



# **Kenyatta University**

## **Department of Computing & Information Technology**

### **SCO400: Project Report**

**Title:** Online Hotel Management System For Chicken-Land  
Pilau Hotel Kasarani With Sentiment Analysis

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## **ABSTRACT**

The Chicken Land Pilau Hotel Management System with Sentiment Analysis is based on the web technology. It is build using PHP, JavaScript, MYSQL and CSS for styling. The system is run on Apache HTTP server installed on the XAMPP platform. The system allows users on the local host to login, create orders, create menu items, view orders, make reviews, serve orders as well as view performance. Currently, the XAMPP software has to be present for the system to run.

A waiter or admin must be registered on the database for the sake of authentication that grants them access to the system. A customer on the other hand does not need to login and therefore does not need to be registered. The customer has the ability to view an online menu, make order and leave a comment.

The system provides a way to create the menu and edit the menu items. This privilege is granted to the admin and the hotel waiters. These can also perform sentiment analysis on the reviews and comments created by daily customers. In response to the reviews, a worker can call up or message a customer as the contact details are also provided and gain insight into the nature and quality of service.

The system also provides a dashboard that summarized and highlights the monthly performance of the hotel. This information is to help the management in decision making. It is worth noting that the level of skills required to operate the system is quite minimal and no additional training is required for personnel and thus no additional costs.

While creating an order, a customer is also required to enter their name and contact information (phone number to be specific). This is to enable the hotel to reach out to customers after they leave the premises for purposes of customer service evaluation and even advertising through bulk SMS service.

## **CHAPTER 1: INTRODUCTION**

### **1.1. BACKGROUND OF THE STUDY.**

This project involves making an online hotel management system with sentiment analysis for Chicken-Land Pilau Hotel. Chicken-Land Pilau Hotel is a business located at Nairobi's Kasarani area near Equity Bank Kasarani branch. The business is a sole proprietorship with two employees making up a team of three people. The hotel mainly serves in-person customers who order food after brief interaction with a printed menu before ordering food and beverages. After the order is served, a customer can pay in cash or through mobile payment. The transactions details are recorded in paper receipts. At the close of business, the owner has to use these receipts to reconcile the records with available cash so as to find out the profit. This project was conceived due to a need to keep proper record that can be referred to at any time to enable smoother running of business operations.

### **1.2. PROBLEM STATEMENTS**

The main challenge with the current manual system of operation is the lack of proper records. There is also inconveniences when updating the menu every time there is a change. The business is also unable to collect customer feedback and reviews accurately over time. The current system does not provide for a way that the business can reach out to customers after they leave the premises.

### **1.3 OBJECTIVES**

The following are the project objectives:

- Develop an online menu to be easily accessed through scanning a QR code.
- Design and implement a database model for the hotel.
- Design and develop a web application to manage order records, collect customer feedback and obtain customer email addresses.

- Build a sentiment analysis model and train it to analyse the hotel's customer feedback.
- Create a dashboard for user to access and use the sentiment analysis function.
- Create a webpage to send email messages to all the collected email addresses.

#### **1.4 SCOPE AND LIMITATIONS OF THE PROJECT**

This project will include a concept paper, this project proposal, analysis and design, implementation and demonstration of the solution to the project supervisor, documentation and a presentation to show before the project panel. The following will be part of the project deliverables:

- Concept paper
- Project proposal
- Analysis document
- Solution design
- Online menu webpage
- Web application accessing the database.
- A trained sentiment analysis model
- Sentiment analysis dashboard
- Email sending webpage

Due to time constraint the project will not encompass payroll management, inventory management and electronic payment verification.

### **1.5 Justification**

This project is worthwhile for the one academic year SCO400 unit as it involves application of skills gathered in the Bachelor of Science in Computer Science undergraduate program in an attempt to solve a real world problem. The skills used will include those learnt in the following course units:

- Object oriented programming
- Artificial intelligence
- Database systems
- Research methodology and technical writing
- Software testing and quality assurance
- System analysis and design

These are only some of the units applied. The project will also include extensive learning and fieldwork.

## **CHAPTER 2: LITERATURE REVIEW**

There is an increased use of information technology to access daily services and manage everyday transactions. Facebook alone has more than one billion users, and there are more than six billion mobile phones. (Westerman & McAfee, 2012) With such levels of mobile computing and easy access to data, businesses have had to shift online. The COVID-19 pandemic has led to increased interaction with electronic devices as a result of reduced human interaction. Significant restrictions on movement outside the home due to the global COVID-19 pandemic have intensified the importance of everyday digital technologies for communicating remotely with intimate others. (Watson et al., 2020) It is in light of such trends that a business would want to manage its operations online to keep up with the current lifestyle. This project seeks to establish a way for the Hotel business to fit into the digital technology usage trend and take advantage of it to streamline operations, improve customer experience and increase profits.

Online menus help restaurateurs provide an outstanding experience to their guests through an attractive display and ease of adding or removing orders, addressing waiters, and finding menu choices. Such applications such as Uber Eats, Jumia Food and Bolt Food have been known to revolutionize the food industry in Kenya. Uber Eats for example has more than 700 registered eateries. (*Three Years Of Uber Eats In Kenya - Africa.Com*, n.d.). The advent of these services has led to better customer experience and a myriad of problems for local restaurateurs who have to cope with the comparison. However it has been observed that these brands mainly engage in the sale and delivery of fast foods. The convenience of these applications may present a greater risk to adverse health outcomes among overweight or obese individuals, who consume more calories than their normal weight counterparts. (Liu et al., 2020)

Hotel and restaurant businesses have more needs than what the mentioned systems can offer. They need not to just manage orders and day to day finances but also to get customer reviews and analyse them, reach out to customers, track performance over time and more. A research study in found that organizations that use social media along with the management tools were better off than those who used social media alone. (Gikaro, n.d.) Some needs have to be addressed by the use of a custom-made solution to an organization's setup. The customers' revisiting intentions to a hotel can be captured in their online feedback reviews, by collecting and



analysing the large-scale customer review data. The service provider can attempt to attract more customers by addressing the dependable responses, reviews, and perceptions of customers willing to revisit. (Park et al., 2020)

The following are systems similar to the one being considered.

### Jumia Food Vendor App



If you are a Jumia Food Partner, start using today the App made especially for managing your orders.

Figure 1: jumia food vendor app

## Bolt Restaurant




### Bolt Restaurant

Bolt Technology Business

3+

★★★★★ 108

 This app is available for some of your devices

 Add to wishlist

Install

**Bolt** Restaurant

**Bolt**

Login

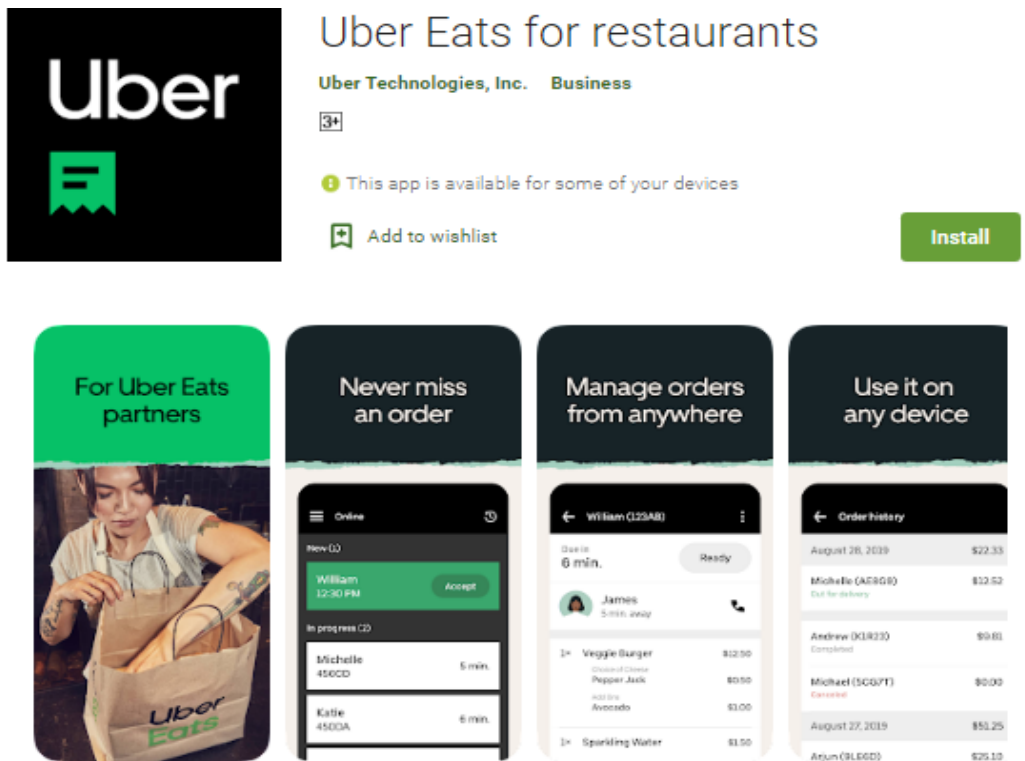
Register



This app allows receiving orders from people using Bolt Food app.  
Please signup here: <https://food.bolt.eu/>

Figure 2: bolt restaurant app

## Uber Eats for restaurants



"This app allows you to manage your restaurant on Uber Eats in a single, centralised place. Whether you'd rather have a single device in your store or an app that all your restaurant staff can use on their own phones, Uber Eats for restaurants flexes to fit your kitchen's unique needs! Here's everything the app offers:

Device flexibility. Run the app on a single tablet or on multiple mobile phones! Uber Eats for restaurants flexes to meet your needs.

Figure 3: Uber Eats for Restaurants

The above mentioned applications are all similar in that:

- They are mobile applications.
- They help manage orders on a day to day to day basis; order can be accepted or rejected.
- They provide order history.

- Enable hotel to link to a delivery service
- Generate receipts.

The system being considered will provide additional functionality such as:

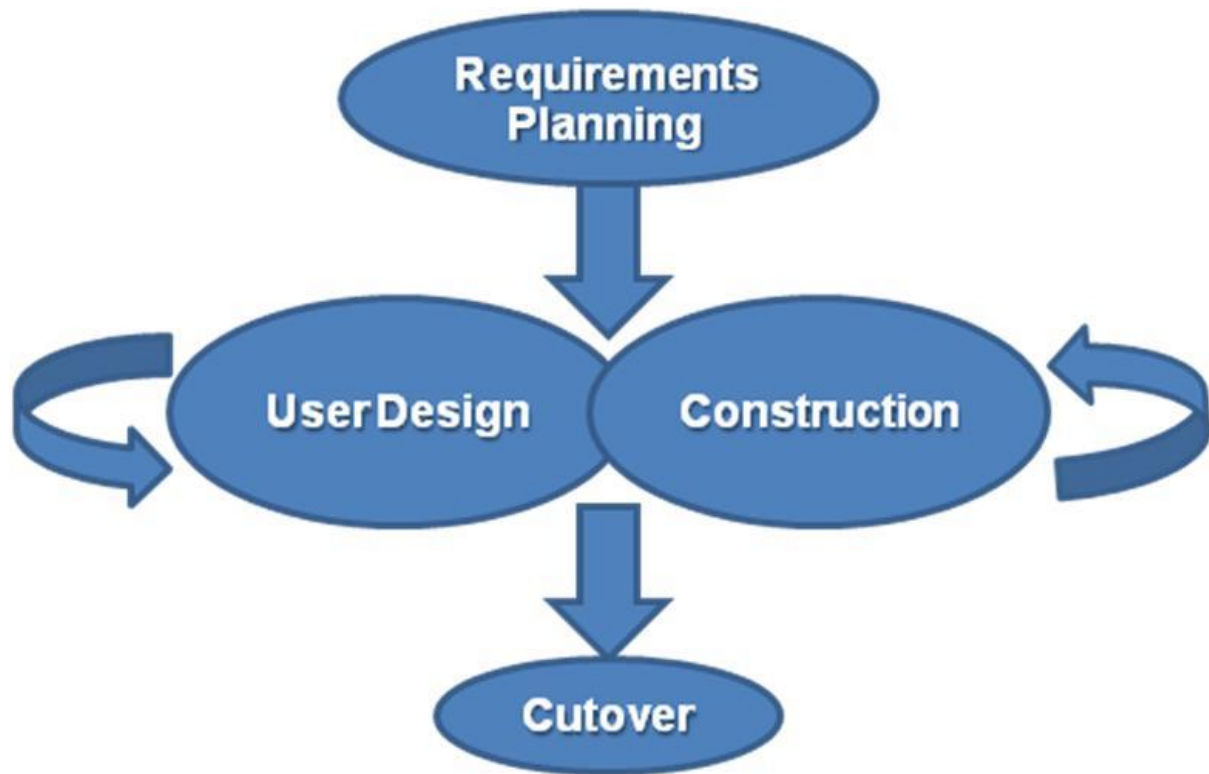
- Create a direct link between customer and hotel. The customer can directly provide feedback and the hotel can reach out easily at a later time.
- A sentiment analysis dashboard.
- The hotel will be in control of the data.

The system will be in the form of a web application. This makes it easier to use without the need for installation which would be an unnecessary use of memory space and time.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

This project will be carried out under the Rapid Application Development (RAD) methodology (Martin, 1991) which is a type of agile software development lifecycle. This methodology suits the project as it involves the user more than any other methodology. The product of this project will be highly customised and it is absolutely necessary to involve the users all the way. RAD can be summed up by the diagram shown below.



*Figure 4: rapid application development*

The requirements planning will be done by gathering data from users through interviews, literature review, document review and brainstorming. This phase combines elements of the system planning and system analysis phases of the software development lifecycle (SDLC). This phase involves establishing business needs, project scope, constraints and system requirements.

User design involves considering user feedback and then building the prototype according to the feedback. In this phase, the users interact with system analysts and develop models and prototypes that represent system processes. CASE tools are utilised to translate user needs into working models. This project will embrace an evolutionary prototyping approach where eventually the prototype becomes the system.

Construction focuses on application development. However, users continue to participate and can still suggest changes or improvements while the system is being actually developed. By iterating between user design and construction phases, the project is kept within a manageable scope and is likely to lead an acceptable final product for both parties.

Cutover phase involves testing the product, deployment and finalising the documentation. This is the endpoint of the project. After this phase, the project can be presented before the final panel for examination. (Martin, 1991).

### **3.1.1 THE SENTIMENT ANALYSIS**

This project will involve the implementation of VADER (Valence Aware Dictionary for sEntiment Reasoning). VADER is a rule based model for analysing microblogs. In this project's case, the model will be implemented using PHP programming language to analyse customer feedback obtained from the web application that will be developed. VADER provides for a way to analyse a text's polarity and intensity. Polarity means classifying if a text is neutral, positive or negative. Intensity is the measurement/description of how positive or negative the sentiment is.

### **3.1.2 IMPLEMENTATION TOOLS**

#### Programming languages

- PHP (server side language to program business logic, database connections, authentication, routing, sentiment analysis)
- JavaScript (client side language. Mainly to make web page dynamic and interactive)

#### Development environment

- XAMPP (PHP, MySQL and Apache server configuration)
- Visual Studio Code (Code editor)

#### Framework

- React JS (Client-side framework for single page applications)
- Bootstrap CSS (CSS framework)

### CASE tools

- Draw.io (Software tool for making Use-Case diagrams, DFD and other models.)

### Database technology

- MySQL (Relational database management system.)

## 3.2 TIME PLAN

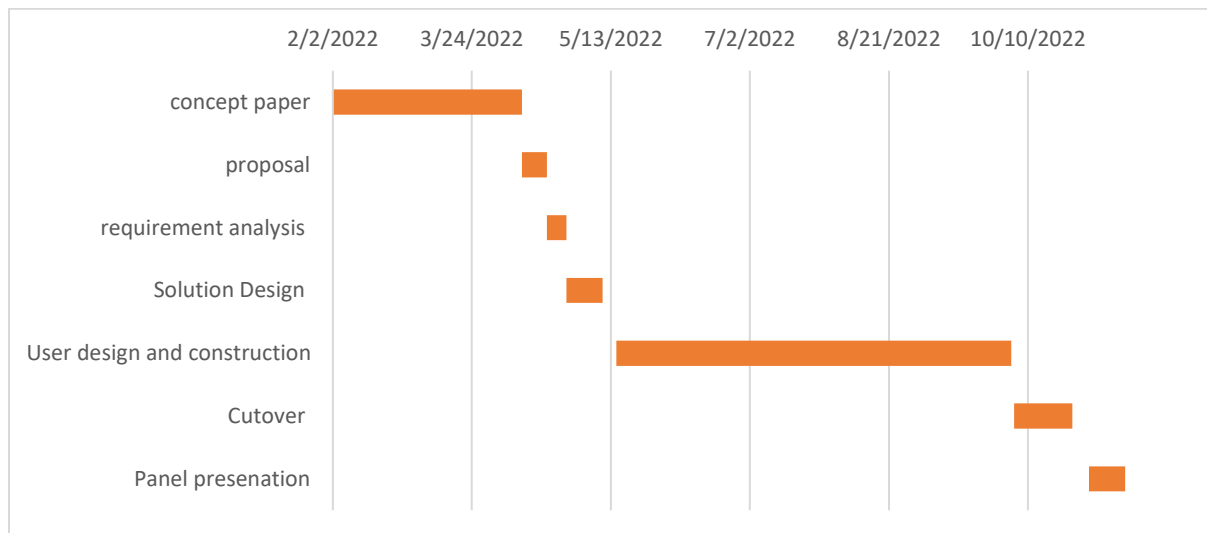


Figure 5: time plan



### 3.3 PROJECT BUDGET

This is the budget estimate for the project:

*Table 1: project budget*

ITEM	UNIT COST	QUANTITY	TOTAL COST
WIFI	4500	2	9000
Printing charges	10	50	500
Travel expenses	100	12	1200
Cell phone airtime	4	100	400
		Total budget cost=11,100	

## **CHAPTER 4: THE CURRENT SYSTEM**

The hotel currently utilizes a manual system for management. An interview was conducted to acquire information on the business model and business processes carried out on a daily routine. Currently the, business employs one manager (the owner) and a waitress on daily wage. In the morning, the owner notes down the expenses occurred to produce the food, this can vary depending on prevailing prices. In the day, the hotel accepts both call-for-delivery orders as well as walk-in customers. Every order and its value is recorded in a notebook by both the waitress and the owner. Orders can be paid for via cash or mobile money. In the evening, the owner does a reconciliation of all the earnings and takes note of the profit.  $\text{Profit} = \text{Income} - \text{expenses}$ . The hotel also regularly received feedback by word of mouth from customers. The current system is quite efficient as it informs the owner of the business's daily performance fairly accurately. The owner is actually able to make decisions as to the quantity of food to make based on average daily sales. The business remains afloat using the current system and this points to the fact that it actually works.

The current system faces challenges such as inability to easily track performance and reaching out to customers to enhance sales. It is also quite difficult to establish a long term performance trend accurately. Additionally, the owner has to spend time in the evening calculating the profit. It also lacks a way of receiving customer feedback from one time customers after they leave the premises and a way to document such reviews for long term business performance evaluation.

To cope with these, the business could consider employing an electronic hotel management system especially to handle the orders and manage customer relationship.

## **CHAPTER 5: DATA COLLECTION**

The hotel owner was interviewed with a view to acquire information about the current system of operations and getting opinion on the system requirements. A lot was discussed including the process of making business decisions such as how much food to cook per day, determining performance and receiving customer feedback. The owner gave information on how profits are calculated on a daily basis. At the beginning of each day, the owner notes down all expenses on ingredients. In the evening, the expenses are subtracted from the total income for the day to determine profit. For bills such as rent, the owner needs to save up gradually.

## **CHAPTER 6: ANALYSIS OF SIMILAR SYSTEMS**

This analysis shall involve the study and sampling of three electronic systems similar to the current manual system namely **Jumia Food Vendor App, Bolt Restaurant and Uber Eats for restaurants**

These three are popular mobile applications used for hotel and restaurant management.

### **Jumia Food Vendor App**

- Get orders from your tablet or mobile phone
- Receive and manage your orders quickly
- Access performance reports and receive customer reviews
- Chat, directly from the app with Jumia support team

### **Bolt Restaurant**

- Allows receiving orders from people using Bolt Food App

### **Uber Eats for restaurants**

- Used by Uber Eats (A food ordering and delivery app used by customers) partners.
- Manage orders from anywhere
- Installed on mobile phones and tablets
- Monitoring the business in real time
- Accepting or rejecting orders
- Tracking couriers
- Adjust item availability quickly
- Contact Uber Eats support team at any time.

A context-level diagram for the three systems would be as follows

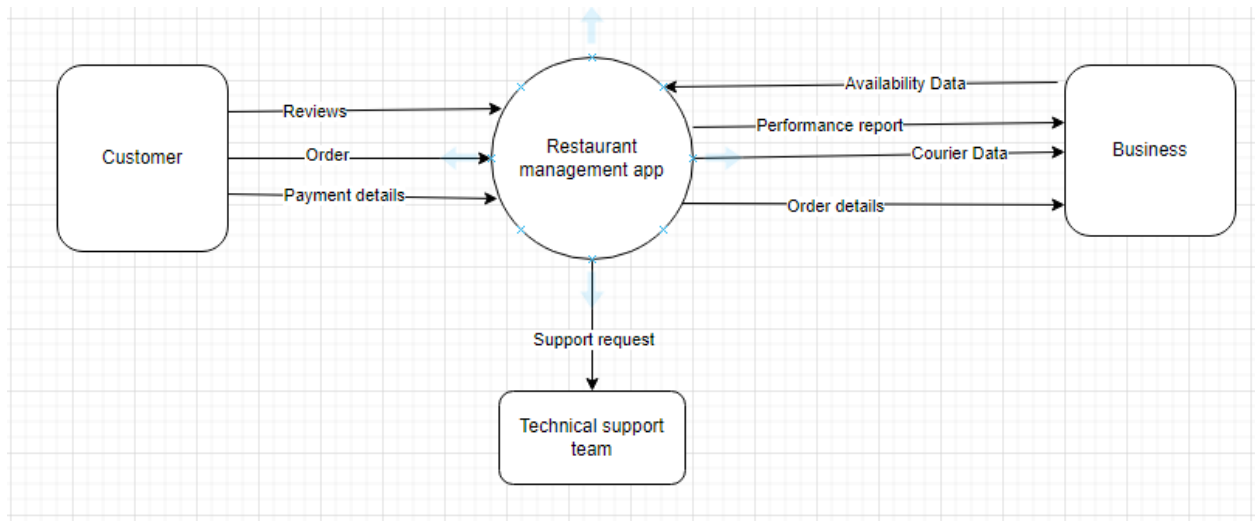


Figure 6: context level diagram

This applications provide very easy ways to manage orders and track performance. However they perform poorly at enhancing the Hotel's ability to reach out to customers and improve based on their reviews which would greatly improve results. The apps are also platform centric (they are more popular than the actual food providers) and this would be a stumbling block for the hotel as using one platform denies you access to customers on other platforms. Registering for such platforms would also involve as major shift in Chicken-Land Pilau Hotel's business model. The hotel mainly serves in-hotel-dining customers while the apps highly encourage food delivery or pickup customers. The shift would need use of single use utensils as opposed to the current stock of reusable utensils and cutlery. It would also involve training both the hotel owner and the worker (waitress) on how to manage the hotel on the basis of the new applications. The cost of such a shift could incur a cost that outweighs benefits.

## CHAPTER 7: THE NEW SYSTEM

It is in the view of these implications that is deemed necessary to make an electronic hotel management system to aid the business in achieving goals.

### Context diagram for new system

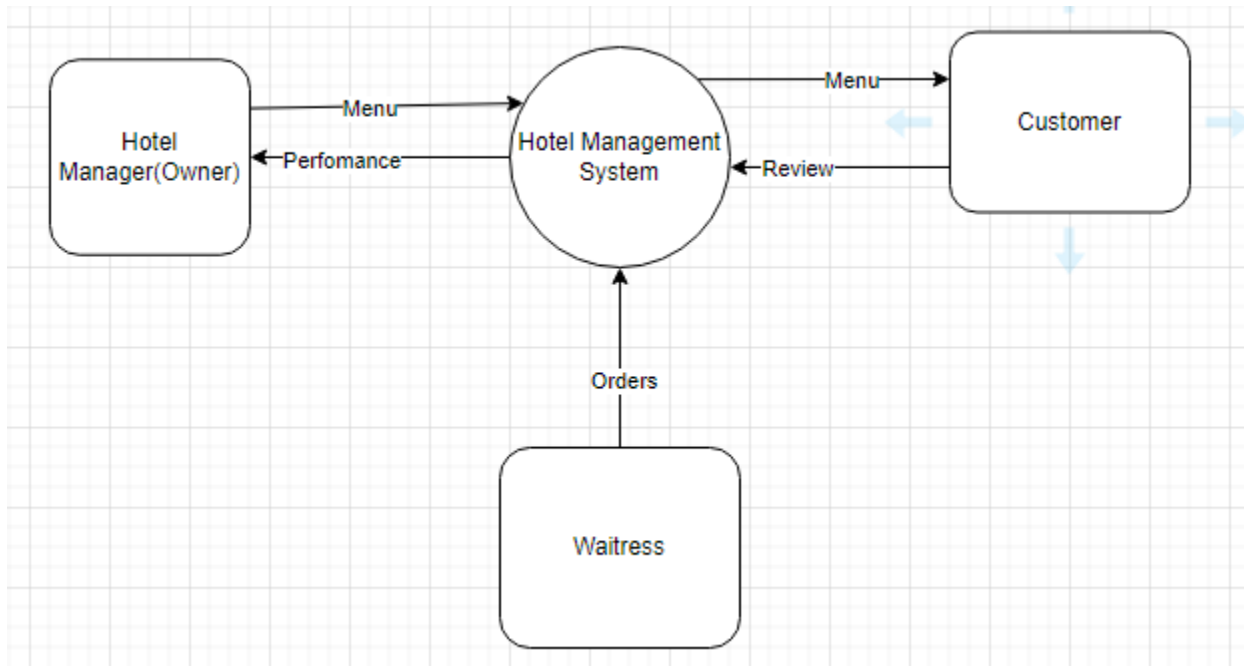


Figure 7: context diagram for new system

The new system will enable the customer to view the hotel's daily menu and from that make a decision which will be communicated to the waitress. Based on this information, the waitress is able to create an order in the system and serve the order. The customer also has the ability to create a review. The hotel manager can update the hotel's daily menu and view performance.

### **Proposed system Use case**

The proposed electronic system has the following primary users with their corresponding use cases.

#### **1. Admin-The Hotel Owner**

The admin is a role played the hotel owner. This role has the ability to create and update menu items, create orders, track orders (view order details), track performance and perform sentiment analysis.

#### **2. Hotel side user-Waiter**

The waiter executes a subset of the admin use cases. These are creating orders and tracking the orders.

#### **3. Customers**

The customer executes two use cases. These are viewing the hotel's menu and writing reviews to be read by the hotel admin.

Beyond these two, the system will have authentication required for the admin and the waiter (hotel side user). Customers do not need to be authenticated.



Figure 8: use case diagram for the new system

## **CHAPTER 8: REQUIREMENTS**

This chapter lists down the system requirements as gathered during the system analysis stage.

### **8.1 USER REQUIREMENTS**

User requirements are requirements set by the end user. In this system these are:

- Multiple users can use system concurrently.
- Owner can filter orders by date, value and number of items.
- System to classify reviews without user's intervention.
- System to always produce final product, not data that that needs further processing.

### **8.2 FUNCTIONAL REQUIREMENTS**

These describe what input the system accepts and the expected outputs. They describe how a system should behave under certain circumstances

- Dashboard showing performance and current state of restaurant in metrics of orders, reviews, income and menu items.
- The user will be able to create menu items, create menu page.
- A view orders page to track orders created.
- The user will be able to create orders, create orders page.
- Customer menu page visible to both the hotel management and the customers.
- Review creating page for customers.
- Authentication of users, different roles to access different views based on privilege.



### **8.3 NON-FUNCTIONAL REQUIREMENTS.**

Non-functional requirements relate to attributes of the system. Could include attributes such as scalability, performance and maintenance.

- No lagging while posting or retrieving data.
- Minimum training, ease of use.
- Error handling-always catch errors and provide useful message on how to recover.
- Feedback when a successful change of system state triggered by user is completed.
- System should always be available as needed by the business.

## **CHAPTER 9: SOLUTION ARCHITECTURE DESIGN**

The final system will have the following components;

- a. Data stores
- b. Web application made up of:
  - Dashboard
  - Sentiment analysis page-enable by a VADER PHP package
  - Manage orders web page
  - Online Menu
  - Reviews page

### **9.1 DATA STORES**

The systems uses a relational database model and MySQL Workbench as the relational database management system. The database consists of five tables. These are:

- Users
- Reviews
- Menu
- Orders
- Order items

The table 'order items' emerges as a result of the many to many relationship between orders and menu. Shown below are the entity relationship diagrams for the system. Under "order\_items" table the primary key is a compound one. It is made up of the foreign key for menu item and the foreign key for order which is 'order\_id'

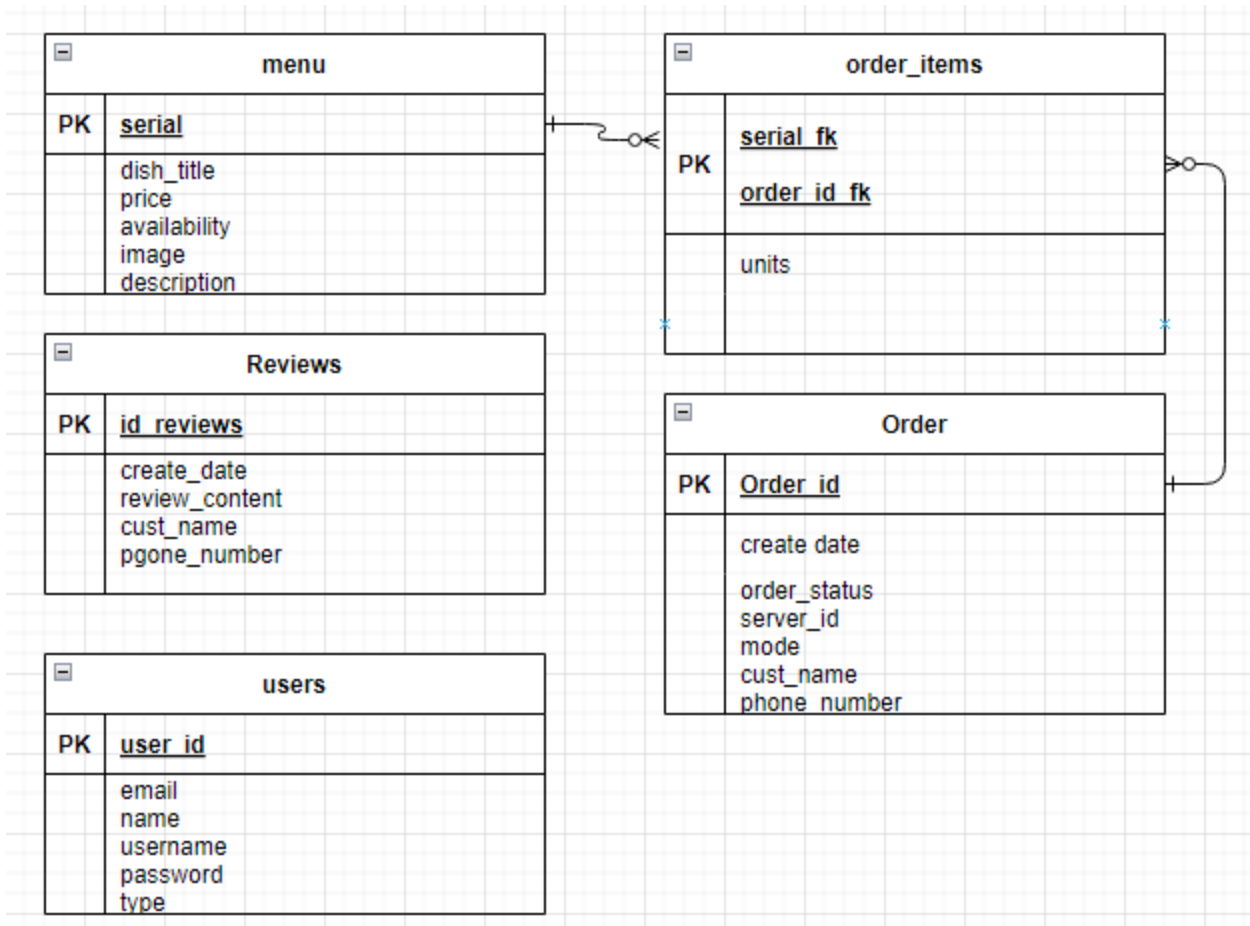
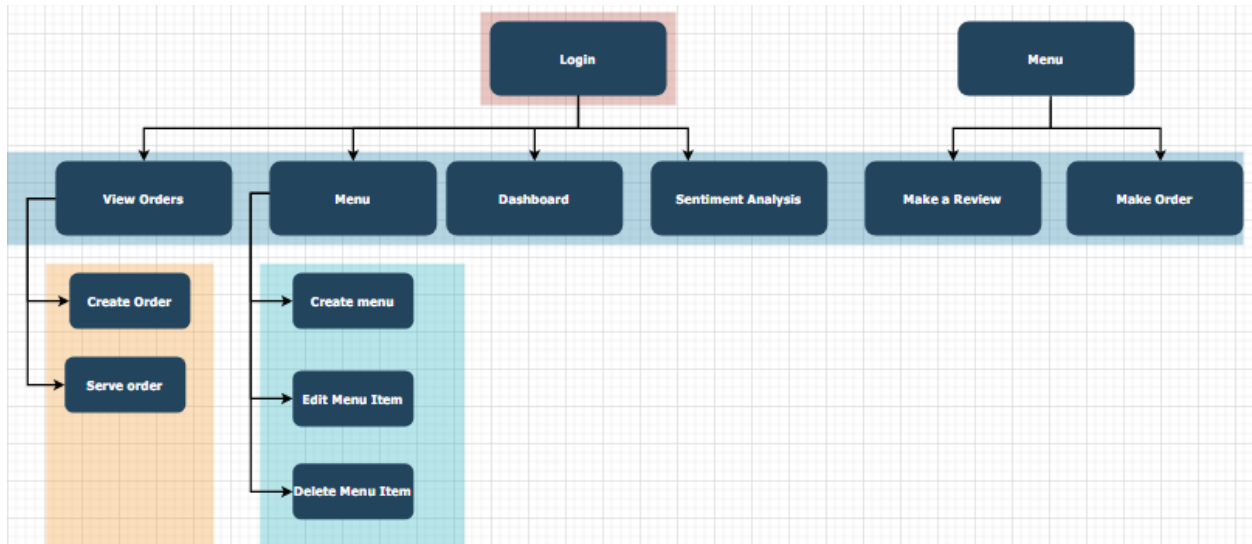


Figure 9: ERD for the new sytem

## 9.2 WEB APPLICATION

The web application provides an interface for input and output of data while also providing the business logic required to analyse and manipulate the data in the database. Below is a site map for the web application. Navigation for the hotel workers and the admin begins on the login page. Customers do not have to login, instead they are provided with a link to the menu which in turn provides a link the create order page and the make reviews page.



## **CHAPTER 10: PROCESS DESIGN**

The new system adopts features of the manual system but in an electronic format. The process begins with the starting of Apache HTTP server and MySQL Maria DB server using the XAMPP software. The business logic is written in PHP and this is interpreted by the XAMPP platform. The starting of HTTP server enables the running of the web pages and makes them available on the local host.

As shown above, the login page is the entry for both admin and workers while the menu page is the home page for customers. Customers are able to view the menu and if interested use a link provided to navigate to create order page which enables them to create and pay for order. On creation of an order, the admin and waiters are able to view details of order on the view orders page and from here have a choice to serve order. Orders can be in one of 3 status; pending, completed or cancelled. Every order not served at end of day is cancelled. The customer is also granted the opportunity to leave a comment on the system. The hotel admin has the ability to access dashboard to view performance and also perform sentiment analysis on the sentiment analysis page.

## CHAPTER 11: DATABASE DESIGN

The database used for the system is Maria DB on the XAMPP platform. The following shows a relational view of the database and the tables as created in the software. It also shows details of datatypes used for every attribute.

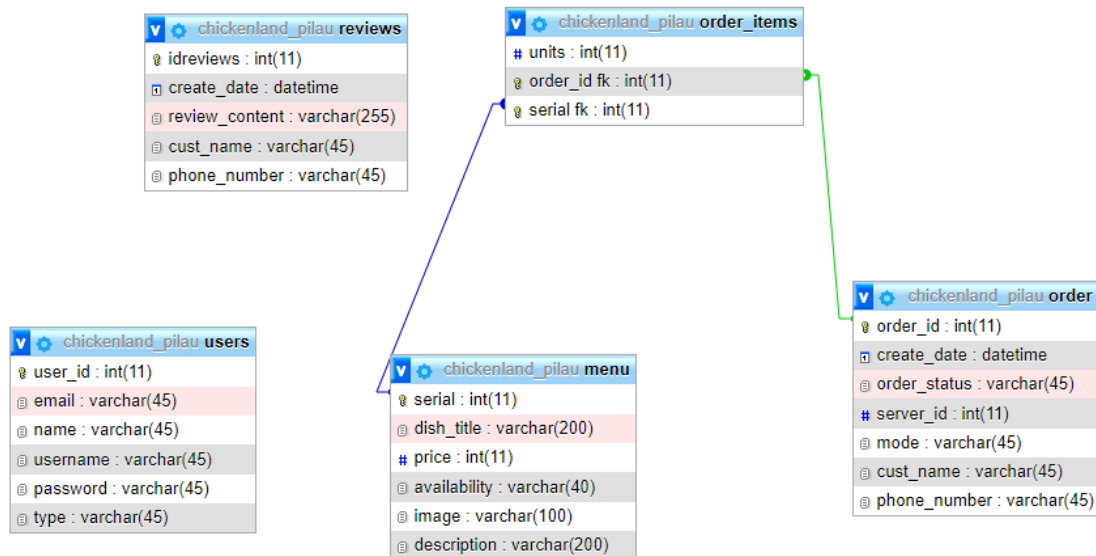


Figure 10: XAMPP snap of the database design

## CHAPTER 12: INTERFACE DESIGN

The interface design of the system follow the sitemap shown above. The following are some of the interface prototypes of the critical pages of the system

The web application has a dashboard as shown below:



Figure 11: user interface-dashboard

This is the page that is displayed to the admin on logging in.

The page to view orders is as follows:

The 'View Orders' page includes a 'Create Order' button and a filter section with 'Created From' (01/11/2022), 'Created To' (21/11/2022), and a dropdown for 'All' with a 'Go' button. The table below lists the orders.

Order No.	Date	Value	Customer	Contact	Status	View
80	2022-11-14 15:10:18	180	James	745200415	Completed	<button>Serve</button>
79	2022-11-14 14:53:48	300	James	745200415	Completed	<button>Serve</button>
78	2022-11-14 11:46:21	120	James	745200415	Completed	<button>Serve</button>
77	2022-11-14 10:16:38	150	James	745200415	Completed	<button>Serve</button>
76	2022-11-14 10:11:38	270	Louis	719440705	Completed	<button>Serve</button>
75	2022-11-14 06:28:37	90	Denice	114516980	Completed	<button>Serve</button>
74	2022-11-14 06:27:50	90	Lucy	707845386	Completed	<button>Serve</button>
73	2022-11-13 21:36:40	110	Peris	715323678	Cancelled	<button>Serve</button>
72	2022-11-13 21:35:27	120	Louis	719440705	Completed	<button>Serve</button>

Figure 12: user interface-view orders

The online menu is as follows:

## Menu

### Githeri



Served hot.

100

### Mahamri



Tastiest mahamri you'll ever have.

20

### Pilau



Take-away available

150

### wali



Spicy and non-spicy options

150

### Black Tea



Sugarless, customer to add preferred amount of sugar.

50

### Githeri



120

### Ugali



Served hot

120

### White Tea



Sugar to be added as per convenience

30

Figure 13: user interface-menu



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