

RESTAURANT ORDERING BILLING AND DATABASE MONITORING SYSTEM

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Abstract—Restaurant business is ever growing. There has been ignorance in technology when it comes to restaurants and hotels. During the peak business hours there is a lot of rush and the customers have to wait and are not served immediately. This traditional menu cards are monotonous, difficult to maintain and have to be updated or changed which is rather expensive. Therefore a solution to all such obstacle and to improve restaurants guest experience and exquisiteness of the restaurant establishment of Touchscreen Based electronic menu card is proposed which will be interfaced with Raspberry Pi an Embedded Linux board which wirelessly through Wi-Fi sends the order to the kitchen bypassing the intermediate. This system has a database which keeps track of the orders given by customers on each and every table. The business can be inspected by the owner of the restaurant remotely through the webpage which keeps on updating dynamically as the orders keep on coming. This system takes care of billing discrepancies or any kind of ill-practices that usually take place in the restaurants which are operated by owners remotely. This system is built on PHP scripting, MySQL as database, Twitter Bootstrap for front-end.

Keywords — *RaspberryPi(Rpi), Touch-screen, PHP(Hypertext preprocessor), MySQL, Twitter Bootstrap.*

I. INTRODUCTION

The population of the world is increasing at a huge rate which arises a need of restaurants and hotels. The restaurant industry is an ever green sector. But this sector has been away from the technological benefits. The restaurants become over crowded during the peak hours. Humongous number of people pour in the restaurant at times and due to limited number of waiters they have to wait for their turn. This leads to inefficient operation.

Now-a-days almost all the medium scale restaurants are operating on traditional paper based menu card system which is outdated in this 21st century. The waiters take the orders at the table and carry the KOT to the kitchen where it is processed. This KOT is a piece of paper which is taken to the kitchen where it may get spoilt due to the rush in the kitchen.

KIOSK based food ordering system is also one of the technologies in existence. There is a counter where the customers have to queue up for displacing their orders with the available menus present. The orders once placed the customer has to pay the bill according to the payment options available. Then a token number is given to the customer which is then displayed over the screen. Once the order is ready they have to collect it. This system is partially automated where the traditional menu cards are not required. But during the peak hours the customers have to stand in a queue for placing their orders.

QORDER is a wireless portable ordering system. This system works similar to the traditional menu card system but the only difference is that the waiter has a wireless tablet instead of pen and paper. This system sends the orders to the kitchen wirelessly through the Wi-Fi. This system faces the same drawbacks during the peak hours. The customers have to wait and call the waiters to note their orders. The paper menu card is still given to the customers.

II. OVERVIEW OF RESTAURANT ORDERING SYSTEM

2.1 Architecture of Proposed System

This system consists of Raspberry Pi which is an Embedded Linux Board which is interfaced with the HDMI Touchscreen Display which runs the digital menu card over it. The Rpi will be interfaced with a wireless Wi-Fi dongle which will wirelessly send the orders given by the customers to the kitchen and to the billing counter. These orders sent by the customers will be stored in MySQL database which is the central database of the complete system. The kitchen will have a LCD display screen plugged into another Rpi which will show the buckets according to their table numbers. The buckets will display the orders in the kitchen from the database. The billing counter will also have bucket for every table. Once the manager presses the bucket it will generate the

bill for that table number. The details of the architecture are given as below.

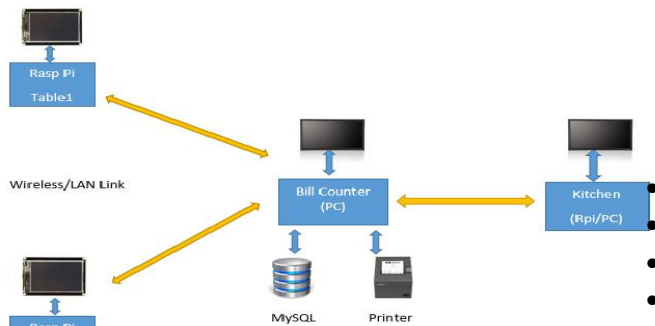


Fig.1 : Overall Ordering System

1) Raspberry Pi

In this system Raspberry Pi is used as core of this system. It mainly used as single board computer to be interfaced to the touch-screen. It is wirelessly connected to Wi-Fi and sends orders to the central MySQL database. It is small and compact in size and does not occupy a lot of space on the table.

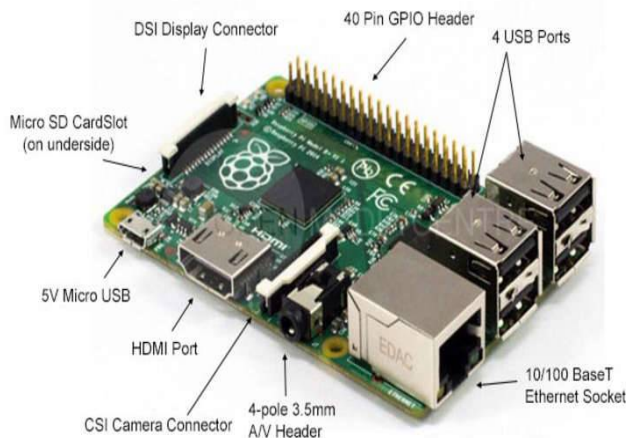


Fig.2 : Raspberry Pi

Main feature of Raspberry Pi are as

- Broadcom BCM2835 ARM11 900 MHz
- HDMI Video Output
- 4 USB Ports (Max Output 1.2A)
- Dimensions 85 x 56 x 17mm
- Micro-SD card interface slot to carry the OS
- 40 GPIO pins are available
- Ethernet port for internet connectivity

2) Touch-Screen

The touch screen used in this system is a wave share 5 inch which is interfaced to the Rpi using a HDMI interface. This touch screen completely fits over the Rpi and uses its 26 header pins to interface. It appears as a very compact ordering device which can be fitted over the table.

The main features of the touch-screen are as follows:

- Touch Panel Type: Resistive.
- Dimensions:121*78
- 800*480 high resolution
- Directly-pluggable into any revision of Raspberry Pi (only except the first generation)
- Driver is provided for the first and second generation Pi (works with custom Raspbian directly)
- HDMI interface for displaying, no I/Os required.
- Back light control to lower power consumption

3.) MySQL Database.

MySQL is the most popular Open Source SQL database management system. MySQL is a relational database management system. A relational database stores data in separate tables rather than putting all the data in one big storeroom. This adds speed and flexibility. This database is the heart of the system. All the orders sent from the customer table gets stored in this database. This database is installed in the system at billing counter.

III. IMPLEMENTATION OF THE SYSTEM

This system consists of the menu management which consists of three forms mainly those are Menu Master 1, Menu Master 2 and the Menu Rate Master. These forms are used to enter the details of all the dishes in the database. The menu master 1 form consists of all the details of the menu types available i.e. Indian, Chinese and Australian etc. The menu master 2 form consists of the details of the dishes available in the above category. For instance Indian consists of Paneer Masala whereas Chinese consists of Hakka Noodles. So all the details of the dishes of that particular category are entered in the database by using this form. The menu rate master form assigns the rate to each and every dish in the database. These three forms fill the details in three different tables in the database. These three forms generate a base for the digital menu card which is displayed over the touch screen. Any changes made in the database through these forms gets reflected dynamically on the digital menu card.

In addition to the above menu management we have two more forms which are the Table Master which gives the information of the credentials of the table such as the Table Id which uniquely identifies the table, the description of the table i.e. its location of table in the restaurant, the waiter assigned to that table to serve the food and the Employee Master which gives the details of the Employee Id and the details of that employee such as contact no, address etc. These two forms occupy additional two tables in the database.

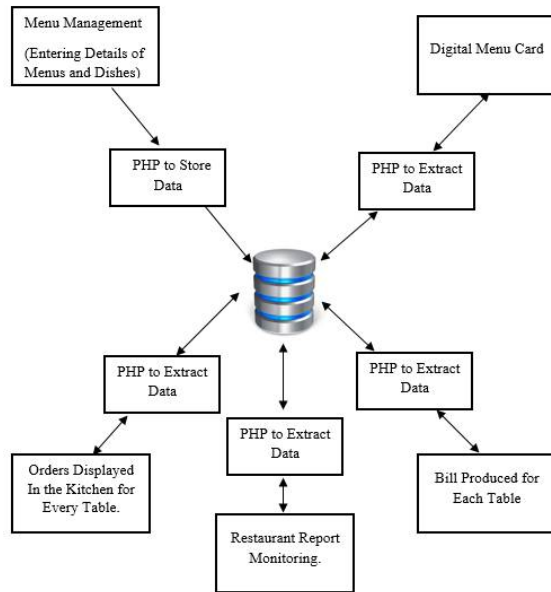


Fig.3 : Work Flow of the System

The above figure shows us the back end implementation of the complete system. As we can see the MySQL database is the central processing unit or the heart of the whole system. The menu management unit is the block which is used by the manager of the restaurant to add, delete, update or edit the menus in use. This data is then stored in the database using the PHP scripting. The information stored in the database is then extracted using the PHP scripting and then used by the digital menu card to display the dish items. Similarly when a customer orders from a particular table all the order details are entered in order detail table in the database. This table in the database consists of the Table id which shows the order arriving from which table. The menu codes which gives information about which dish has been ordered. The waiter id implies which waiter is serving that table. The quantity of the dish ordered and the rate of that dish.

These details from the order detail table is used then to display the orders to the kitchen using PHP. The same information is

further used to generate the bills for that particular table. The billing reports are also generated using this information.

As we are able to see in the figure below the manager is able to view the complete dynamic system wherein he is given all the access to the whole system. . The manager will also be able to view the orders sent by the customers in the kitchen the status of the orders whether confirmed or not he will also be able to view whether the sent order is kitchen processed or not. The manager will also be able to view the reports of all the orders and the business the restaurant is doing and the total collection of cash on that particular day.

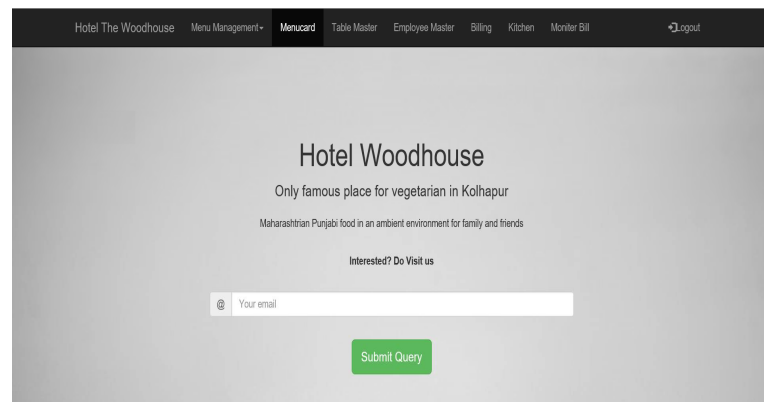


Fig.4 : Manager/Admin Login

The above design is done using Twitter Bootstrap which is a famously used front-end architecture for web development. The navigation bar at the top shows us the details of the options available for the admin.

The customers in the restaurant are provided with the digital menu cards which are logged in by the particular waiters serving the table. Once they are logged in they are presented with the digital menu card as shown in the following figure.

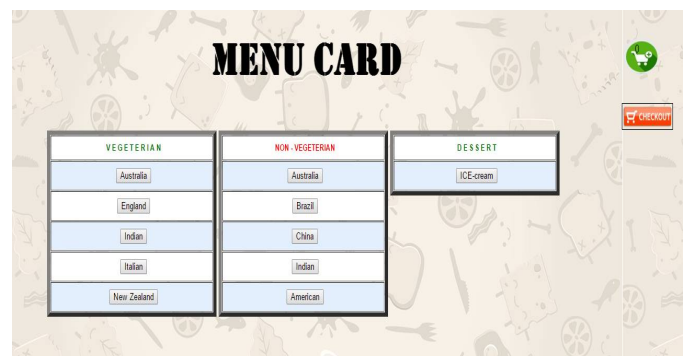


Fig.5 : Customer Login Displays Menucard

The digital menu card has the options as Vegetarian, Non-vegetarian and desserts. Various types of categories of dishes are shown in the above figure. When the customer clicks on these using touchscreen they will be presented with a pop-up which will have the details of the dishes available in the restaurant. The pop-up is as shown in the following figure.

All	Size	Menu Name	Unit	Rate	Quantity
	1	matan	F	100	
	2	Chicken Kurma	F	100	
	3	Chicken Kurma	H	50	
	4	Chicken Hyderabadi	F	200	
	5	Chicken Hyderabadi	H	100	
	6	Chicken Malai	F	200	
	7	Chicken Malai	H	50	
	8	Chicken Sukka	F	200	
	9	Chicken Sukka	H	100	
	10	Mutton Hundi	1	400	
	11	Tandoor Roti	1	20	

Add close

Fig.6 : Dishes Displayed on Menu Card

The above pop-up belongs to Non-vegetarian type in the Indian Category. This shows us the description of the dishes. The unit of the dish, rate and the quantity is to be entered. Once the add button is pressed as we can see in the fig5 at the right corner the bucket is present and that gets incremented according to the dishes ordered. Pressing the checkout button we can check the details of the dishes fallen inside the bucket. We can even edit the quantity inside the bucket or even delete the particular dish which we would not like to order. Once the order is confirmed the order is sent wirelessly to the kitchen and the billing counter.

IV. EXPERIMENTAL RESULTS

4.1 Kitchen Order Processing

TABLE No	TABLE DESCRIPTION	WAITER name
1	center front	Rahul

TABLE ORDER			
O O O O			
MENU Name	UNIT	QUANTITY	READY ORDER
Chicken Hyderabadi	F	1	Yes!
Tomato cheese	H	1	Yes!
Rio Vegano	H	1	Yes!
Bhindi fry	F	1	Yes!

Fig.7 : Kitchen Order Display

As shown in the figure below the chef in the kitchen when clicks on the bucket (button) corresponding to that particular table id he will be able to see the above description. This shows the description of the dish ordered, the quantity of the dishes to be prepared, table from where the order was placed and the waiter who will serve the table. The flag ‘O’ indicates that the orders are confirmed by the customers and if not it shows ‘N’. So the chef can start preparing the dishes accordingly. Once the dish is prepared the chef clicks the order ready which will update the order status flag to ‘K’ which implies that the dish is kitchen processed.

4.2 Order Bill Processing

*** BILLING ***

Hotel The Woodhouse
kolhapur

MENU name	UNIT	QUANTITY	RATE	TOTAL (Rs)
Chicken Hyderabadi	F	1	200	200
Tomato cheese	H	1	100	100
Rio Vegano	H	1	100	100
Bhindi fry	F	1	150	150
TOTAL BILL = 550				

Print

Visit Us Again

Fig.8 : Billing of Table 1

As seen from the above figure we are able to see the bill generated for the particular table no 1. The bill gives all the details about the dish ordered, quantity, unit rate for that dish and generates the total bill which is the sum of all the given amount which is to be paid by the customer.

Once the customer demands for the bill the bill is printed and presented to the customer. As soon as the manager click on the print button all the order details from the order detail table in the database will get copied to the order history which is another table in the database for generating the billing reports.

4.3 Billing Report Monitoring.

As in the below figure we can see the billing reports for the table no 1 and 2 and the orders displaced from those tables.

Date	Table Id	Menu Type	Sub Menu	Quantity	Rate	Total
2016-07-01	1	N	008	1	200	200
2016-07-01	1	V	004	1	100	100
2016-07-01	1	V	002	1	200	200
2016-07-01	2	N	006	1	200	200
2016-07-01	2	V	012	1	100	100
2016-07-01	2	N	002	1	150	150
						Total Collection:950

Fig.9 :Report of Orders Processed

The reports also gives the information of the total collection of cash on that particular day. The manager can also know the collection of the cash during a month by simply not deleting the records every day. The reports can also help the owner to know the how well the restaurant is performing on weekdays and weekends. The most important advantage of this system is that the owner will be able to spot any kind of billing discrepancies or ill-practices. This leads to very efficient operation of the restaurant whenever the owner is not present at the restaurant.

V. CONCLUSION

This is an accurate system when it comes to handling the orders in busy hours of the restaurant. The orders given over the touchscreen are accurate and there is no ambiguity when it comes to test the efficiency of the system. This system is using MySQL as server which is fast and scalable, so there is no doubt when it comes to real time processing of the orders. This system helps in avoiding any kind of malpractices performed by the staff in the restaurant. We get the reports for the billing every day and the owner can log in to the system to know the total collection of cash and verify accordingly. When compared to the other systems in existence the customers have to wait for the waiters to arrive at their table. The waiters need to be trained for using the tablets in addition the conventional menu cards wear out or need to be updated every time which involves lot of investment. This system can be implemented in small

restaurants which get crowded at peak hours and need a real time smooth operation.

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