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AUTOMATED HOTEL BILLING SYSTEM USING LSTM

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Abstract: Technological innovation has been changing the hotel industry enjoyable and easier than before. More and more, hotel industries have come to realize that in-depth customer service with properly harnessed customer insight is the best key to increase brand value. This is why we have begun to see a rise in mature-service hotels where customers are not only related with hotel's interior charm but are also equally satisfied with good service. The use of this automated voice recognition system has been adopted through various applications. People have been managed to feel comfortable with voice assisted devices in every sector home, office, hospital out bringing the gap among machine and humans. Where it has numerous services, which can be handled via computing it online mode and can maintain data of customers as well as the items preferred via them. The project focuses on the automated voice assisted services for the customer in the hotel. The voice assisted service includes placing the order for the service as of the client. And generation of bill to the customer. An approach has been made to implement machine learning namely LSTM for the voice to text provides a automated ML techniques for consumer services in the hotel. The Natural language processing application has been adopted to get the words well tokenized where the main importance is that NLP can be used in translation, summarization etc. once all these words are been predictable plus tokenized these will be sent for the billing purpose. At the end the customer will receive bill through the email which is been done via implementing through SMTP protocol in this system.

Keywords: NLP, LSTM, RNN, ML, SMTP, ST, NLP, ASR.

I. Introduction

Hotel management system has dissimilar field of services so one of the services at the tip is getting served to the consumer so it starts through the purchasing of items to generation of bill. This project deals through the methodology of automated speech recognition where the consumer voice resolve be the input for the process plus then the voice which is been taken as an input will be taken for the conversion of text format using dissimilar methodologies will be disused [1].

Automated speech recognition (ASR) is a technique where speech recognition is one of the more knowledgeable method subfields of the related studies related computational work through computer analysis which develops the approach as well as all the technique of dissimilar technologies which will assist in the recognition process as well as once the recognition is done the system will adopt to translate to the text format which is done via the computer and this techniques where the speech is been converted keen on text by computer and its application is called as (STT). This STT replica is good enough and presentable for the user as well as this application is user friendly as per the use of the users [1]. This STT provides all with dissimilar tasks for user to communicate and listen as well as to narrate conveniently. This speech to text module which has been generated will be convert the specified input voice through Google API servers to the text module and which will be shown as an output to the other next model.

Once we learn about the speech recognition the next most important task is to convert that recognized speech to the text which is most important task plus this task is called as tokenization and this tokenization of words after recognizing is carried out via an application called as Natural Language Processing (NLP) [1][6]. Almost all the present system will store these statistics types which just convert speech to text but this Natural Language Processing application not only convert it actually and tokenizes the word it can store all these tokenized words as of the application.

II Literature Review

As of [1]: A Voice to Text transcription system for NGO's was build to record the conversation throughout surveys and renovate it keen on text and save it. This system includes an open-source application. The CMU Sphinx toolkit was used for speech recognition. The system ropes multi-language recognition. The CMU Sphinx toolkit utilizes acoustic replica, phonetic dictionary and language replica. The user had recorded his/her voice through the mobile application then recognition as well as transcription were done through CMU Sphinx toolkit. The transcription file was saved as a text file in device memory which user can upload and retrieve information as of the database server through the application. The system could recognize and translate multi language speech or voice. The application reduces the instance exhausted via the counselor to manually kind the whole session to text.

As of [2]: An interactive database system for automatic speech recognition, in which speech was recognized using speech recognizer as well as the recognized voice was converted keen on text. An xml configuration file for the shaped database was written. The configuration file was taken as an input for the conversion of text into SQL query. Then text was converted keen on a standard SQL query. For the constructed SQL query necessary particulars were retrieved as of the database. This process was repeated until the user was satisfied through the retrieval results.

As of [3]: An Intelligent Hands-Free Speech based SMS System on Android in which Voice or signaled input was insert through any speech tool such as microphone, then speech was process and transformed to text hence able to send SMS, also Phone numeral was entered either via voice or via selecting it as of contact list. Voice had opened up statistics input for a diversity of user such as illiterate, handicapped, as if the person cannot write then the speech input was a boon as well as other's too which led to better usage of the application. Users who encompass no knowledge about the SQL queries can also use this for retrieving the particulars as of the database.

As of [4]: A Text to Speech conversion module in which Text transformed to Speech, Text file converted to Speech, Text in assorted language converted to Speech, Image rehabilitated to Text as well as Image converted to Speech using MATLAB as a programming tool. The assorted methods used were Pre-processing, Unicode Conversion, Segmentation, Concatenation, Prosody plus smoothing, to be then united in an application for easy access and usability. The text-to-speech mode converted a text dossier or inputted text to speech which then was narrated/read using the voice database used via Microsoft SAPI.

As of [5]: A querying database system using a voice-based interface called Echo Query was developed. It show the sensibleness as well as utility of QbV for relational DBMS using a proof-of-concept system called Echo Query. NLIDB had been very limited since they mostly focused on construct interfaces for individual domain as well as not general-purpose interface for exploring arbitrary statistics sets. They used deep learning model to allow for a robust translation as of natural language to SQL. The query interface of Echo Query is stimulated via regular human-to-human conversation where the system can ask question back to the user.

III Methodology

A. Conversion of speech into text

B. Tokenization of Words

C. Generation of bill.

A. Conversion of Speech to Text

The conversion of speech to text format uses dissimilar machine learning technique which be used to convert audio records. These speech recognition model are been skilled via google for specific audio files as well as audio sources [6][4]. Whenever the translation of speech to text resolve is requested, we will acquire the transcript one to progress the outcome which specify the original audio files. This thing allow in the alteration of speech to text conversion of audio files using machine learning replica.

B. Tokenization of Words

To show a model for Natural language processing, recollect the replica field for thing for your sale, decide the replica to encompass been used. "Tokens" are usual for individual words and "tokenization" is a bunch of text as well as unraveling it keen on its individual words. It is the method for finishing the specified content keen on units called tokens. These tokens could likewise be words or numeral or accentuation [3]. Tokenization does this via following the words plus their limits. Finishing point of a word as well as start of ensuing word is named word limit. Tokenization is otherwise called word division. The strategy word tokenize () is utilized to part a sentence keen on words. The yield of word tokenization can be changed over to statistics layout for better substance perception in AI application [5]. It likewise can be specified as contribution to additional content cleaning steps like accentuation expulsion, numeric person evacuation or stemming. Word tokenization turns into a momentous a piece of the content to numeric change.

C. Generation of Bill

When these voice contributions of words as well as sentence be tokenized, the tokenized words are specified as the contribution for the bill computation. Here this information contain the thing bought plus amount of everything. The purchaser can provide the thing purchased through voice, as well as buyer can moreover drop the purchased things before it gets decided. When the request is done receipt is made and email sent. In Chatbot, the equipped request as well as bill gets created.

IV IMPLEMENTATION

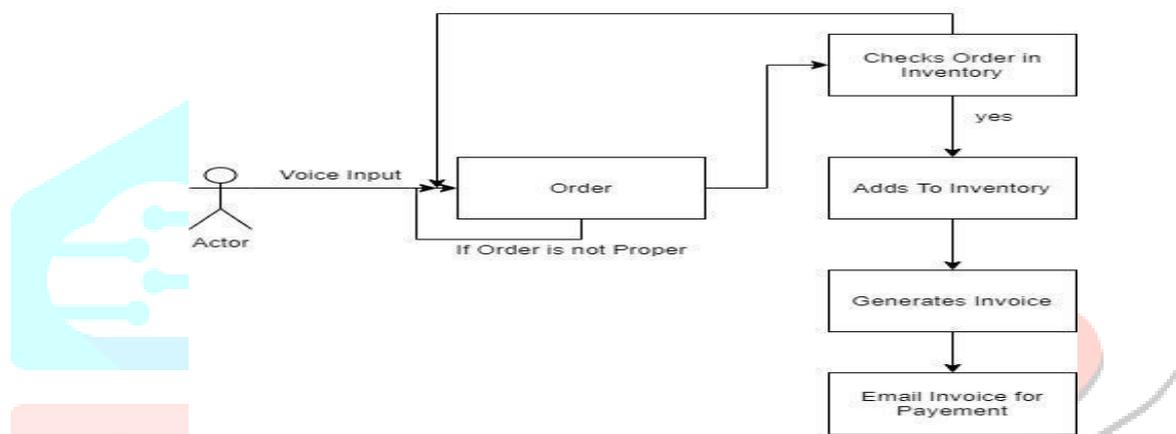


Fig 1 Flowchart of proposed system

The above fig 1 shows the flowchart of the proposed system, where it starts through the consumer voice input to bill generation process. An automated hotel management system include a table service system in which the items which has been ordered be need to billed so this voice-based billing structure has been planned to do the billing for the things purchased which get voice as an information statistics [1]. The information voice is either a word or a sentence which gives the name of the things purchased as well as its sum. This is a necessity in customary language preparing undertakings where each word must be caught as well as exposed to additional assessment like arrange and tallying them for a specific opinion as well as so forth [3]. This is a need in customary language arranging attempts where each word must be gotten plus introduced to additional evaluation like organizing plus checking them for a specific appraisal, and so on. At the point when the bill has been resolved, the substance record resolve be made through the decided yield to can be seen. The execution time is furthermore resolved as well as shown. Despite it, the precision for the distorted over text is resolved using chaos organization plus the chart has been plotted.

The Fig 1 shows the flow chart of the planned system, where the user's voice is an input for system. When the consumer enter plus after entering his personal information like mail then he start order as the system is been trained then it takes the statistics when the person orders the food inside the menu then it accepts when it's in the format if not it gets rejected until the user instructions the food inside the menu. When the food is ordered then it resolve go to inventory as well as then facts is been sent to the person within the kitchen to get the order plus once it is done then the order is carried out and then it generates invoice which is sent to the consumer or customer, then to will include the price of each item and been calculated as well as sent to the user.

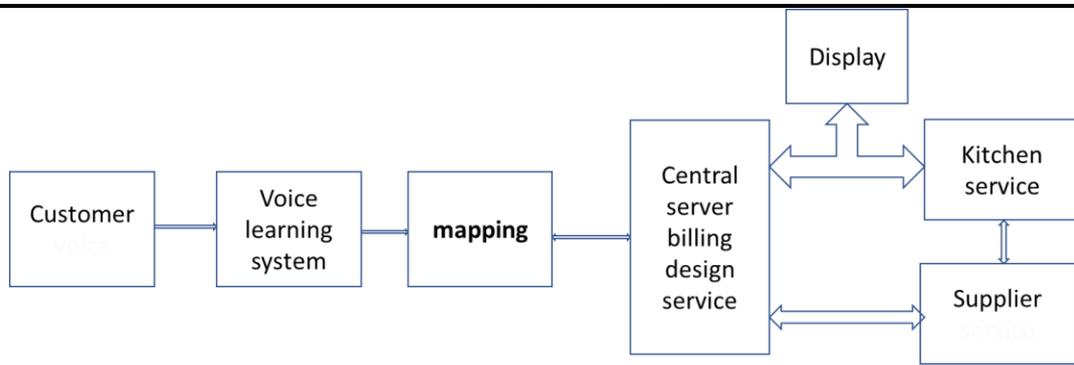


Fig 2 Implementation of proposed system

As above Fig 2 shown illustration converse about the proposed system where the consumers module deals through the voice input then the LSTM activate to convert the voice formatto text as well as mapping [11] for the items is been done when the system start mapping forthe items which consumer has been ordered then it is sent to Google API where the items be been matched to get through appropriate outcome, And once the outcome are decided to end service replica where kitchen admin and hotel manager plus consumer will receive the information what the consumer has ordered.

V. Sequence Implementation

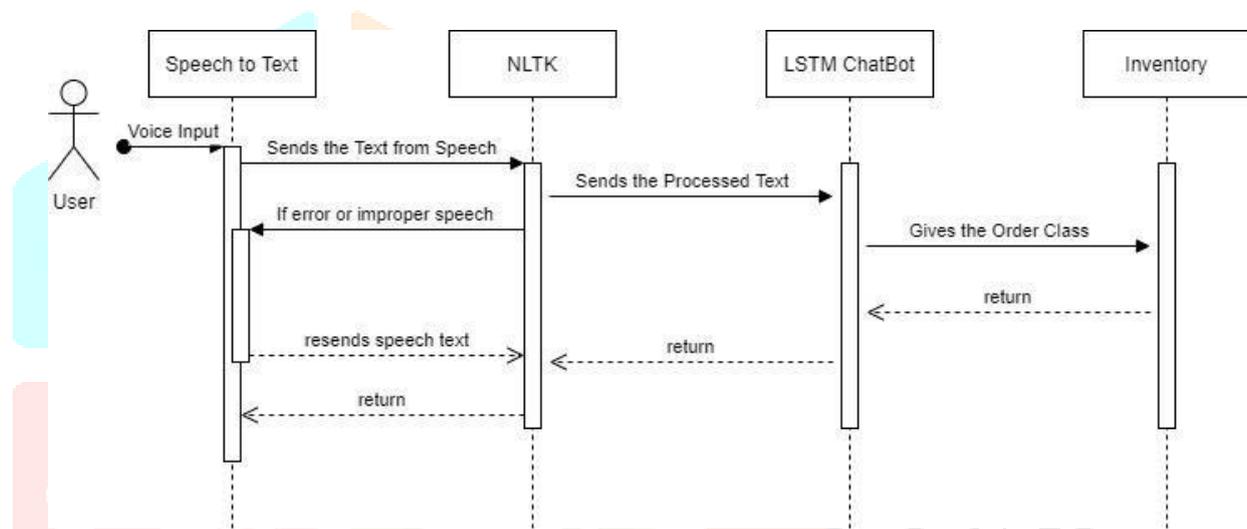


Fig 3 Sequence Implementation

The sequence implementation is to process of implementation is being going through the step-by-step process as of the user to the inventory creation. primary as per the LSTM credentials the initial process is to give input via the user as seen in the fig 3 this is procedure of the implementation of the chatbot of system, first task is to recognize the voice of user then forward via the conversion, when the consumer speak it word the machine resolve understand as well as if its not done it will propel back as an error touser plus if it is understood via the system then it goes to the NLTK where it recognizes the language processing the main use of this NLTK keen on this project is to dissimilar person encompass dissimilar speech tones where everybody has can process through is language kit which recognizes natural languages. Once it is done it will propel the processed voice plus hence then it is followed via the LSTM chatbot.

VI Result Analysis

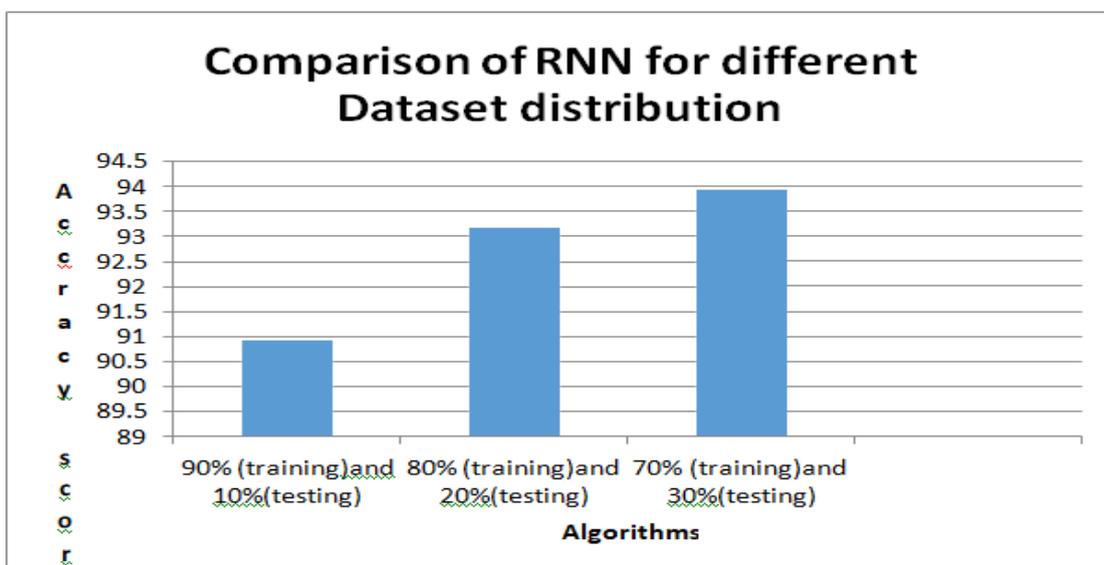


Fig 4 Comparison of RNN for different dataset distribution

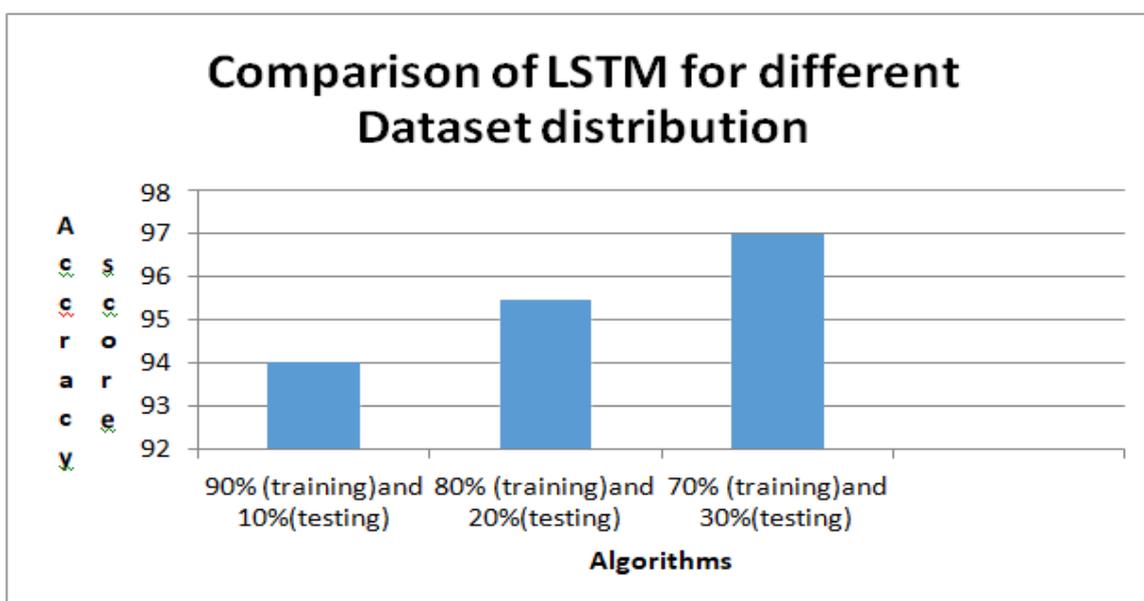


Fig 5 Comparison of LSTM for different dataset distribution



Fig 6 shows the text converted form sent to the customer and kitchen person

Invoice num.: None

Provider ABC Food	
Payment Information Account n.: 2600420569/2021	
Customer nan	

List of Items			
Description	Units	Price per one	Total price
coffee	1	K€50.00	K€50.00
Total: K€50.00			

Creator: e-billing

Fig 7 Invoice sent to customers email id.

VII Conclusion

The created structure will interpret discourse i.e., verbally expressed words or discussion kept on text as well as store all pertinent information. Merchant's utilization of this information for the estimation of bill for the thing bought via the buyer. One of the essential targets is to alter over the inputted discourse kept on text even if it has an uproarious foundation. The structure is executed for together the sort of discourse input for instance it very well might be either a name of the food product alongside its anything but a sentence which contains the natural product name as well as the bought amount. Execution of a profound learning strategy for the discussion part can give entirely assorted outcomes. Another choice is to refresh the accessible stock as well as its particular cost through voice. As of now a voice-based charging structure has been constructed as well as in the future certain Machine Learning strategies can be applied to something very similar to work on its productivity. To meet the full consumer necessities as well as to contend among the worldwide commercial center the planned LSTM should fuse the accompanying offices: wise room circumstance marker, wise ID recognizer, room circumstance marker, structure self-checking, the declaration of statistics, forced air system regulator. We are currently believing the above ways to deal with be consolidated through the LSTM structure. A simple feed forward neural network is not capable of handling reverse links. They cannot persist past information to make prediction at the current instance which is imperative for errands like speech recognition. For this purpose, RNNs were introduced. RNNs have a loop-like structure as well as can persist short-term past information. Due to the limits of RNNs to the vanishing/exploding gradient problem as well as not being able to work on long-term temporal dependency in the statistics, LSTMs were introduced which overcame these limits through the assist of memory cells in their structure.

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