's identity and confirms that it is authorised to access the Telegram API. To authenticate the bot and validate API calls originating from the specified source, this method frequently leverages the unique token issued by Telegram when the bot is constructed. By authenticating the chatbot, it may ensure that only authorised bots have access to the Telegram API and can carry out tasks like

sending messages and accessing user data. Figure 13 demonstrates the code needed to implement bot token authentication.

Figure 13:- Code for authentication.

Furthermore, FoodieRunOwner will use the hash function to generate a unique hash from a plaintext password. Instead of the original plaintext password, the generated hash will be saved in a database. When a user attempts to log in, the entered password is hashed and the resulting hash is compared to the previously stored hash. If the two hashes match, the password is correct, and access is provided to the owner. Figure 14 depicts the bcrypt hashing algorithm coding used in this system.

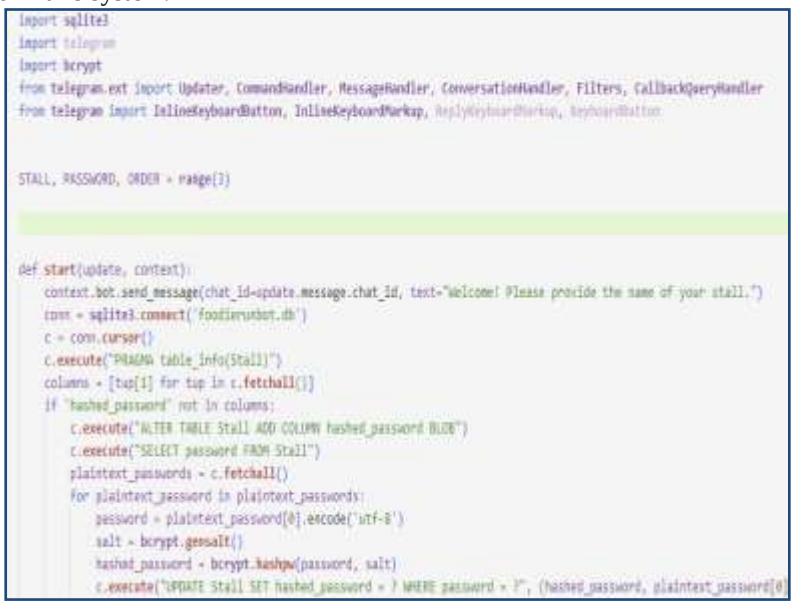

Figure 14:- Code for hash password using bcrypt

Testing

Testing the functionality of a system ensures that any potential bugs in the program's code are discovered before its implementation. The application will be tested using the criteria to ensure that the code meets the requirements (Kramer, 2018). Integration testing is required to ensure that the application works as expected and to detect any mistakes or failures in its performance. Test cases and user acceptance tests are used as testing approaches.

Functional testing is a type of software testing that verifies the compliance between a software system and its functional requirements and specifications (Hamilton, 2022). Functional testing is designed to test each function of a software application by providing the correct input and comparing the resulting output to the functional requirements. This type of testing is conducted by the developer of the system and the test cases will be developed to compare the expected and actual results. If the two results do not match, the developer will fix the errors.

Evaluation of Functional Testing

The functional component of FoodieRunBot was put through its paces in the testing process to ensure that it meets its intended goals. The user acceptability test was carried out using a Google form; nonetheless, however, the user has a physical testing experience. All the respondents are students at USIM.

Functional Training Result

A Google Form was given to 11 respondents as a survey for the user acceptance test. The survey contains 12 questions consisting of linear-scaled questions. The scale has five ratings, which are 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly Disagree). Figure 15 shows that 9 respondents assessed the success of FoodieRunBot's performance as a 5, whereas 2 respondents rated it as a 4. It indicates that FoodieRunBot has accomplished its system purpose. Lastly, Figure 16 demonstrates that 8 respondents rated FoodieRunBot's suitability for implementation in USIM as 5, while the remaining 3 respondents rated it as 4.

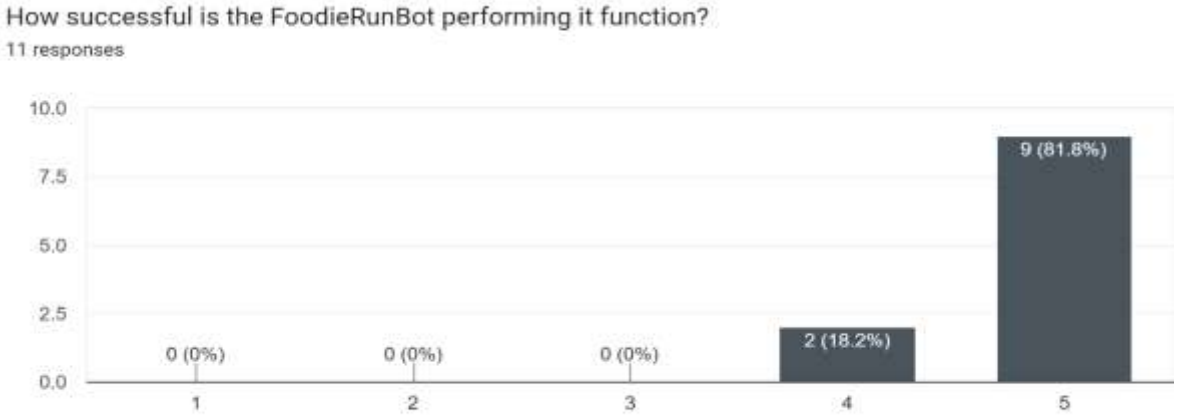

Figure 15:- The percentage of respondents rate the successfulness of FoodieRunBot function.

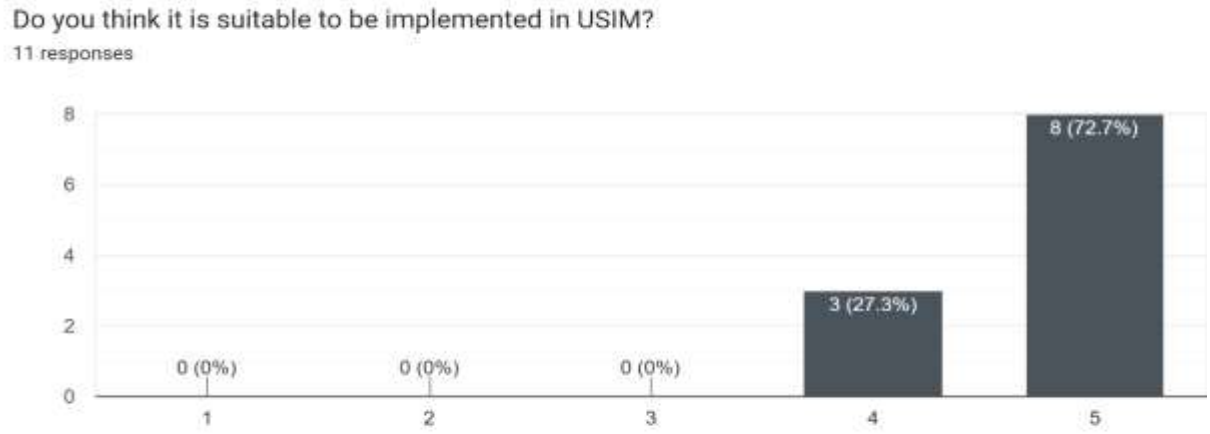

Figure 16:- The percentage of respondents think it is suitable for implemented FoodieRunBot in USIM

User Feedback

The feedback from users in Figure 17 shows that most of them say that the function is performing well. Additionally, some of them recommend sending the user a notification when the meal is prepared. The respondent also agreed that this FoodieRunBot may work in practise. Lastly, one of the responses advises adopting an e-wallet as the payment option.

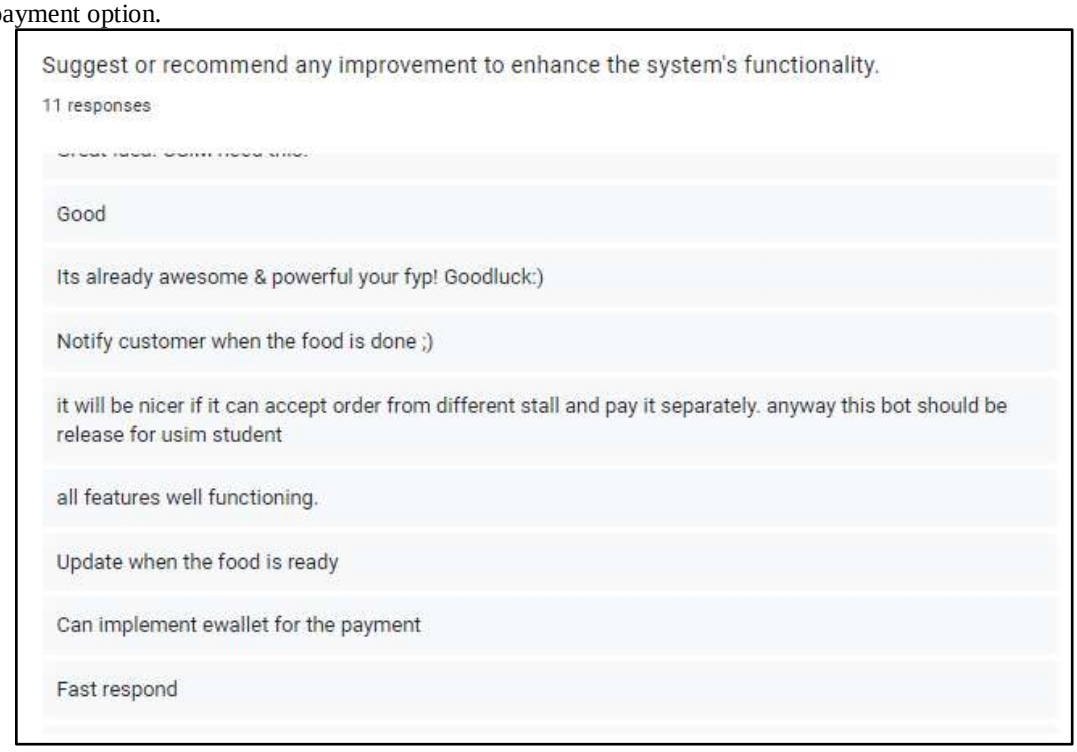

Figure 17:- User Feedback.

Maintenance

Maintenance is one of the most important aspects of a product or software. After the product has been delivered to the customer, it may be required to make changes to improve its performance. These changes have to be made by either user adjustments or issues experienced while using the product or program (Creation, 2022). When all previous development processes are complete, the product developer once again gathers the entire product and reviews the strides achieved in specifications being met. In this maintenance phase, maintenance activities are done for the deployed system. If any problem happens, the developer will try to fix it. Besides, if any user asks for any changes or enhancements, then the entire process is restarted. Its means of parameters against a collection of expectations of quality, importance, relevance of the learning process. The product has already completed testing during this process.

Conclusion:-

In conclusion, FoodieRunBot is a Telegram chatbot developed with several types of programming languages, including Python and SQLite. FoodieRunBot is a chatbot that assists USIM customers in having the online meal ordering system. Users are able to choose a meal from the canteen menu. Customers may proceed with the checkout process and make further payments. Finally, consumers will be able to pick up their meals without having to wait any longer, saving time.FoodieRunOwner can be enhanced by adding an owner function to add, update, and delete their stall's menu. Furthermore, integrating real-time updates on food availability in FoodieRunBot can help clients avoid disappointment. Adding additional payment methods, such as online banking, credit/debit cards, and e-wallets, can boost user convenience. Order monitoring in real time can improve operational efficiency and customer satisfaction. Implementing a real-time monitoring system for orders may be a smart option; this will allow the restaurant to process orders more efficiently and avoid delays.

Current food ordering systems have a number of restrictions, including the usage of traditional ordering processes that require consumers to queue and place their orders at the counter. Furthermore, it is not appropriate during peak

hours. Furthermore, the traditional ordering method is inconvenient and time-consuming. Customers can order meals in advance and pick it up when it's prepared by developing a campus online food ordering system using chatbots. Staff and students can begin placing orders after launching the FoodieRunBot. Customers can choose the canteen where they want to examine the stalls and menus by selecting the canteen selection display. Customers can then browse various stalls and select the lunch entrees that best fit their tastes. Customers can check out once the items have been added to their shopping basket. Then, proceed with the payments. It indicates how simple the system is.

Using the information gathered throughout the review and evaluation procedures, the administrator can alter the menu by adding or deleting products and viewing order history. The owner can inspect, modify, and delete the menu item as necessary and has complete access to the database. Customers have the option of using cash or a QR code to pay for their order. Before receiving their food, customers who choose to pay with cash must do so at the counter. Customers who select the QR code option must provide payment documentation into the FoodieRunBot. The user will then receive an order ID from FoodieRunBot, which must be submitted to the business owner upon pickup. For instance, by adding and implement the QR code for user easy to scan directly to the application. As a mobile application is more practical than a web-based system, the system can be designed as one. Lastly, an online payment gateway can be developed to ease the transaction process when donating such as by using Billplz, toyyibPay or any type of payments infrastructure.

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