

# Smart Hotel Using Intelligent Chatbot : A Review

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## ABSTRACT

A chatbot is a conversation agent where a computer program is made to simulate an intelligent conversation. It can use user inputs in several formats such as text, voice. For such different open source platforms can be found. A Chatbot plays an important role in human-machine interaction. A Chatbot has three modules: the user interface, an interpreter, and a knowledge base. It is a program that tries to simulate the typed text in such a manner that human feels like it's talking to another human, not a machine. There are many chatbots that are on the internet for different purpose like education, customer service, entertainment.

**Keywords :** Intelligent Chatbot, Natural Language Understanding, Natural Language Generation, NLP, WIT, API, LUIS

## I. INTRODUCTION

A Chabot is called intelligent when it is aware of the requirements of the user. Its intelligence is what provides the Chabot the ability to handle any scenario of a conversation.

For example, a Chatbot is helping a user book a room in a hotel. The user is then asked to provide a date for which the room is to be booked. It is all good until the question 'Is there any premium rooms available?' is asked by the user. An intelligent chatbot will then understand this and give a convincing answer.

A chatbot is created to attend to the user requests. A chatbot is recognized by its ability to understand and process natural language. When using natural language processing, the answer is found by deconstructing content provided into intents, entities, agents, actions, and contexts. With NLP platforms like WIT, API, and LUIS can be leveraged to make an intelligent chatbot. A model is to be decided before

building an intelligent chatbot when one chooses to use machine learning to build their own NLP.

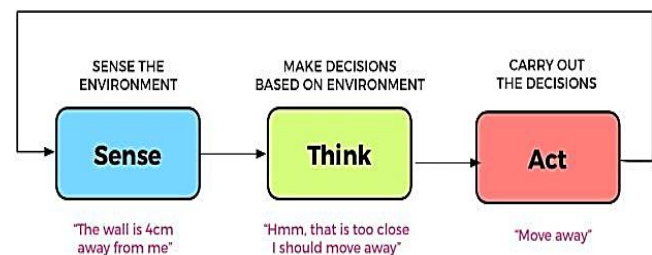


Fig 1

## II. METHODS AND MATERIAL

### A. NATURAL LANGUAGE PROCESSING(NLP)

The field that focuses on easy communication between humans and machines is called Natural Language Processing.

NLP is a way for machines to analyze, understand and derive some meaning from human language in an intelligent and useful manner. NLU or Natural

Language Understanding is a part of NLP and is used to manage unstructured data/inputs and convert them into a structured form that a machine can understand and act upon.

NLG or Natural Language Generation is the process of computer converting its machine code into a more human understandable language. NLG processes structured data gives the output in a text format.

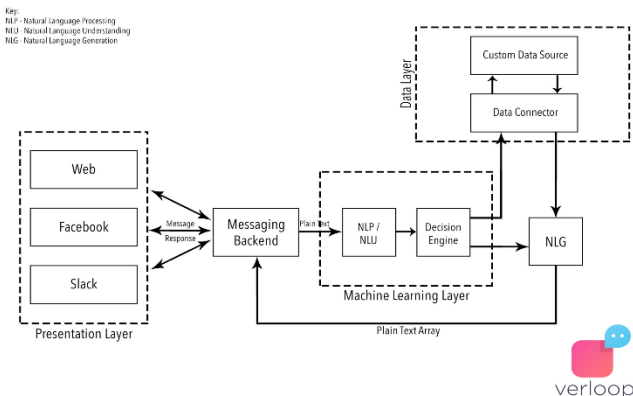


Fig2

## B. METHODOLOGY

Natural Language Understanding (NLU) involves the following tasks –

- Plotting the user inputs in a useful manner.
- Recognition of different features of the language.

Natural Language Generation (NLG)

The process of making a machine-generated output into natural language. It involves –

- Text planning – It includes salvaging the related content from the database
- Sentence planning – In this steps machine decides the right words, phrases, attitude of the sentence and makes it into a meaning text.
- Text Realization – Finally making the sentence plan into an actual sentence structure

Natural Language Processing (NLP) is a way of

recognition texts by computerized means. NLP includes the gathering of knowledge on how human beings understand and use different language. This is done to make the correct tools and techniques that make the machine understand and change the natural language to be able to do different tasks. This paper reviews the literature on NLP. It also covers or gives a clue about the history of NLP. It is based on documents analysis. This research paper will be beneficial to those who wish to study and learn about NLP.

## C. CUSTOMER SATISFACTION

Customer satisfaction is the key driver for any representation to sustain in current competitive. Service providers need to know their customers and design their services in such a way that more possible satisfaction is attained by the customer. The objective of the present study is to measure customer satisfaction in the hotels of the Kashmir valley. The study will also provide different suggestions to the users so as to make their services more efficient and effective. For conducting the survey a well-organized Questionnaire is used to collect primary data from the respondents. The sample size for the research is 150 Sample variance and confidence methods are used for Determining sample size. Simple random sampling procedure has been adopted by the researcher to collect the data. On the basis of results, 40 % of the respondents are better satisfied with the safety and security of the hotel while 20 % are not satisfied with the location of the hotel. With every attribute the level of satisfaction changes, therefore making it clear that users rate their satisfaction differently with every single attribute

- Users Loyalty
- Customer Loyalty Scale
- Service attribute
- Service Quality Scale

Measuring user's satisfaction in the hotel industry is important in order to: and services offered; supervise the operations of the enterprise as a system. Guests' loyalty represents a homogeneous cluster which can be accentuated using behavioral and attitudinal.

The result through the observations showed that the customers are very much sensitive towards the various service segments and thus it is very much needed from the service provider's end to know guests' opinions. Each guest has various expectations about hospitality services, thus it is important to know their impressions not only by aggregated statistics but also particular; determine the expectations, the requirements and the requests of users, overcome the gaps between customers' expectation that they should draft and present their services in such a manner that maximum users' satisfaction is attained and a strong user base is attained. The service providers thus need to augment their services in such a way that they meet the expectations of the users at desired levels. The service providers need to improve their services from time to time to meet the changing global scenario. The managers should make a provision for customized services which should be user-centric and should focus on the complaint.

#### **D. SELF ORDERING SYSTEM OF RESTAURANTS**

This paper proposes a novel menu display and order system based on personal devices that consider customer information when personalized menus are presented. We implemented the five necessary components: NFC tags, Smartphone applications for the restaurant staff and the customers, a web application for the restaurant staff, and a database. This application requires the following abilities: Reading NFC tags; Updating user information; Displaying menus; Placing orders.

#### **E. NLG-TECHNOLOGY THAT GIVES MACHINE VOICE**

NLG platform is a machine process that can generate natural language text and speech from pre-defined data. NLG software has the ability to mine large quantities of data, identify patterns and share that information in a way that is easy for humans to analyze and understand. With NLG tools, data analysts can spend 80% of their time analyzing data rather than 80% of their time preparing and sorting data. NLG tools will reduce the number of people required to generate and analyze data.

NLG simply means creating text from computer data. It acts as a transcriber and converts the computerized data into natural language representation. In this, a result or text is generated on the basis of collected data and input given by the user. It is the natural language processing task of generating natural language from a computer representation system. Natural Language Generation in a way acts opposite to Natural language understanding. In natural language understanding, the machine needs to disambiguate the input sentence to create the machine representation language, whereas in Natural Language Generation, the system needs to make decisions about how to put a concept into words.

The process to create text can be as simple as keeping a list of readymade text that is copied and pasted. Consequences can either be satisfactory in simple applications such as horoscope computer or generators of personalized business letters. But in a sophisticated NLG system, it needs to include levels of arrangement and merging of information to generate text that looks natural and does not become repetitive. Example of a simple NLG system is the Pollen Forecast for Scotland system that could essentially be a template. NLG system takes as input six numbers, which imagine the pollen levels in different parts of Scotland. From these numbers, a short textual

summary of pollen levels is created by the system as its output.

## F. CHATBOT CONCIERGE

Chatbot Concierge is real-time direct booking support for forward-thinking hotels. Book more rooms in a hotel. Help your customers make reservations while they're on your site with live and automated chatbots. The unique promise of combining live and automated chat is that it gives real-time direct sales opportunities while a user is on your website. Chatbots deliver a customized experience for a guest's entire booking journey: from prompting an inquiry to checking availability, to upselling and assisting with the booking.

1. Artificial Intelligent
2. NLP, NLU & NLG
3. Deep learning
4. Machine learning

Chatbots are reconsidered the way companies interact with customers, with employees, and with things. chatbots can yield clear benefits: cost-effective users service, faster response times, and easier business transactions. Chatbots also bring pitfalls: costly lawsuits, fines for violating laws or regulations and spoil to the brand. Chatbot Concierge is real-time direct booking support for forward-thinking hotels room. Book more rooms. Help your customers make reservations while they're on your site with live and automated chat (chatbots). The unique promise of combining live and automated chat is that it offers real-time direct sales opportunities while people are on your website.

## G. SMART RESTAURANT

The smart restaurant is a concept where the restaurant work is handled by the use of state of the art technology available to everyone from reservation to ordering and storing users response and records.

The traditional restaurant system working is replaced by the use of smartphones, tablets or graphical user interface interactive touch screens. guests will order their meal through tablets so that the order is directly rooted in the kitchen via a central server. Also, customer's records are permanently maintained in the central server which can be used later for advertising, accounts and sales purposes. The smart restaurant decreases the staff employed for hospitality services thus increasing the profit margins. The kitchen will have an interface where orders will be served according to the customer (first come first serve). The guests will order from an android app installed on a tablet either from the hotel or their home. An application on android will also help users to know more about the restaurant and its services and will facilitate online ordering and prior reservation of the table. The traditional system of restaurant working is encountering a lot of day to day problems with most of the operations done by hand, waiters rushing around with hardbound menus, data and information maintenance inability increasing the system inefficiency and probability of error. This system consists of a simple module to communicate between the customer and kitchen which divided into 3 stages. This whole thing is done over the restaurants own WiFi where all these 3 stages except the home delivery or booking service which can be done from anywhere with a proper internet connection take place. The restaurant 3 stage module for ordering is as follows :

1. Customer Module: With the help of this module the customer can order the meal. This module contains the details of the food to be ordered which includes the price of the menu, ingredients and a visual display of the food items and today's special (can be changed by admin). Any personalization required by the customer in the food item can easily be implemented under this module. This will run on a PDA and application to be run on it is made in Eclipse.

2. Server Module: Server models is a web-based module which is managed by the admin (restaurant manager) for managing the database and controlling the entire system. Here the entire details of the item ordered by the customer, time of ordering, bill amount, bill status etc. are maintained. Also, the admin can anytime add and create menus (e.g. Today's Special), their prices and advertise specific food item including special discount and combo offers etc. Server Module is applying in XAMPP server where database management is done in MySQL and programming is done using java server pages.

3. Kitchen Module: This module is a GUI that the chefs or kitchen staff will use to see what the customers' orders are. It will be on first come first get. This can also be used to notify the customer as well. The era where a majority of interactions is being automated completely given that conversation AI/ intelligent chatbots are playing a crucial role in almost every industry. With chatbots becoming the mains streams, many industries are using them as they offer greater and less intrusive opportunities when it becomes to customers engagement. Designed to communicate in a meaningful manner with guests, chatbots can be integrated with any interface (Facebook, Slack or Telegram to name a few). With chatbots, your guests no longer need to make a call to reserve a table, wait for staff to attend to them or wait in line for tables to free up. Restaurants don't need to have an great service executive for the guests either. For millennials, the generation that actively prefers not speaking with others, they can be the perfect fit as they are the ones who, apart from food, also expect a digital experience. Across many industries, capturing and retaining customer interest and business through AI-powered technologies has now become a priority. An estimated 2 billion messages have been sent by 60 million business on Facebook chatbot alone on a monthly basis. This seems that there is a huge opportunity for chatbot in restaurants when it comes to enhancing customer

engagement. However, be it ordering food, making a reservation or even getting recommendations, it is impossible for service staff to meet everyone's standards consistently which can result in a negative brand image for the restaurant. With chatbots, your users no longer need to make a call to reserve a table, wait for staff to attend to them or wait in line for tables to free up.

### III. RESULTS AND DISCUSSION

#### IMPLEMENTATION CUSTOMIZABLE ONLINE FOOD ORDERING SYSTEM USING WEB-BASED APPLICATION

It is presented that a web-based application will be used for booking tables, ordering and pre-ordering foods in a restaurant making the overall process easier and less error-prone. we are using smartphones or tablet to give necessary interfaces for the customer to view and order menu. With private login machine, guests can view and make an order and receive updates in real-time and collect receipts right from the smartphone itself. This machine is convenient, effective and easy so that it improves the performance of the restaurant's staff. Thus, making the restaurant business more effective and dinning more immersive. Typically, in a restaurant food order process involves different steps for ordering the food where firstly customer starting from browsing the paper-based menu and then inform the waiter for ordering items. basically, the process requires that the customer has to be seated before starting. A different method for the guests is "Food Preorder System using Web-Based Application" in which guests can be able to create the order before they approach the restaurant. A customer using a Smartphone. When the guests come to the restaurant, the saved order can be confirmed by touching the Smartphone. The list of selected pre-ordered items will be shown on the kitchen, and when confirmed, order slip shall be printed for further order processing. The solution

gives an easy and appropriate way to select pre-order transaction form customers. The system of customizable online food ordering system using web-based application includes the three main areas of restaurant: The Server, the Kitchen, and the Cashier counter. this system is built using the following components is the web application is used to make orders from smartphones. The restaurant owners System will keep track of customer records and also customize the menu using the server application. The database is used for restaurant-owner to store updated menu information and order details.

There are three main areas of the restaurant are connected using wireless technology.

AI in restaurants takes customer service to the next level AI in restaurants is enhancing and changing the entire food service experience, not only for customers but also in the back-office calculations of food service establishments. Food service establishments of all types ranging from delivery to fast casual to sit-down dining are turning to AI and cognitive technologies to improve process flows and guests experience. AI-enabled chatbots can do a different of things, like help control reservations, respond to guests inquiries and customize guests orders, freeing up staff to spend time with the users currently at the store. Domino's famously experimented with giving guests the ability to text a pizza emoji to order a pizza as a way to not only increase overall sales but to also provide a particular users experience. Many establishments, such as Domino's, Pizza Hut and Starbucks, now offer voice ordering assistants that utilize natural language processing to interpret and place orders. They work by acknowledging the format of a guests dining choices and pairing that information with the customer's location to suggest other restaurants that the user may be interested in. for example, knowing that Monday is always take-out night – this form of AI in restaurants can really become powerful. AI tools can use predictive analytics to help forecast

visitor traffic, food orders and inventory requirements, as well as revenues and costs By teaching machine learning-enabled machine what a typical work week seems like and how many workers are needed at certain times of the day or week, these systems then learn to schedule staff accordingly, take into account scheduled time off and make sure the restaurant is properly staffed during busy and slow times. As less wage has steadily increased in many areas of the country, restaurants are looking to save costs however they will. It's becoming more common to see AI robots in the kitchen. Robots help with consistency in both food preparation and cooking, can help speed up the time it takes to get food to customers and are decreasing training costs, as turnover rates are not an issue with robots. also to assisting the hostess with tasks such as reservation management, robots are also interacting with customers tableside. Smart bots are able to provide meal recommendations to guests, take orders and even process payments once the diners have completed their food. With slim profit margins and high staff turnover, restaurants are getting creative to more profit and efficiency.

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#### Cite this article as :

Shubham Parmar, Megha Meshram, Parth Parmar, Meet Patel, Payal Desai, "Smart Hotel Using Intelligent Chatbot : A Review ", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 5 Issue 2, pp. 823-829, March-April 2019. Available at doi : <https://doi.org/10.32628/CSEIT11952246>  
Journal URL : <http://ijsrcseit.com/CSEIT11952246>