

Restaurant Automation

Report 1 - Part 1
February 5, 2017

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Table of Contents

Customer Statement of Requirements	3
Customers don't have a way to express feedback regarding their experience	3
There is a communication issue between ...	4
Managing customer checks both efficiently and in an organized manner	4
Inefficiency with table management & cleaning	5
Splitting checks & generate bills	5
Wasted time in relaying the order to the kitchen	6
Prioritizing and managing the flow of orders in the kitchen	6
Managing and keeping track of all the raw materials in the kitchen	7
Planning the menu and activities for the day	7
Cleaning dishes	8
Glossary of Terms	8
Technical Terms	9
User Stories	10
Waiter	10
Customer	10
Host	11
Busboy	11
Manager	12
Chef	12
Markup Floor Plan	13

Customer Statement of Requirements

Running a restaurant with pen and paper in the age of technology is getting very inefficient. In order to keep up with the competition and take advantage of the opportunities provided by new technologies. We would like to have a system that will integrate all the employees and allow for seamless tracking of each task. Automation decreases cost by hiring less people and helps to remove the human error that causes customer dissatisfaction.

Customers don't have a way to express feedback regarding their experience

Sometimes our customers may have a bad experience at our restaurant that can lead to a loss of customers. If we are aware of such negative experiences, we can prevent them from occurring in the future, thus increasing customer satisfaction. Currently, submitting complaints at our restaurant comes at a cost of time to both the manager and the customer. Usually, our customers do not want to go out of their way to waste time submitting a complaint. Moreover, spending time attending to customer complaints comes at an inconvenience to the manager because he or she must temporarily stop overseeing restaurant operations.

Imagine a full time employee at an office decides to take their one-hour lunch break at our restaurant across the street. The customer arrives at our restaurant, waiting to be seated. A waiter unwelcomingly greets the customer. Usually, such an incident would not be worthy of complaining about to the manager. The customer is seated, and the waiter takes the customer's order. The food arrives, but the customer receives the wrong item. The waiter sighs and brings the food back to the kitchen. Fifteen minutes later, the customer's food finally comes out. After finishing his/her food the customer pays the bill and leaves the restaurant in a hurry because they had to go back to work. The customer was unable to give the restaurant's manager feedback about the poor service they received and most likely wouldn't go back there to eat.

We would prefer a solution that would allow us to easily receive customer feedback without coming at a cost of time to us or the customer. Also, we would like to be able to view and save customer feedback for personal records to prevent any feedback from being missed.

There is a communication issue between the host and the customer to notify the customer when he or she can be seated

When customers arrive at our restaurant, they want to spend less time waiting, and more time dining with their friends and/or family. During busy hours, wait times can be as long as one to two hours long, meaning that the lobby will be crowded. In such circumstances, it is difficult for the host/hostess to notify a customer that their table is ready above all the noise and ruckus. Miscommunication errors can lead to inefficiency in the seating system, thus increasing overall wait time and customer unhappiness.

Assume a family of six people visit our restaurant at 6PM on a Friday night to enjoy a family dinner. The family enters the restaurant and the host informs them that the wait time will be one hour and 30 minutes to be seated. The family decides to take advantage of the long wait time by visiting the mall across the street. One hour later, an unexpected amount of tables were vacant, making room for the family of six. Unfortunately, the family was not present at the time they were at the top of the queue. The host spent 5 minutes looking for the family of six, unable to find them. As a result, the host assigned the table to the next customers in line. The family arrived 10 minutes later, only to learn they had to wait an extra hour.

We would prefer to have a system that will let us contact our customers when there is a wait time. The customers should be able to keep in contact with us to know if they would like to keep their reservation.

Managing customer checks both efficiently and in an organized manner

Using the old fashioned system to generate bills and keep records is cumbersome, inefficient, and unorganized. The current system requires our waiters to manually calculate subtotals for a customer's bill, which can be time consuming and prone to errors. Moreover, keeping records of all checks for future references requires extra work and responsibility for the manager of our restaurant.

Imagine a party of 15 walks into our restaurant, and they order a lot of food. When it comes time for the bill, the waiter has to start manually adding up each order to get the total for the bill. This can take quite some time because the waiter has to make sure the bill is accurate. After the bill is paid, the waiter adds the bill to the daily stack of bills which will then need to be logged.

One possible solution that could help us solve this is a system that will help us remove the manual calculation of bills and store the data on a computer. This will help save time for both the customer and the restaurant.

Inefficiency with table management & cleaning

A common problem we find in our restaurant is the inability to keep track of unoccupied or dirty tables, which leads to inefficiencies in seating our customers. This means we lose potential revenue because our customers experience longer wait times and are not satisfied.

When a customer comes into our restaurant they first approach the host to be seated. The host has to look at the whiteboard and see which tables are available and seat the customer(s) accordingly. At busy times in our restaurant, the customer may have to wait a significant amount of time for a table to become vacant. However, the wait time is longer than it should be because the whiteboard doesn't get updated instantly when the busboy cleans the table.

A solution we believe would solve this problem is to have a system that allows us to view the dining area in realtime. It would display when tables are vacant, occupied or dirty using different colors and patterns to distinguish between the three statuses. This would allow us to view instantaneous updates about the status of the table and decrease wait time and increase customer satisfaction, when compared to the traditional whiteboard method.

Splitting checks & generate bills

When parties finish their meal, there are instances where they forget to mention splitting checks in the beginning and inform the waiter of splitting checks when the total check has already been calculated. In such a case, the waiter would have to ensure the orders of each individual and split the checks accordingly. In such a situation the waiter would have to go back to the cashier and inform them to print individual checks for each customer. Situations like these usually become a hassle for both the waiter as well as the customers. This leads to customer dissatisfaction, adds to the wait time of the customer(s) which in turn makes that table unavailable for a longer period time for the next customer(s).

A possible solution to this should allow us to split the checks whenever necessary, so this way we don't end up wasting time and resources and can seat the incoming party as soon as possible.

Wasted time in relaying the order to the kitchen

In our restaurant, the waiter has to jot down the order on a notepad for the kitchen and take a carbon copy to the cashier. This is very inefficient in the sense that the waiter will have to make multiple trips between the table, kitchen and the cashier. Doing so for multiple tables, takes away time from serving our customer's needs. The kitchen notifies the waiter when the order is ready by ringing a bell, but the waiter is not going to know whether the bell was rung for his order or a different one. This wastes the time of our waiters and causes them to run around for no reason. Also, we had previously lost or damaged the paper copies. Sometimes we have issues reading the waiter's handwriting.

A possible solution is to make this entire process electronic. The waiter could take the order on a tablet or some device instead of jotting down on a notebook. Then, the order could be sent electronically to the kitchen and the cashier. Also, the same system could notify the waiter when his order is ready. We think this would really decrease the amount of trips to be taken by the waiter. Moreover, we think it would be easier for us to process the bills.

Prioritizing and managing the flow of orders in the kitchen

Our kitchen is typically a chaotic place. Most of chaos results from us having to keep track of all the orders and which of our waiters they can from. However, not only do orders have to be served in a first-in first-out fashion, but the time of delivery made needs to dynamically change based on multiple factors such as: fairness (did one table get both their appetizers and entrees, while another table who arrived at the same time got nothing?), is our restaurant having a slow day and they want to keep as many customers in the restaurant as possible to appear "busy", does a customer want their food to be held until they finish their appetizer?, and etc. Thus managing the kitchen is more complex than simply queueing up orders as they come. That's why adding automation can create order in our kitchen.

A solution we believe would solve this problem is to have a system that automatically keeps track of orders as they come in. However, in our restaurant the orders that come first are not always the orders that get dished out first. We would need to have multiple order queues to make sure all tables get the food in a fair manner (appetizers come first, etc...). We would also like the system to automate the delegation of tasks (which cooks cook what). These multiple queues would also be help for customers that push orders back; they should be put behind other orders that have not been dished out yet.

Managing and keeping track of all the raw materials in the kitchen

Our restaurant has problems with tracking raw materials in the kitchen. We usually order the raw materials for the next week so we receive them on Sunday before the week starts. Since we can't know exactly how much we will use, we order more than required and throw away extra materials at the end of the week. We lose a lot of money and materials because of this. We tried to keep track of the raw materials every day by noting them on paper. But, our cooks found it difficult to note down what they used while cooking. Sometimes we were wrong with our estimate and we ran out of materials during the week.

We would like a solution that electronically deducts materials whenever the cooks finish an order. Then, the system could notify us to if any materials are running low, so we could order them on the go.

Planning the menu and activities for the day

Many restaurants plan activities the night before to streamline cooking for the next day. This allows them to serve more customers and reduce the waiting time for customers to receive their food. A lot of restaurants do not plan these activities properly or allocate enough time to finish them the night before. Hence, this reduces productivity next day and increases stress and unhappiness in the kitchen. Moreover, this might directly affect the revenue of the restaurant and decrease customer satisfaction.

A solution is to combine the planning activities with the cooking activities, so that planning for the next day happens concurrently with serving customers. This solution might work because the planning activities can be completed when the restaurant might not be busy. Also, this simplifies managing the kitchen for the Chef by allowing one system to assign activities for the cooks.

On many days, we are unprepared for cooking items in the kitchen because we did not prepare the required materials properly the day before. We would like a solution that will help us properly prepare the required materials for the next day to improve the efficiency in our kitchen.

Cleaning dishes

Busboys in our restaurant perform two main tasks: clean tables and clean dishes. They have to be in both the kitchen and the dining area and it causes a lot of running around. It is also hard for the chef to find a busboy to clean dishes. This decreases the efficiency of the chef because he needs to be in the kitchen to manage the cooks. Some restaurants mitigate this problem by having some busboys stay in the kitchen as dishwashers. However, this is an inefficient solution because the dishwashers are not needed when there are no dishes to be washed and the busboys don't need to be in the dining area when there are no dirty tables. Moreover, this requires us to hire more people for this solution.

We would like to have a system that will tell the busboys when the dishes or tables need to be cleaned. The chef's should be able to contact any of the busboys that are free. Overall we want less clutter in the dining area and kitchen.

Glossary of Terms

Manager - Responsible for managing employees, overseeing the daily operations of the restaurant, and ensuring profitability of the restaurant.

Kitchen - The area where the chef(s) cooks and prepares food. Also, the busboy(s) transports and cleans dishes in this area.

Chef - A professional cook that prepares food for the restaurant.

Customer - A person that purchases food or service at the restaurant.

Waiter/Waitress - Responsible for taking orders and completing requests for customers to ensure customer satisfaction.

Host/Hostess - Manages the restaurant lobby and makes seating arrangements for customers .

Busboy - Cleans dishes and clears tables for the restaurant.

Dining Area - The area where customers eat their meals.

Cashier - A waiter responsible for completing customer transactions.

Split Check - A check that is customized based on all the items purchased by one individual.

Lobby - The area where the customer checks into the restaurant and waits for a table.

Technical Terms

Graphical User Interface - A visual interface that allows workers at the restaurant to interact with the system

Order Queue - lists out food orders to the chef based on first come first serve

Database - A storage device that archives daily restaurant sales, inventory, and feedback.

Floor Plan - An interface that is used to show which tables are currently busy, free ,or dirty.

Notification - A way to alert employees so they can run the restaurant more efficiently.

User Stories

High (core) Priority

Medium Priority

Low Priority

Waiter

Identifier	User Story	Size
ST-W-1	As a waiter, I can remotely send customer orders directly to the chef	6
ST-W-2	As a waiter, I can choose to split the check multiple ways or generate one check.	5
ST-W-3	As a waiter, I can receive notifications when the food is ready for my table.	4
ST-W-4	As a waiter, I can receive notifications when a table requests my assistance.	3
ST-W-5	As a waiter, I can see how long each order will take approximately based on the data collected from previous orders.	5

Customer

Identifier	User Story	Size
ST-C-1	As a customer, I can remotely make a reservation at the restaurant.	4
ST-C-2	As a customer, I can receive remote notifications that indicate when my table is available.	2
ST-C-3	As a customer, I can alert the waiter to request assistance.	3

Host

Identifier	User Story	Size
ST-H-1	As a host I shall be able to see a floor plan of the dining room with which seats are available.	7
ST-H-2	As a host I shall be able to mark tables as reserved or available.	3
ST-H-3	As a host I should be able to see real time updates of the expected time a table should be done.	6

Busboy

Identifier	User Story	Size
ST-B-1	As a busboy I shall be immediately notified when a table needs to be cleaned	3
ST-B-2	As a busboy I shall be notified when I should go to the kitchen to clean dishes	3
ST-B-3	As a busboy I shall be able to mark tables as cleaned	2
ST-B-4	As a busboy I shall be noticed when to bring more refreshers to tables.	3

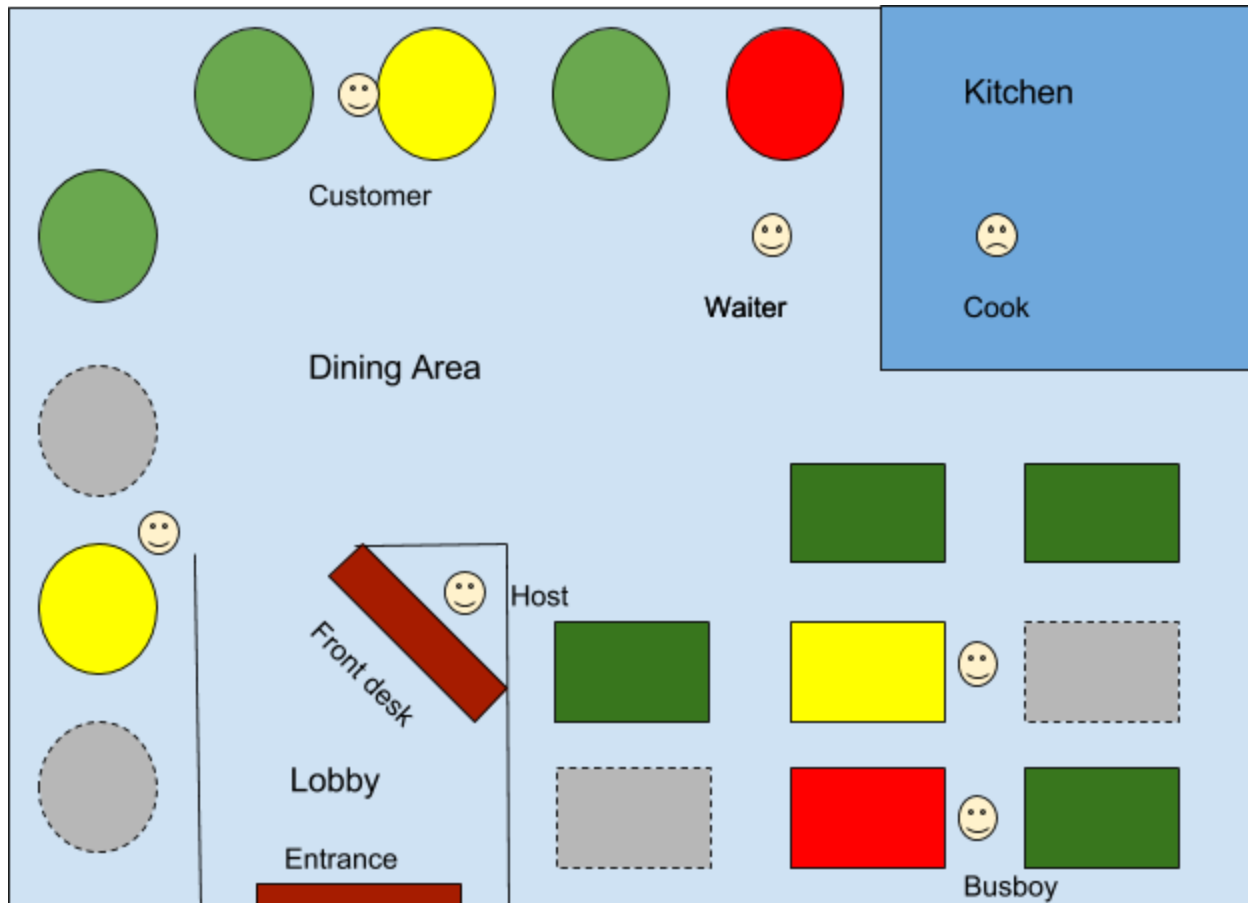
Manager

Identifier	User Story	Size
ST-M-1	As a manager, I can see the status of every item in the inventory. Such as if an item is running low, it will give me an indication.	6
ST-M-2	As a manager, I can modify accounts and permission for each employee and add or remove new ones as necessary.	5
ST-M-3	As a manager, I can view all the transactions that took place in a given day.	3
ST-M-4	As a manager, I can view statistics on the sales in a given day.	4





Chef

Identifier	User Story	Size
ST-CF-1	As a chef, I can view orders that have been placed by the customers	4
ST-CF-2	As a chef, I can notify the waiter that the order is done	4
ST-CF-3	As a chef, I can manage the inventory, and notify the manager when items are running low	7
ST-CF-4	As a chef, I can prioritize and manage orders in the queue	6
ST-CF-5	As a chef, I can view the status of each table	3
ST-CF-6	As a chef, I can alert the busboy to clean the dishes	2
ST-CF-7	As a chef, I can make the use of raw materials more efficient using the data from the system	7
ST-CF-8	As a chef, since I pre-make dishes, I can get information on the most popular dishes of the past day, so I can decide which dishes to prep before tomorrow's opening.	6

Markup Floor Plan



Legend:

-  Available Table
-  Occupied Table
-  Dirty Table
-  Reserved Table

**All team members managed the
project equally!**