Compatible Voice App for Restaurant Management System

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Abstract - *Ordering food or booking a table is the most recurrent activity in the 21st Century. In today's modern era, talking to a restaurant to find the availability or details of your order status, reservation of table, menu available has become a mundane task. We investigate the use of Google Assistant to cut down the long, hectic process and deliver all the information that a customer needs to book a table, view his/her order status, order food, and other functionality just using the google assistant platform which is directly integrated with our "Voice-based App for Restaurants" (name of our project) a dynamic Web App. We have innovated a way in which a restaurant interacts with the customer and have to build a platform for the restaurants as well. Where they can sign up on our platform and when our Agent is invoked the user can see all the restaurants that are available on our platform. People do not want to stand in line, waiting to be served. They want to be able to make orders and even make cancellations in the privacy of their home or on the move just using their smartphones. It is developed mainly using the Jovo framework, Flutter, and Action on Google Platform as a simple way to generate and train a natural language model. Another convenience of this platform is its ability to collect usage data that is potentially useful for future reusability of the data.*

*Key Words***: Action on Google, Jovo Framework, Web App, Flutter, Voice based App, Restaurants, Agent, Google Assistant, Natural Language model**

1. INTRODUCTION

In the 21st century, advancement in technologies is growing at a significant rate, and its potential to incorporate in various sectors is also growing exponentially. An application area of Artificial Intelligence (AI) is Natural Language Processing (NLP). Voice assistants incorporate AI by using cloud computing and may communicate with the users using voice. Voice assistants are easy to use and thus many devices come with them in households nowadays. Google Assistant that's present in every Android smartphone is that the prime example of a Voice Assistant. Voice interaction is reshaping the way people engage with the planet and reworking digital experiences. Voice control is that the next evolution of human-machine interaction, because of advances in cloud computing.

Restaurants are in search to provide their services to a wide range of audiences; they are looking to use the advancement in technologies and integrate with it to reach a more captivating audience. Moreover, users/customers are on the look to order/search for restaurants within the comfort of their homes or on a go, without talking to any person on a phone call. Users, just with their Google Assistant on their smartphones could invoke the Agent register themselves on it and view all the restaurants that have already registered themselves on our Web App, then user/customer can select any restaurant they want to order from, it will lead to virtual room inside the selected restaurant where user can see the menu, order request like book a table, order food and get the Frequently Asked Questions (FAQ).

The fundamental idea is that the user uses his/her google assistant on his smart device and invokes our Agent then makes a request related to the restaurant services, and then, the voice request gets streamed through the cloud into our backend. In the backend, our algorithm works on the requesting user made, and then after processing, the backend replies with a text response. Finally, the response goes through the cloud and gets transformed into voice, which will be streamed back to the user.

The Web App is mainly for the restaurant side and it performs various functions such as Restaurant account creation and updation, Menu creation and updation, Interaction with orders from customers, and giving statistics of the number of orders received, traffic, and engagement

2. OBJECTIVE

The main objective of building this project is to allow the idea to amalgamate technology with the Restaurant businesses; the need to cope-up with the ever-growing world of technology is at an all-time high. As the lives of individuals are getting more intense and busier, we provide them a source of virtual assistance without the need to talk to a human being to manage the restaurant services. Which not only saves time but also increases efficiency by outsourcing non-core tasks. It also helps the restaurants with a detailed overview of their orders completed, traffic obtained, and popularity among customers. Restaurants could also make any changes in their system at any point of time which would instantly be updated on every individual's mobile phone when searched for that particular restaurant which

minimizes the cost of updated marketing which in return act as a profit to the restaurant business. In summary, amalgamating technology with the restaurant business provides profit and comfort at both ends.
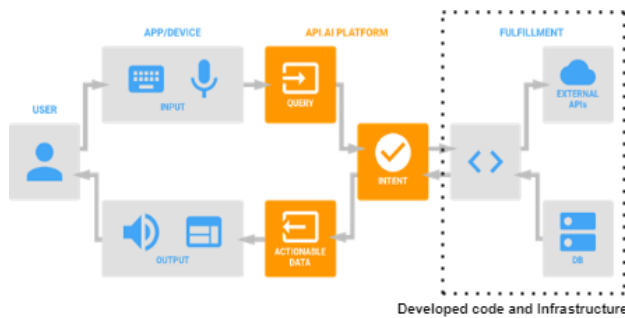
3. METHODOLOGY

3.1 General Structure

Fig-1: Structure of the model

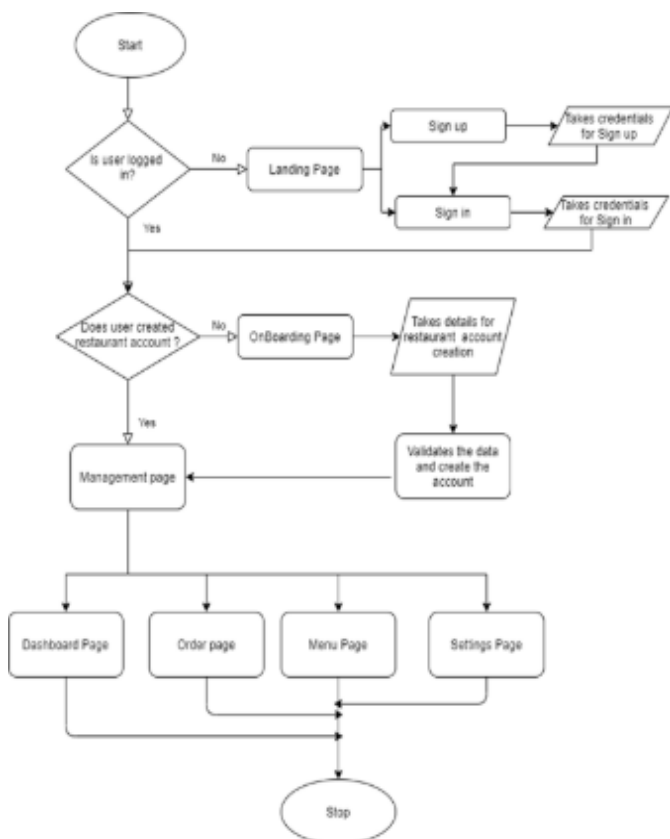### 3.2 Front End Interface

Fig-2: Flowchart of the App's Flutter model

Flutter (developed by Google) which is a User Interface toolkit designed to build Web/Cloud Application is used to create the Front End of our Restaurants Voice App, as the Web App is accessible to only the Restaurants end in-order

view Dashboards pages, Order pages, Menu Page, and Settings Page. When the restaurant visits our App for the first time it instructs it to register itself on the App, after taking the credentials it validates the data and creates an account. After creating the account, it lands the user on the management page where he/she can use our Web App for various services which are provided.
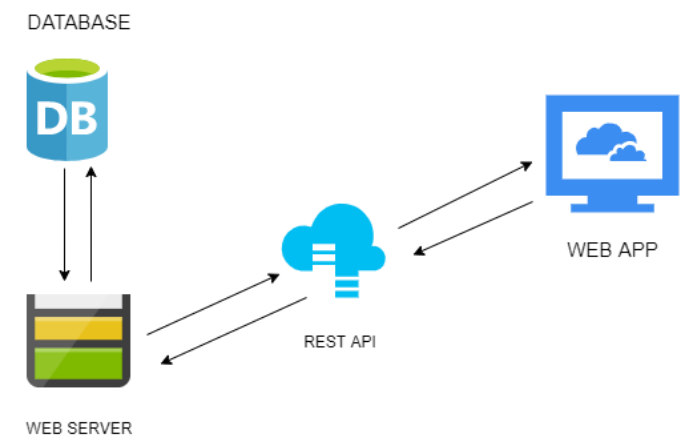
3.2.1 Rest API to Server

Fig-3: API to Server

REST API acts as the mediator between the web app and the server when any request is made on the Web App it requests the webserver for the data that is required, then the webserver approaches the database to extract the data that is needed, it returns it to the webserver and the webserver forwards it to the Application Programming Interface (API) then it returns the data that can be used to GET, PUT, POST and DELETE, which is used to the services that are needed like reading, updating, creating and deleting of operations.

3.2.2 Jovo framework

Jovo is an abstraction layer over Actions on Google platform. It handles all the requests from the actions console, implements our custom backend functions (logic), and returns the appropriate response back to the platform. It provides a set of functions to work with request and response objects and also to deal with Speech Synthesis Markup Language (SSML). In conclusion, it acts as a bridge between the Front-end and the Back-end.

3.3 Back End

3.3.1 Actions on Google
The voice assistant Agent is build using Actions on Google platform, which uses fundamentals like Actions, Intents, Type, Scenes, Prompts, and Webhook and returns responses with audio and visual components. It uses the inbuild Actions on Google's Natural Language Understanding Intent matching technique to invoke the Agent and process all the queries that

the user is going to say during his entire conversation with the Assistant.
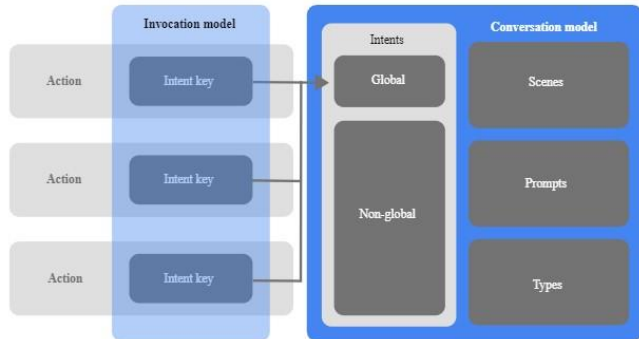
3.3.1.1 Actions on Google Flow Sequence

Fig-4: Actions that serve as entry points into a conversation model (Image source: [1] Actions on Google Docs).
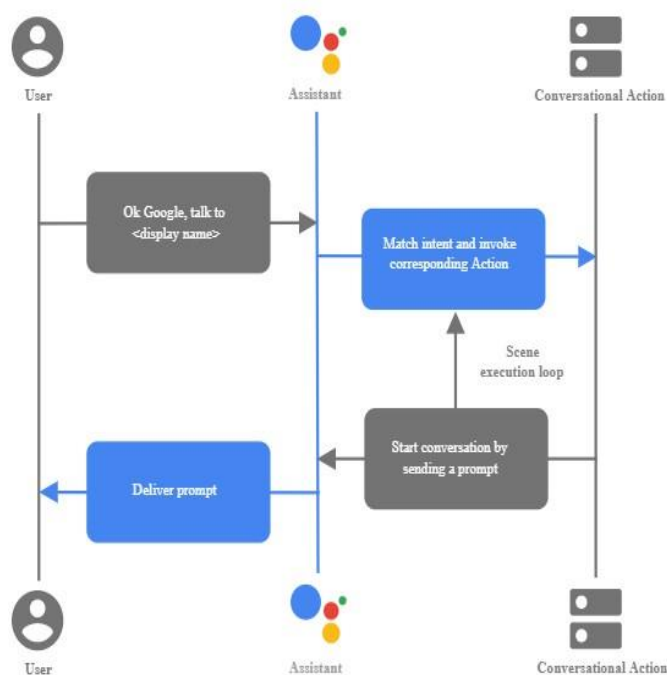

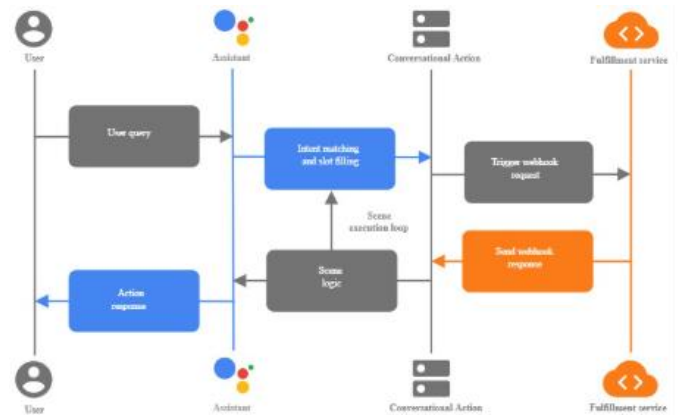**Fig-5**: Main invocation model (Image source: [1] Actions on Google Docs).

Fig-6: Conversation and Fulfillment model (Image source: [1] Actions on Google Docs).

4. ADVANTAGES

Customer's point of view:
1. Easy to use with just saying 'OK Google' or 'Hey Google '.
2. Can use the Management system at any time and place.
3. Can get details of the restaurants without giving them a call.
4. It could be easy to compare various restaurant's Menu.
5. Makes the user comfortable as it acts as a personal Assistant.

Restaurant's point of view:
1.No longer needed to keep paper-based records, everything can be viewed dynamically on the App.
2.Increase's traffic as more customers tend to order from new technology.
3.Acquire a large spectrum of customers.
4.Check the order status at any point in time.
5.Easy and Efficient to use the Application.

5. FUTURE WORK

1. Support for Amazon Alexa, Microsoft Cortana and Siri.
2. Support for more Restaurant Management Systems.
3. Advanced features integrations.

6. CONCLUSIONS

The idea of automating the Restaurant Management System is on a boom with the ever-growing market of technology. 'Voice App for Restaurants' is the ideal solution for this. It provides ease of access within the comfort of your home, flexibility, reliability on both the ends of the customer as well as the restaurants. Restaurants would no longer keep the records on paper which is a hectic task, every request through our Agent to the restaurants would be in a digitalized form where it can be viewed with more ease and restaurants would able to understand the data more comfort and analyze/strategies to make decision according to their

plan. It is designed to minimize human efforts and control the device majorly with human voice; moreover, users can type as well as use the traditional clicking system. In a Nutshell, 'Voice App for Restaurant' is the idea of opening the doors to automation for restaurants and customers.

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