

Report #1: Part 1

ChefBoyRD

Restaurant Automation

GROUP #6:

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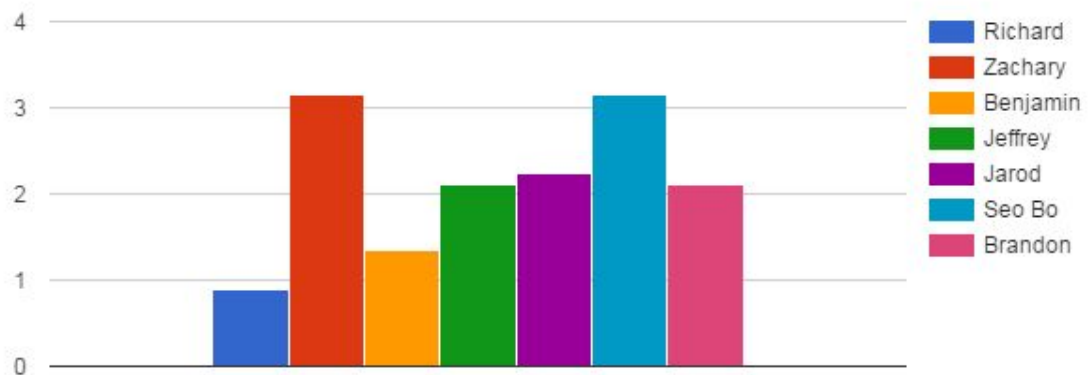
<https://github.com/ZacBlanco/ChefBoyRD>

Individual Contributions Breakdown

Responsibility Matrix

		Richard	Zachary	Benjamin	Jeffrey	Jarod	Seo Bo	Brandon
Project Management	10							
Customer Statement of Requirements	9	10	25	15		15	35	
System Requirements	6		15		35	15		35
Functional Requirements Specification	30							
User Interface Specs	15							
Domain Analysis	25							
Plan of Work	5							
Total	100							

Responsibility Allocation



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1. Customer Statements of Requirements

a. Problem Statement

As an established restaurant, we wish to incorporate more technology to help run the restaurant more smoothly and to help us compete in the saturated restaurant market. Our understanding is that with the help of technology we are able to track information on large scales. The broad problem that restaurants like us face is creating meaningful contextual relationships using this information, which can be analyzed to improve the restaurant greatly. More specifically, we would like to focus on a software application that will address some specific problems. The problems we would like to address are improving the customer experience, increasing the efficiency of running the restaurant and bringing more customers, ultimately leading to the financial success of the restaurant.

PREDICTING INGREDIENT USAGE

Chef:

As a chef, one of my responsibilities is gauging the amount of food that needs to be prepared for a typical day. This plays a crucial role in the day-to-day operation of a typical food business. As the restaurant gets busier throughout the day, our kitchen has to predict which dishes will be ordered and begin preparing them in advance to keep up with customer demand. However, if we predict incorrectly, we risk preparing too many dishes and wasting both time and money with the wasted dishes. According to the NRDC, approximately 40% of food gets wasted, and a major contributor to that number is restaurants.^[1] Our kitchen can attempt to prepare fewer dishes, but if we get too much business and have not made enough dishes, our customers will have to wait longer to receive their orders. This makes customers unhappy and discourages them from returning to our restaurant in the future.

With prior experience, it is possible to predict (to a certain degree) which dishes and how much food should be prepared from day to day. However, this method is very prone to error for even experienced chefs. A system that can analyze our restaurant's metrics and order histories would be extremely useful, as it will use this data to determine the amount of food we should prepare for a given day. This would not only reduce our restaurant's waste but also increase our profit margins. This allows us to invest more into our business and make our customers and employees happier.

For chefs who are constantly busy around the kitchen and preparing food we would like this predictive system to not only be available within the software application, but also available to use and communicate with through a voice-activated service such as Amazon Alexa. Being

able to use this service through Amazon Alexa's voice services the chefs will be able to work in the kitchen, while receiving updates and predictions from the service on the day's food production. It should be able to provide the same type of estimates or similar to the ones available by the software application.

Manager:

We would like to reduce waste and excessive use of ingredients, and what would help is we can view exactly how much of each individual ingredients were used over different time spans. With the aid of this system, chefs can more accurately estimate the ingredients needed on a particular day, expediting the food preparation process and minimizing the waiting time for customers to receive their orders. We would like the application to give us detailed analyses and reports about the restaurant's order history over the course of days, weeks, months or years. We would like the application to display order history information in an easy-to-view format, such as dashboards with graphs and charts. This system is also helpful for me as a manager so that I can understand the day-to-day performance and long-term trends of the restaurant. The ability to see this data helps me determine overall business trajectory and make informed decisions to keep the restaurant financially successful.

We would also like the application to use the accumulated data to give the chef an estimate - an actual number - of the type and quantity of specific ingredients that are required throughout a typical day. The estimates should be able to tell how much of certain ingredients will be consumed within certain hours of business operation. Ultimately, the quantities for food preparation will be determined by the chef, but the system's estimate should serve as a general benchmark from which the chef can base his decisions.

Overall, this should result in a more efficient use of food resources, especially with time-sensitive ingredients. It can also allow us to prepare food in advance with more time-fragile, but fresher, ingredients.

We do however recognize that one of the drawbacks of using the predictive software is the lack of reliability in its initial stage due to insufficient data. Therefore, we would like the system to provide a simple interface to allow us to sync our historical records from our existing POS system to the new one. This way, we can quickly get the prediction software running as best as possible. This preliminary step of obtaining data is extremely important because a predictive software that is unreliable for the first few weeks or even months is highly undesirable.

Overall, this system can help us serve our customers faster by telling us how much food to prepare at a given time. This system will also allow our business to waste fewer ingredients, resulting in greater profits for our restaurant. Our managers will also be provided with a clear and simple visualization of their restaurant's financial status to make their own analyses and business decisions. Eventually, the profits from this system can be invested back into our business to provide higher quality ingredients, higher employee salaries, or even lower prices for customers.

CUSTOMER FEEDBACK

Waiter:

Customer feedback is very important in how I'm presenting myself to my customers. Some nights I receive awful tips, or no tips at all and I have no idea why this is the case. Though every customer is different, if I had some concrete feedback to work with, I could improve my customer service skills or communicate any problems to the management. Different customers use different signals to get my attention when they want something. Usually people will wave me over or call out when I pass. Sometimes when the customer thinks that I am being inattentive or am ignoring them, it is just that I didn't recognize that the signal they were using indicated that they wanted my attention. If people communicated more details about their expectations and the signals they used instead of simply rating the service as excellent or poor, it would allow me to learn these new signals and prevent me from repeating my mistakes.

Chef:

When I test new dishes, it would be very helpful to know if people like them. It's never easy to find out what exactly the customers are thinking, but if people are leaving unhappy or are absolutely raving about my dishes, they usually make their opinions clear. My waiters and the manager already do a good job of communicating what the customers think about my dishes, but it would be nice to have something concrete to work with.

Customer:

The waiter usually asks us to complete an online survey about our experience when we receive the check. The website is written on the receipt, and there are usually prizes, but I've never actually completed one. Entering the website on mobile is cumbersome so I prefer to respond on a home computer. However, by the time I've gotten home I've usually forgotten about the receipt. Sometimes going to a restaurant isn't the last thing I do while I am out and I don't remember the details about my dining experience by when I return home I would be happy to offer my opinion if the restaurant provided a solution so that customers could take the survey before leaving the restaurant.

Manager:

A critical task that I have to perform as a manager is finding the source of problems that I see. If the restaurant is only half-full on a Friday night, I have to find the cause behind the problem. Could it be an employee? Is there something wrong in the kitchen? This is where customer feedback is useful, where I can learn the perspective of the customers and act

accordingly to find solutions. In fact, it would be even more helpful to have contextual information about a specific feedback. Who was on shift during this time? What did they order?

I need to have improved methods of collecting feedback, because the current methods do not suffice. Verbal feedback is easy to understand, but difficult to quantify. Online surveys require patrons to visit a website and submit a specific form that restricts users entry. Though they are detailed, they are unpopular because they are so long!

Our previous implementation was to use a suggestion box, but the results were underwhelming. Very few customers offered suggestions and the results were disorganized. We have switched to an online form that requires customers to create an account to participate. To compensate for the added inconvenience, we provide incentives to respond. These prize rewards are also advertised on receipts. We have received more feedback as a result, but the increase in responses does not justify the cost of the prizes.

I want to improve the quantity and quality of the feedback collected, perhaps make feedback submission convenient to the customer and easily trackable. Then once I can receive the feedback, I have to make business decisions based on them and eventually report them to the restaurant's owner. Tracking feedback helps me by providing evidence for my decision-making process. If I need to justify my managerial decisions to the owner, it would be extremely helpful to have supporting data, such as the customer feedback.

I also want to make sure that feedback is sincere and addresses a problem. I would like the ability to keep track of feedback and determine whether the feedback is useful or not.

If a customer is blatantly dissatisfied with a service, in my experience they usually communicate this directly to me or the owner. However, this situation can allow minor or subtle problems to exist undetected. What if customers have feedback that is not substantial enough to warrant calling me or a staff member over?

This could be something like: the table is wobbly, the light is too dim at times, the seats feel a little hard. Individually, these bits of feedback may not be important, but collectively they could make a difference. Some of these items may not be important in the big scheme of things, but making these subtle changes are key to providing an excellent customer experience that exceeds expectations.

TABLE MANAGEMENT

Hostess:

As a hostess, one issue that I constantly deal with is seating customers. Each table seats a different number of people and different-sized groups of people arrive all at different times. Updating this is a tedious, error-prone process, especially during peak hours when the restaurant is busiest. I want to be able to quickly assign people to tables, and change

Customer:

Long wait times at restaurants are inconvenient and annoying to deal with. There are times I've had to wait outside because there were too many people lined up inside the restaurant.

But that's what I always reserve my spot at restaurants now. I usually call in, or make a reservation online. Even then, I do get a wait time estimate but I can wait in the comfort of my home and plan accordingly. But some of these online reservation systems are not convenient at all, I have to enter my full name, address, credit card number, when I just wanted to reserve a spot. And there are times where after I reserve a spot and come into the restaurant, I find out that my spot wasn't reserved at all. It would be nice if I could be more confident that the online-reservation is working. A simple confirmation message with a generic message just doesn't do it for me.

Also, the waiting times are not very accurate and can be inconvenient. I'll be told that I have to wait an hour, then when I arrive on time, I'm told I have to wait another 30 minutes! It would be nice to see where I am in line, and how many people are before me.

Overall, I just want to ensure that I'm not wasting my time when I decide to eat out at a restaurant. I'd like to have short, accurate waiting times, with minimal errors in how I'm being seated.

b. Glossary of Terms

Chefs: A critical member of the kitchen staff who directs kitchen activities including food preparation, cooking, and presentation. Also responsible for creating new recipes.

Customer: A person who uses, or intends to use the services and products of the restaurant.

Customer Satisfaction: A measurement of whether a patron's enjoyment or satisfaction of the restaurant experience meets or exceeds standards. This is impacted by quality of service, food quality, wait time, and overall experience.

Dish(es): A complete food item produced by the kitchen staff.

Feedback: Information that signifies, to any level of detail, a positive, neutral, or negative response to products or services.

Food preparation: A process executed by the kitchen staff between the time the food ingredients are stored, and cooked.

Host/hostess: restaurant employee in charge of greeting customers at the door, and seating arrangements in general

Ingredients: The edible components of a prepared dish before being cooked.

POS (Point-of-Sale): A system that a modern restaurant may use to manage its customer orders, process them to collect payment, and send the orders to the kitchen. These systems often include the cash registers and monitors that employees use to enter in orders.

2. User Stories

Higher size values indicate a longer expected implementation time.

Role: Manager

Identifier	User Story	Size
ST-1	I can modify the menu based on inventory and customer demand.	6
ST-2	I can hire and fire employees with a valid reason	2
ST-3	I can find openings in the schedule and ask employees to come and work in those openings	4
ST-4	I can pull up economic information (net gain, net loss, revenue, expenses, etc.) at ease	6
ST-5	I can see who is working at the moment	2
ST-6	I can see the customer feedback on employees and dishes served	5
ST-7	I can request see the inventory that we currently have to make sure that we have enough ingredients and/or materials to continue the quality of service.	7

Role: Chef

Identifier	User Story	Size
ST-8	I can see a queue of orders waiting to be made and their special instructions	4
ST-9	I can change the ready status of a meal	3
ST-10	I can communicate to the host through their device	5
ST-11	I can record what dishes I made to track my performance	5
ST-12	I can update inventory levels so the menu can update and the manager can be notified	4
ST-13	I want to hear back from the customer about how the food tastes and was prepared.	6
ST-14	I can view customer feedback about the meals I prepare	6
ST-15	I can prepare the proper amount of ingredients for the restaurant at a certain time	10

Role: Host

Identifier	User Story	Size
ST-16	I can input the customer's order into the queue for the cook to see	3
ST-17	I can easily bring up the customer's bill and payment options	4
ST-18	I can mark a table to be cleaned after the customer has left	3
ST-19	I can check in reservations and waiting customers to update table availability	4
ST-20	I can change the customer's order to fulfill a	5

	special request to the cook	
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Role: Customer

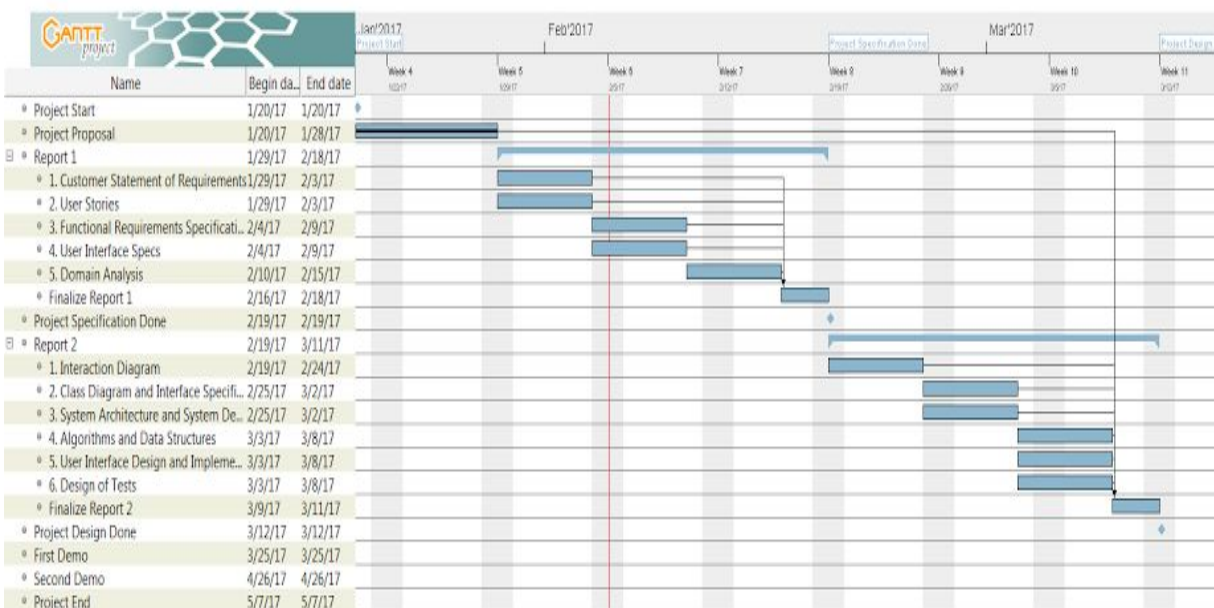
Identifier	User Story	Size
ST-21	I can reserve a table with ease	4
ST-22	I can cancel a reservation if something else happens without reason	3
ST-23	I can see a confirmation to make sure that the information that I provided for the reservation is accurate.	2
ST-24	I can be seated in a timely fashion when I arrive at the establishment	3
ST-25	I can order food that are on the menu without a problem	2
ST-26	I can modify the ingredients in the food if I have an issue with that ingredient (i.e.: allergies or distaste)	5
ST-27	I can see the status of my food after I have ordered it. Meaning that I can see when it is "ordered", "in preparation", "completed" and "served"	6

Role: Employee

Identifier	User Story	Size
ST-28	I can see my work shift and hours worked in daily, weekly, monthly, yearly format as well as wage.	1
ST-29	I can see who else is working at the same time that I will be working	3
ST-30	I should be notified when a table is requesting assistance	4

ST-31	I can take breaks at a set interval after working a certain amount of time	6
ST-32	I can request absence from work	1
ST-33	I can be notified food from the kitchen is ready to be served	1
ST-34	I can be notified when a table needs to be cleaned	1
ST-35	I can request assistance from other employees in case I am not sure about what I am doing.	3

6. Plan of Work



Short-term:

Subproblem A team - Richard and Zac:

Over the next few weeks, we plan to accomplish:

1. Implementing a configurable dashboard interface
2. Determine details of algorithm analysis for the predictive solutions

- a. Possible using advanced statistical techniques such as multivariate regression analysis, regression support vector machines, artificial neural networks, bayesian regression, or possibly even more.
3. Connecting the voice service to our backend.

Subproblem B team - Ben, Seo Bo, and Jarod:

Over the next few weeks, we plan to accomplish:

1. Implement basic text-message receiving system
2. Brainstorm possible parsing algorithms to analyze received text messages.
3. Design GUI of how feedback analysis will be shown of managers
4. Design basic feedback form

Subproblem C team - Brandon, Jeffrey:

Over the next few weeks, we place to accomplish:

1. Design a basic reservation form and customers can leave the necessary information
2. Implement a basic text message notification system
3. Design a server database model to hold and return required information
4. Brainstorm possible seating algorithms to efficiently seat customers
5. Create a savable graphical interpretation based on restaurant.

Product ownership:

Each team will be responsible for the following features and qualitative property of the subproblem solutions. Throughout the course of the project, the following teams will implement the following functional features and qualitative properties of our project:

Subproblem A team - Richard and Zac:

- A simple easy-to-use interface to view the restaurant business trends
- A predictive service to determine the amount of food that will be needed on a given day.
- An interface to create custom dashboards with analytics based on manager preferences
- Voice commands to report to managers and chefs.

Subproblem B team - Ben, Seo Bo, and Jarod:

- A convenient post-meal survey that customers can complete to provide restaurant feedback.
- Feedback submissions remain confidential via each user being given a unique non-identifiable ID
- Customer receive a confirmation of feedback entry. (maybe include some of the organizing data that was parsed)
- Manager receives a summary and analysis of the feedback included
- Send out notification of action from management to customers who provided relevant feedback

Subproblem C team - Brandon, Jeffrey:

- An efficient and convenient system that allows customers to provide information and reserve a seat.
- Server notification that the table is now reserved as well as text/QR notification that the table is reserved for a guest.

- Manager/Host will receive seating confirmation and reserve the seating to prevent walk-in customers from taking the seat.
- Queueing of walk-in customers depends on the size of the group that comes in, basically table size demand queue.
- Designing a webpage for reservation systems, which implements a graphical interface that allows customers to reserve seating with the knowledge of where they are sitting.

7. References

- [1] - "Statistics on Food Waste in the United States",
<https://www.nrdc.org/issues/food-waste>