VOICE BASED CUSTOMIZED E-MENU

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***Abstract*:** Importance of Automation cannot be undermined in human life. There are still some fields where more traditional methods are being used. The ordering system in restaurants is a such a field. Generally, in restaurants menu ordering system will be available in paper format from that the customer has to select the menu items and then the order is handed over to waiter who takes the corresponding order, which is a very time-consuming process. In this project we propose a fully automated ordering system in which the conventional paper-based menu is replaced by a more user-friendly touchscreen-based e- Menu card. A Wi-Fi based captive portal is placed at the restaurant with the help of which customers would be redirected to restaurant's network. In addition to the same, the project would also help the customers in customizing the ingredients considering their allergenic contents prohibited by their doctors. This would help the customers modify their orders more efficiently using voice commands too. Thus, automating the entire restaurant management.

***Key Words* - Wi-Fi, captive portal, e-Menu, customization, voice commands.**

I. INTRODUCTION

Time is paramount in the current age of business. Increasing use of technology for effective time utilization and decreasing load of manpower is need of the hour. Absence of intelligent stratagem in restaurant industry has led a downfall in the business of the same. Technology nowadays isn't just essential in any business but also differentiates them from their competitors. Use of machinery can not only help any organization achieve more but can also help the clients ease their experience. Creativity and innovation in the field can be considered a crafty but underhanded deception. Casting this type of automation in the food industry would make a drastic change in the quality of service provided. An increase in allergenic conditions in the modern era due to a variety of reasons mainly due to the allergic foodstuffs is a considerable point to be noted. The current scenario of restaurants is that, modification of recipes by the customers is quite complicated. Now the mindset of people stands at a place where they consider themselves falling prey to various allergic situations due to various ingredients in the recipes. The paper proposes an efficient way with which the customers would be able to customize the ingredients in their recipes. Now this would help them order without any worries about the ingredients as they can swipe in and off their likes and dislikes. Using such a technology in the restaurants would definitely escalate their business experience by avoiding human errors caused by conventional use of paper-based systems. The system is primarily bifurcated into modules like user module, menu module, customization module, voice module and order module, with the order module being subdivided into delivery, take-away and dining modules respectively. Customers can effectively place their orders while at home. The captive portal equipped at restaurant would redirect the customers to its network. Charging into this network would succor the individual in ordering their food while at the restaurant. With the integration of voice module in this system, customers can use voice commands to initiate the service. It is with the restaurants to set a range of delivery. Implementation of such a system in this industry would help customers in efficiently customizing their order as per their requirements.

II. LITERATURE REVIEW

The following research articles are selected for review, keeping in mind the traditional and conventional approaches of restaurant systems:
Ravi et al. traditional ordering methods are the methods in which customers specify what they want to the waiter who takes the order on a paper. Personally, he then takes the order to the ordering department [1]

Karan Kaushal et al. worked on a mini restaurant with 3 tables. It consists of a webpage for placing the order, a robotic waiter which will then serve the order and an automatically moving trolley. The serving may be singular or multiple depending on the readiness of the order, the food will automatically come out from the inside of the robot once it reaches the customer's table, using a webpage is considerably handy but generalizing the technique for hotel industry where human interaction is common avoiding the robotic staff and using the technology for unique need of the customers. The use of the robotic waiter and staff would increase the maintenance thereby increasing the human dependency. [2]

Raviprakash Shriwas et al. worked on Touchscreen Based Ordering System for Restaurants where he proposed self-service or self-ordering systems in restaurants refer to the restaurants taking order from customers using technologies such as the internet, kiosks and many others. Usually the users prefer self-service because of speed and convenience in making order and transaction

while minimizing the miscommunication [2014]. A touchscreen along with GLCD will be placed on each table. Now the GLCD will act as a menu card displaying all the items available in the restaurant but this is will increase the expanses of the restaurant instead providing Wi-Fi and letting the customer use his/her mobile phone for ordering will increase comfortability. To simplify the ordering process addition of voice command will change the scenario. [3]

III. PROPOSED SYSTEM

The traditional restaurant industry stands quite inefficient in delivering the needs of digital era. Since the pen-paper based ordering system is erroneous, digitalization of the ordering system is a boon. With the introduction of e-Menu the manual calculation is avoided and hence human error is reduced. We propose easier use of e-Menu with voice integration and smart search bar. Web application (Web app) or rich internet application is website that does more than displaying content, it has a business logic. It is intended for user interaction performing actual business functions. Compared to the website which is mostly informative and static at times web application is interactive and provides a richer user experience and reliability. Earlier website development language like PHP is prone to higher risks of security breaches, is not suitable for larger application, has an implicit conversion which may surprise unwary programmers and lead to unexpected bugs. The framework has poor error handling methods and the technology is helpless in supporting a large number of apps. Hence our project rather than being implemented on preprocessor like PHP, it is been developed on a framework by JavaScript which is used for building user interface and single-page application called Vue.js. Conventionally MySQL is used which is an open-source relational database management system instead we are using Firebase Realtime Database which is a cloud-hosted NoSQL database that lets you store and synchronize data between your users in real time. Captive portal has been used in system which forces the user to accepts the terms of using the network provided along with redirection the intended destination of site. To ease the usage of the provided service addition of the voice-based ordering along with customization of the recipes have been introduced.

Following are the modules of this system:

a) Authentication Module

In this we have added authentication of the user by making them signup to the system so that they could login and this helps them to choose form the available options of the menu, usage of the firebase will have in easier implementation of the authentication process thereby increasing the speed of this process.

As the captive portal will redirect the user of the available Wi-Fi network to the intended site to accepts the terms and condition of usage of the provided network. User can surf the Web app without logging in to the system but for ordering and confirming payment the user has to login.

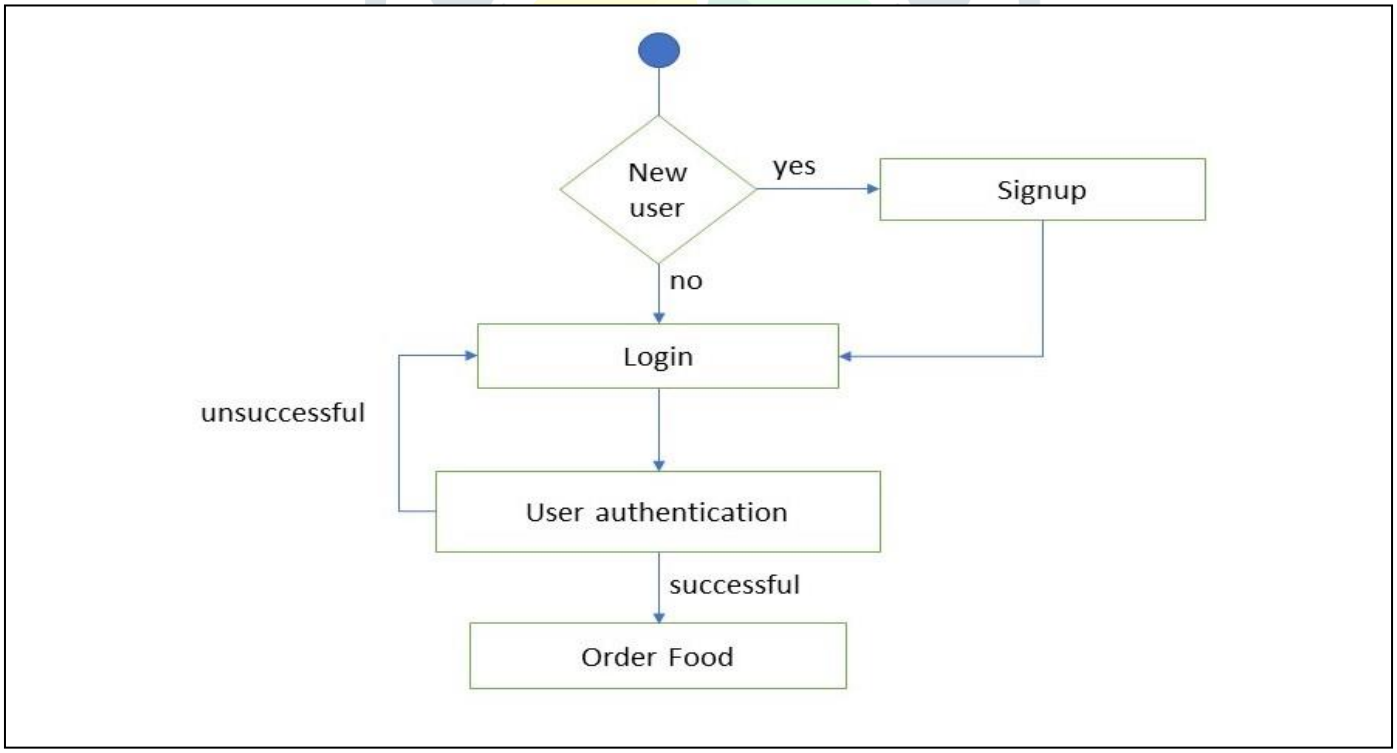

figure 1. authentication module.

b) Voice Module

This proposed system uses personal systems and mobile equipped with microphones, speakers and JavaScript enabled browsers to convert the speech-to-text using the Node Package Manager (NPM) which is a default JavaScript package manager. The package manager is used for runtime environments for Vue.js which is a part of Node.js. The flow of Speech Recognition is as shown in Figure 2.1.

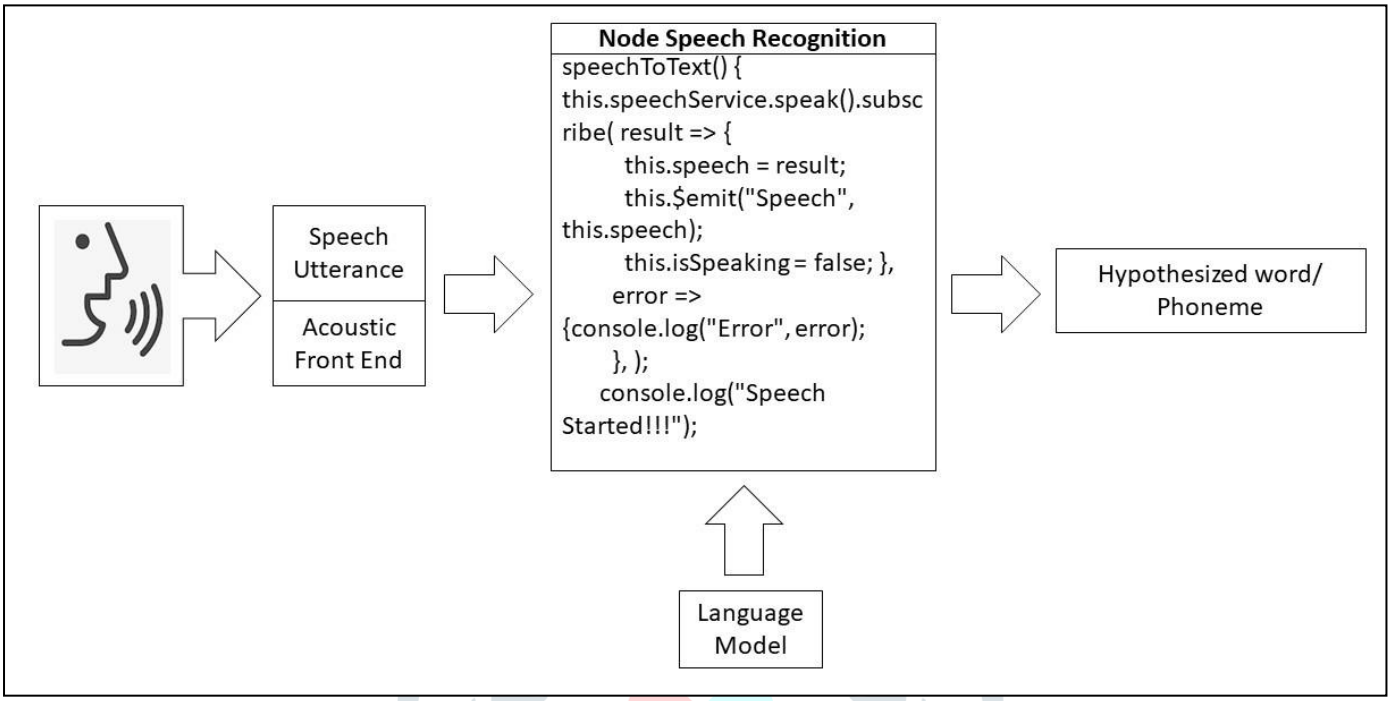

figure 2.1 speech to text.

A corresponding text-to-speech NPM module as shown in Figure 2.2 is used to respond to the user. Changes on the recipes have been already been made available with accordance with the concerned people. Voice commands can be used with the changes available. Any new changes or suggestion can be given with a comment section provided for such instances.

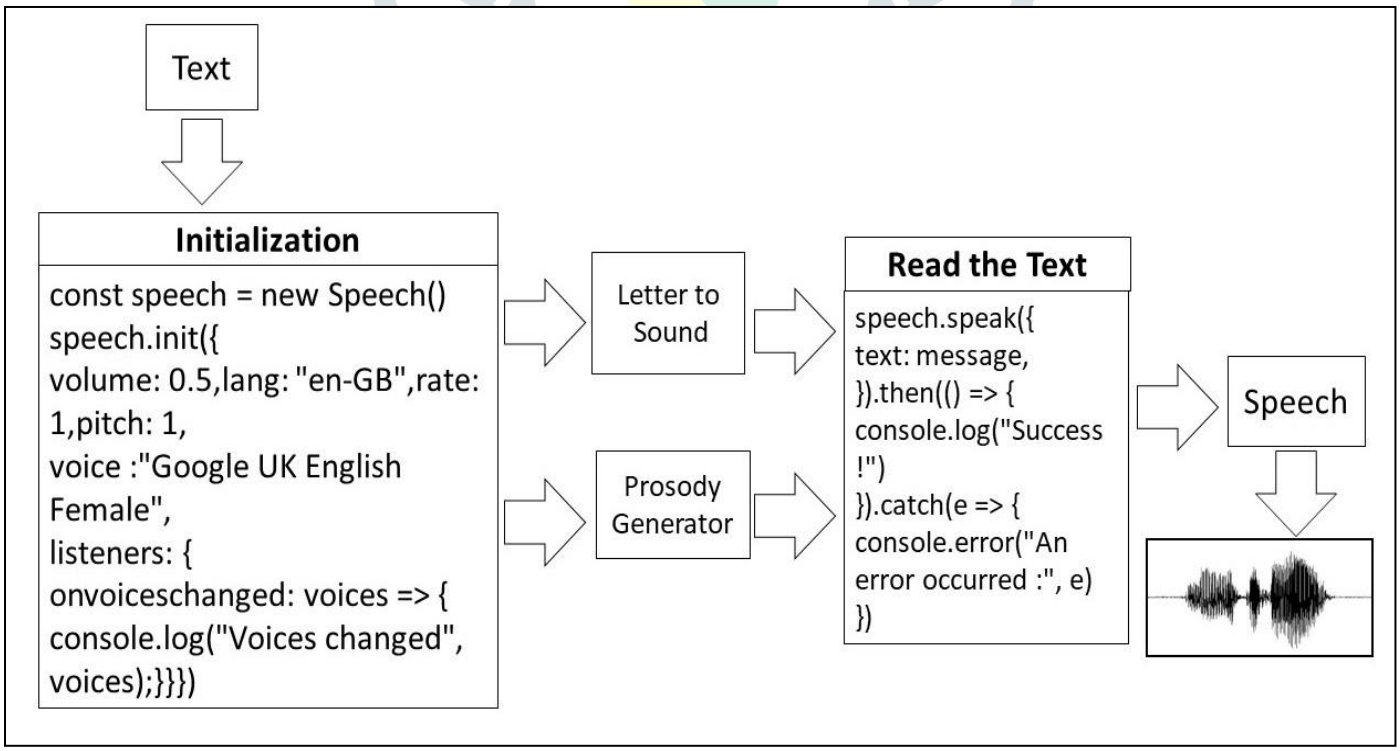

figure 2.2. text to speech.

c) Customization Module

This module helps the user in customizing the recipes using GUI as well as voice commands. The feature of this module is that not only are we using the voice module to search in the menu but also for customization of the recipes. Users having some special needs which are to addressed in this. Any changes to the recipes can be made using the voice commands which will convert the speech to text and search the same in firebase and make the appropriate changes in the intended menu option.

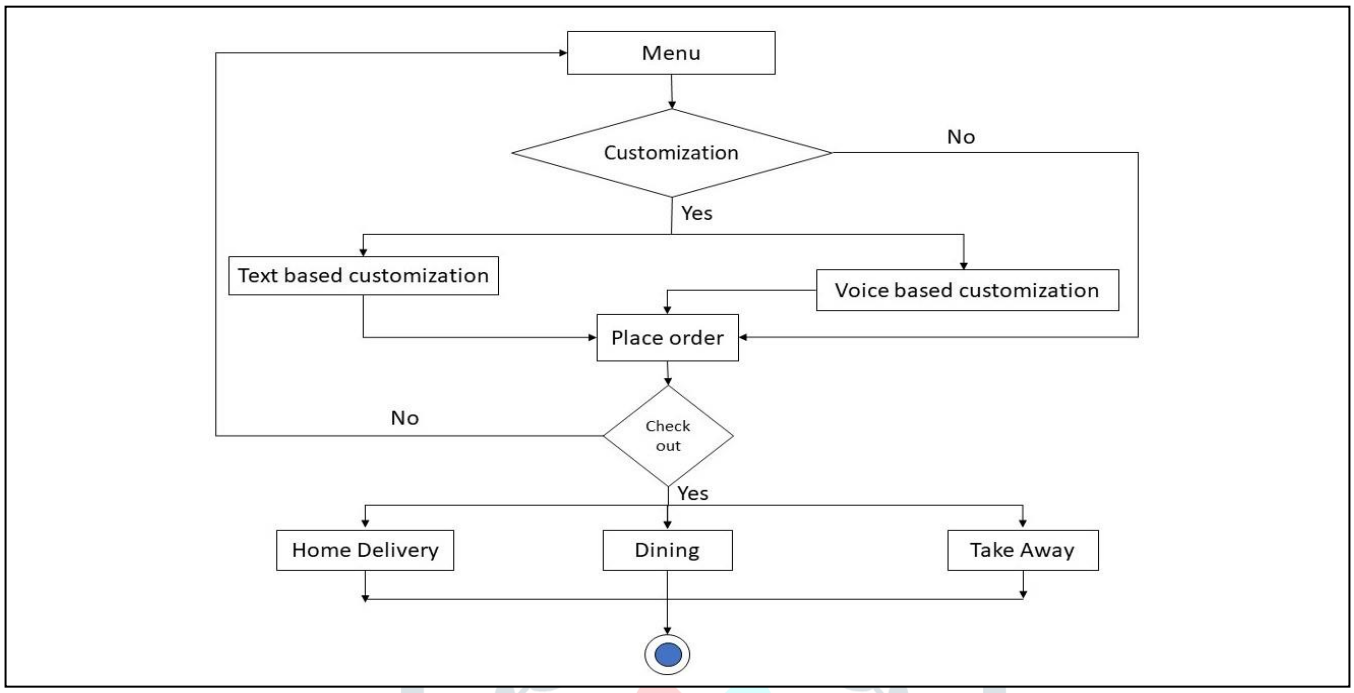

figure. 3 customization module.

IV. RESULTS AND DISCUSSION

This section depicts the entire dynamic Web application created. Following are the screenshots in an orderly manner:

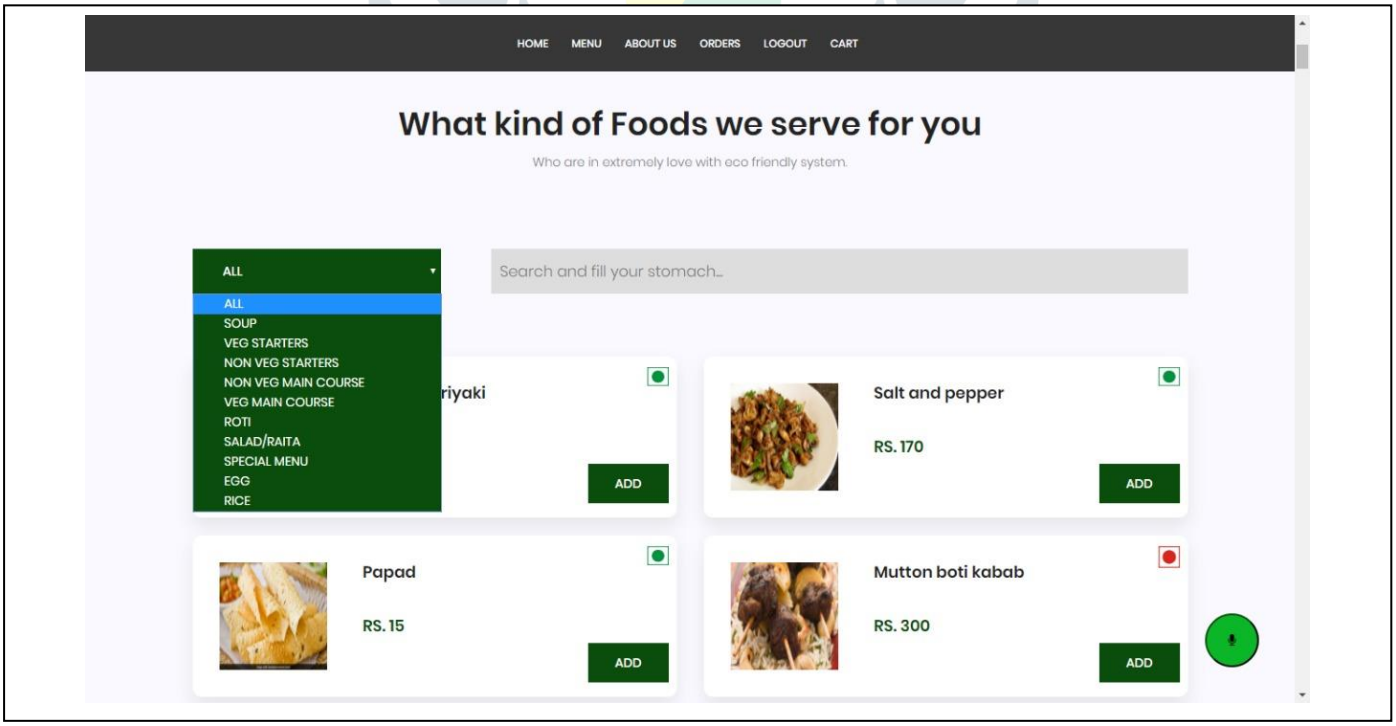

figure 4. initial page.

Figure 4 depicts the page which have all the option in the menu as well as the search bar which can also be used to the select the food item available in the menu.

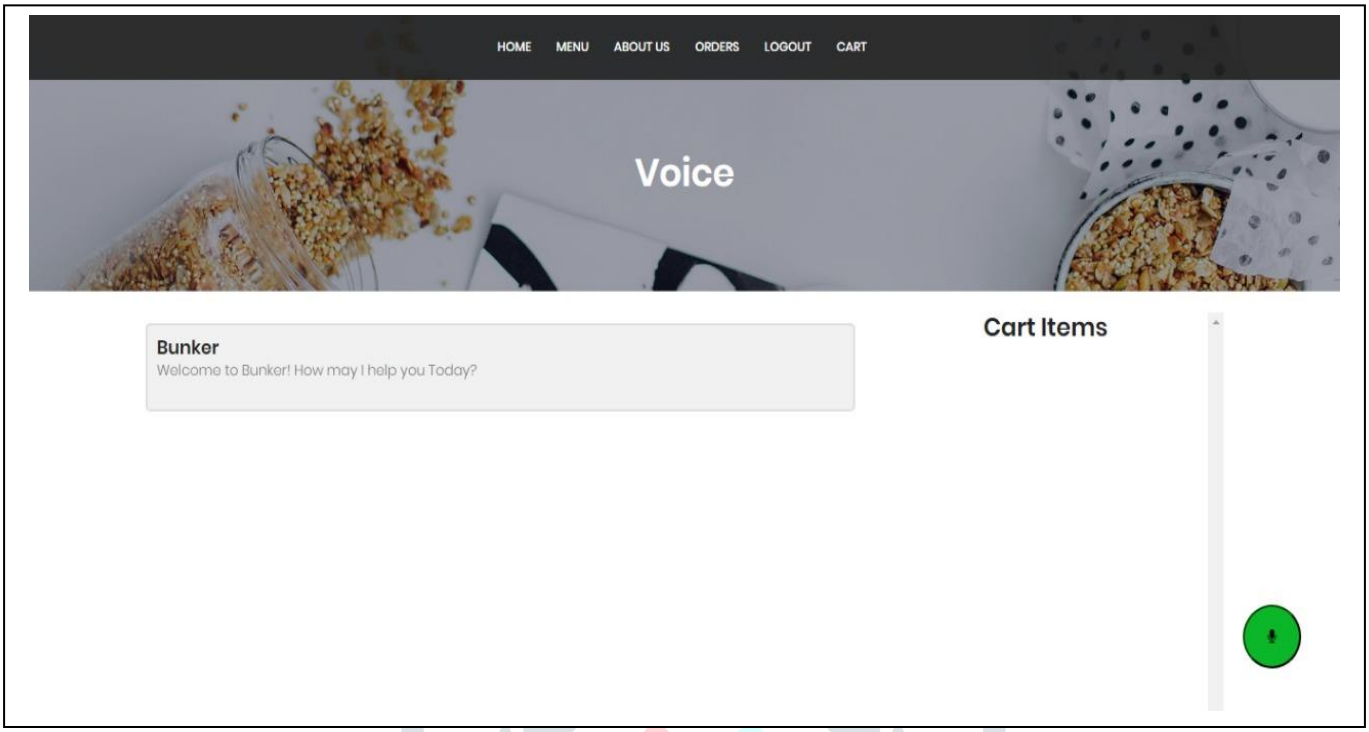

figure 5. page after the action.

Figure 5 depicts the page that will be opened when the microphone button is pressed given on the bottom right corner of the page.

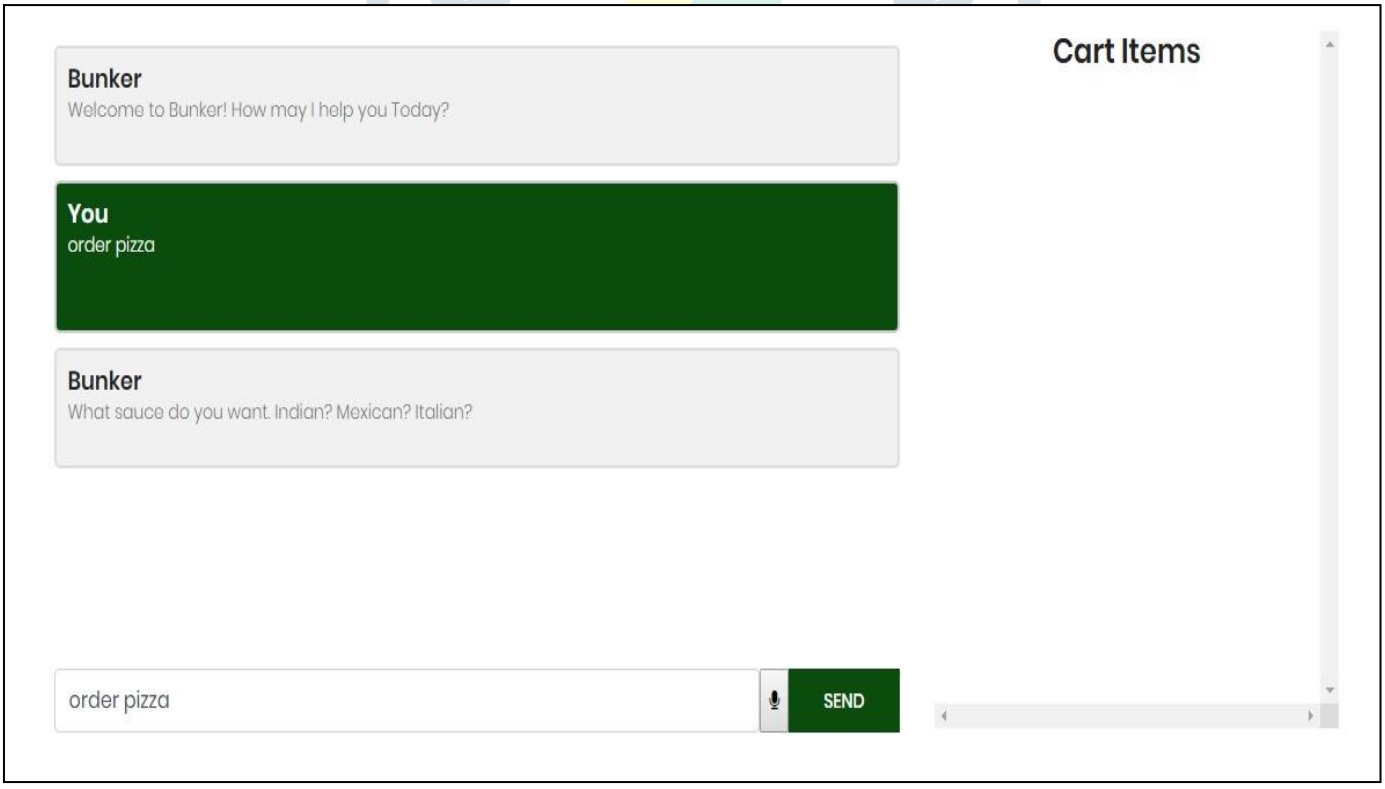

figure 6. voice based ordering.

Figure 6 depicts the phase where the order is being placed using voice commands. Example given here is ordering of Pizza. As the dish is customizable using voice, our restaurant that is Bunker asks what type of sauce do you need?

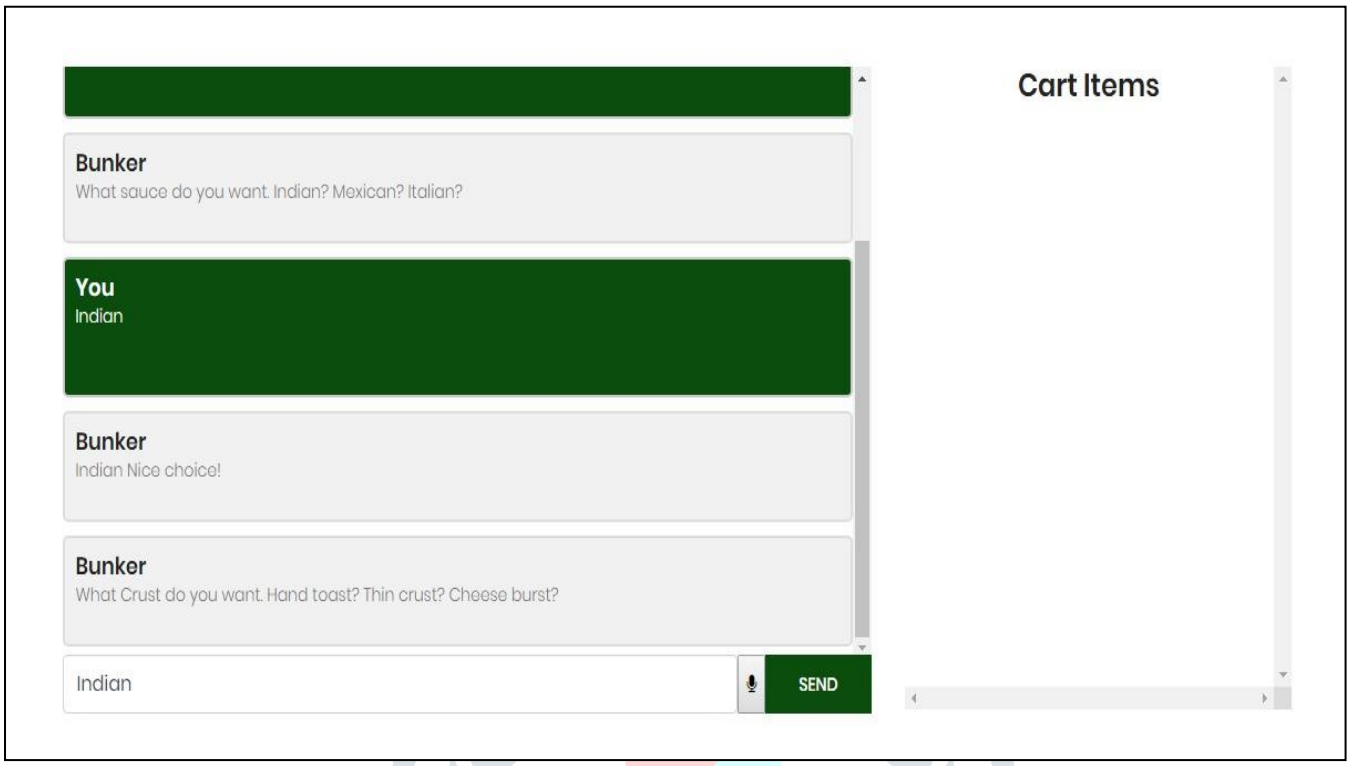

figure 7. message displayed after user's choice.

After selecting the appropriate sauce for the pizza further the choice for the type of crust has been given

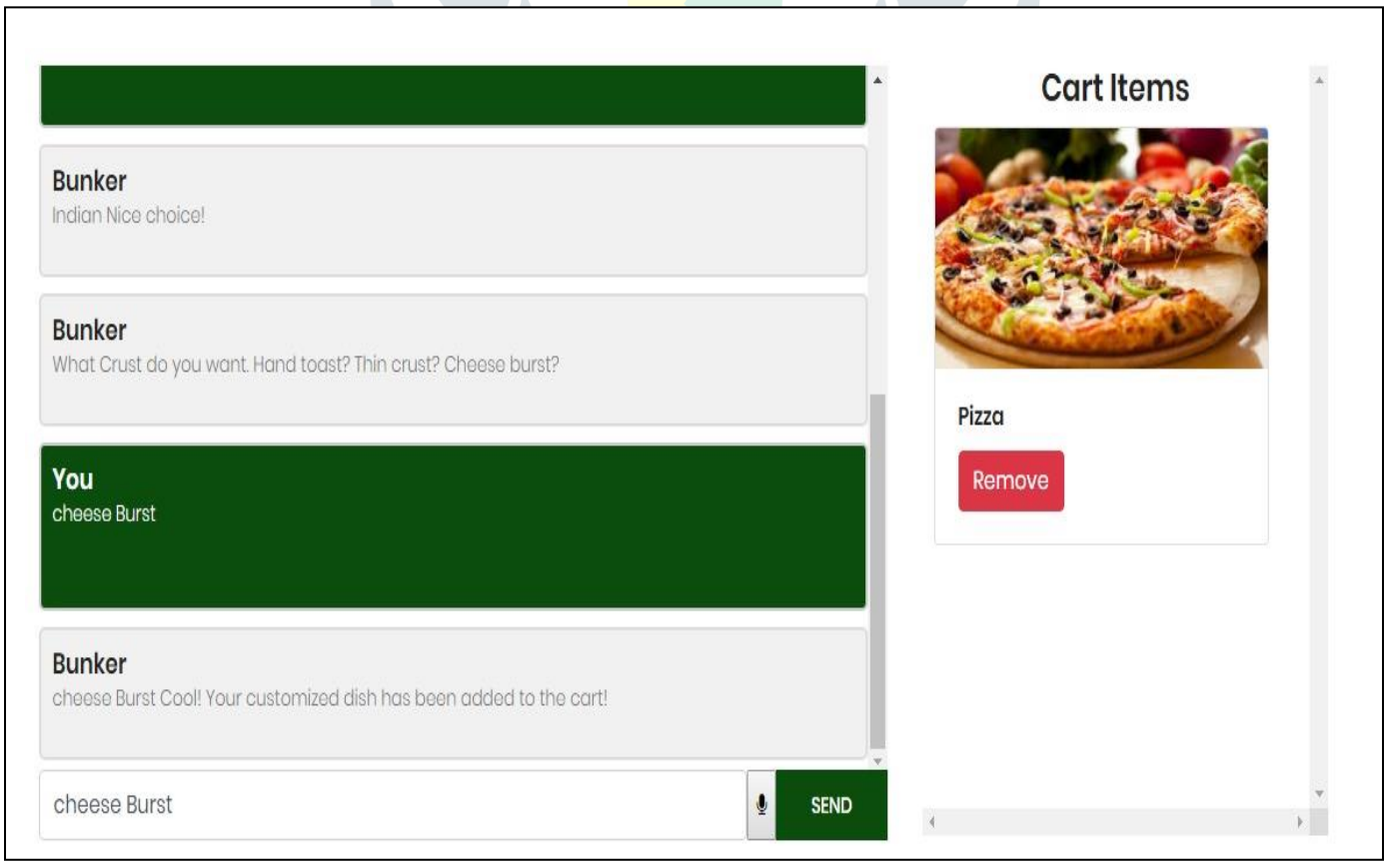

figure 8. addition of item in cart for ordering.

Figure 8 shows the food item being added to the cart after selecting appropriate crust from the available options.

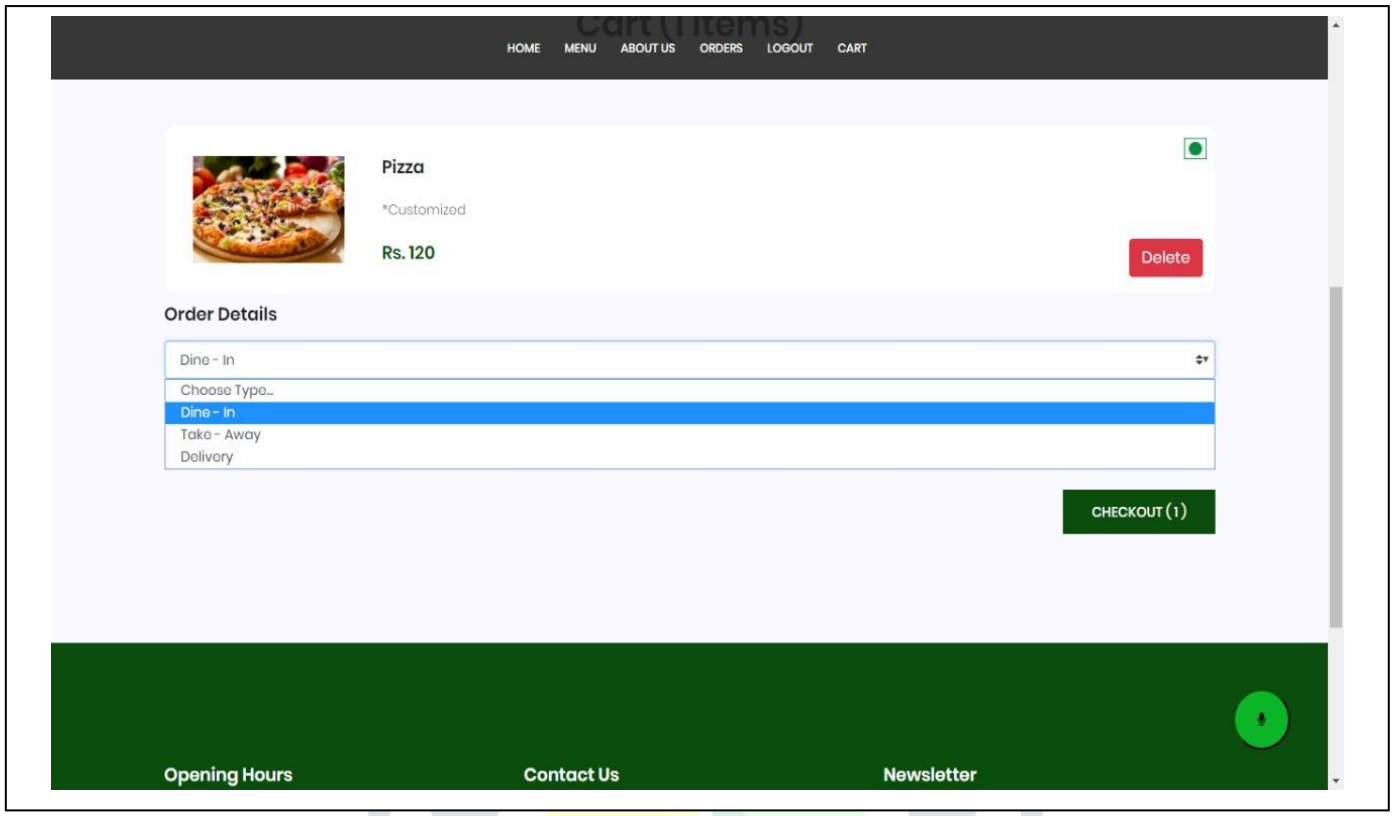

figure 9. type of order.

Figure 9 show the option of dining, take away and home delivery.

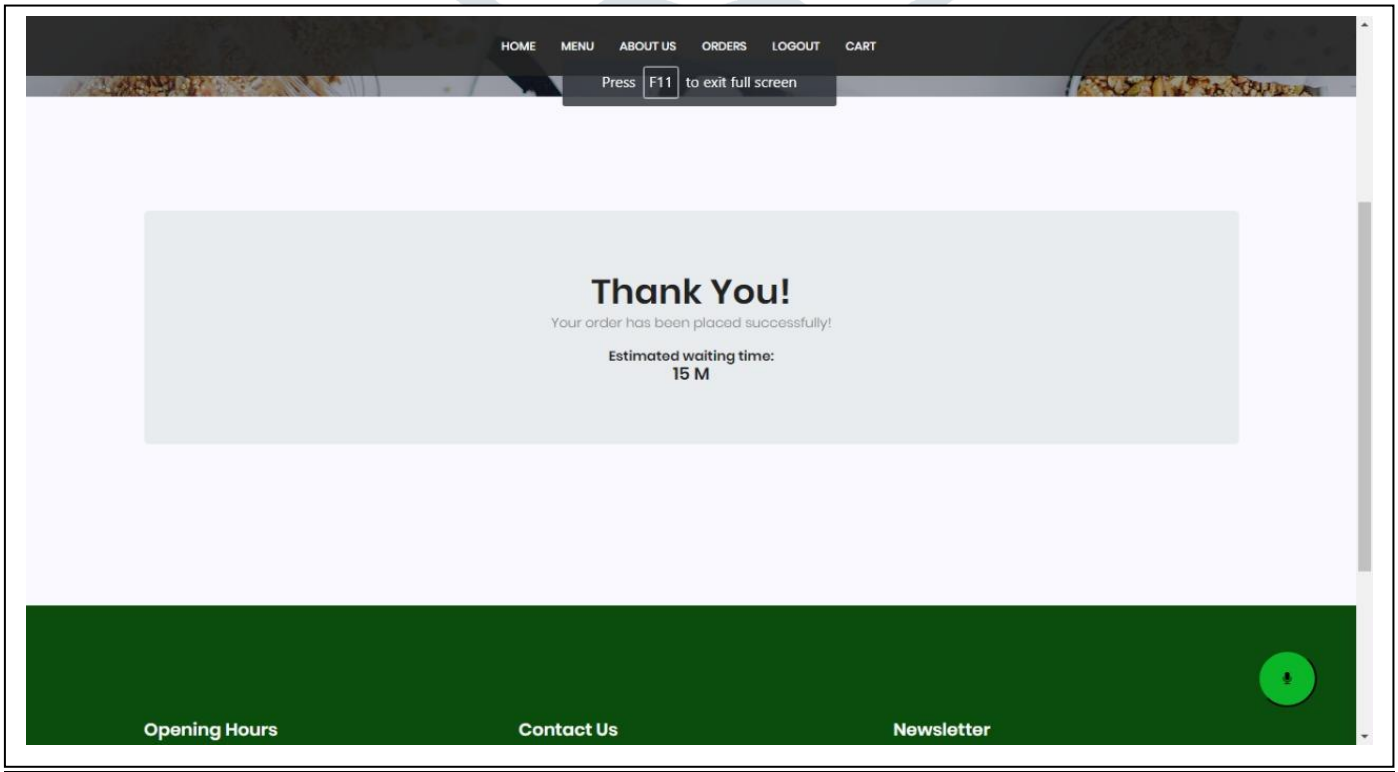

figure 10. order completion.

Figure 10 shows the last step after selecting the dining option a waiting time is displayed in this system.

V. CONCLUSION

The proposed system in this paper can automate the entire restaurant effectively. With the availability of e- Menu and customization of recipes customers are at an ease to eliminate the allergenic contents in their orders. Initiating such an innovation would also help elimination of errors caused by manpower, reduction of paper work and such kind of systems can prove worthy in transforming the entire restaurant industry. An introduction of captive portal in restaurant would help the customers present at restaurant place their orders. While at home, individuals can place order with the help of web app. Voice based customized e-Menu has been implemented using intelligent technologies and smart responsive UI's. A touch free voice-based UI would definitely prove to be a boon to the restaurant industry. Furthermore, with a user-friendly UI and an intelligent transparency, the complexity of customization is hidden, proving it to be advantageous. In the era to come, with multiple additions, the current system could serve multiple purposes and would drastically change the way restaurant systems work.

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