International Journal of Soft Computing and Engineering (IJSCE)
ISSN: 2231-2307 (Online), Volume-12 Issue-3, July 2022

A Chatbot Application by using Natural Language Processing and Artificial Intelligence Markup Language

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Abstract- A program which helps in making conversation with the help of textual methods is referred to as chatbot. Chatbot helps in responding to a message quickly and that too without human intervention. Startups are inventing thousands of chatbots in order to provide a better service and keep their customers busy by a kind and simple conversation. It also helps in providing far better services to customers and helps in buying products. It takes an input from the user in the form of keywords, and it matches those keywords in its data-set to give out the corresponding output saved in it. It gives all the possible answers related to user queries. Since, most of the times like during pandemic, we cannot go outside and cannot meet people, it is an interactive way to get to know about how world is dealing with it. Chatbots exploits AI and ML platforms. Chatbots are becoming popular day by day in this modern era, they are being used in business groups and helps in reducing costs and can help in providing one to many communications that means it can handle multiple customers at same time. Chatbots need to be as efficient as possible.

Keywords: Chatbot, Artificial Intelligence, Enquiry, NLP, Response, Query, AIML, Machine Learning. etc.

I. INTRODUCTION

An automatic and software program which interacts with humans is said to be a chatbot. Chatbot is a program which helps in multiple interactions at the same time. It takes help of artificial intelligence and machine learning, and it also uses neural functions which help in making it function like a human brain. Chatbots talk just like humans do and that too very easily. Chatbots gained importance in 2016. 2016 is also referred to as the year of chatbots. All start-ups and businesses started using chatbots to improve their customer service. According to a survey, it is said that chatbots are currently used in businesses like train reservation, bus booking, hotel booking, logistics, amazon, flipkart and many more. Analysis general queries based on patterns [8].

Manuscript received on 21 March 2022 | Revised Manuscript received on 01 April 2022 | Manuscript Accepted on 15 July 2022 | Manuscript published on 30 July 2022.

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In artificial intelligence we are specifically using AIML. The major advantage of using AIML in our chatbot is that it becomes very simple to apply and learn. The main characteristic of it was its user- friendliness and easiness of the system of dialogue, and the use of various languages for the formal, computer readable representation. The bot introduces two more interactive phases [26]. Like web search, where users can search any other additional information other than covid-19. The second feature is self-diagnosis.

In this lockdown, if anyone falls ill and is confused whether he/she should go to hospital or not, because going to hospital can also increase the chance to get affected [7]. So here we can provide the user to self-diagnose them and it will also check their travel history.

The product business is principally situated on chatbots. Huge number of chatbots are created by new companies and utilized by the organizations to further develop their client support, keeping them hanging by a benevolent correspondence.

As indicated by research, these days chatbots are utilized to tackle various business undertakings across numerous ventures like E-Commerce, Insurance, Banking, Healthcare, Finance, Legal, Telecom, Logistics, Retail, Auto, Leisure, Travel, Sports, Entertainment, Media and numerous others. Subsequently that was the second to take a gander at chatbots as another innovation in the correspondence field. These days different organizations are utilizing chatbots to answer rapidly and productively, some every now and again posing inquiries from their own clients.

II. CLASSIFICATION OF CHATBOT

CHATBOTS can be classed utilizing different factors, for example, the communication level and how reactions are produced [9]. A concise schematic order of CHATBOT is displayed. The primary kind of CHATBOT is a space of information grouped by the information accessible to them or how much information is prepared.

They are additionally ordered into Open Domain and Shut space. Open-space bots can address general points and respond to them properly. Shut domain bots center around one explicit subject matter and may not address different inquiries. For example, a flight booking Bot won't tell you the name of Canada's first President. The subsequent one is administration given; these Bots are wistful closeness to the client, how much private association happens, and relies upon the Bot's assignment.

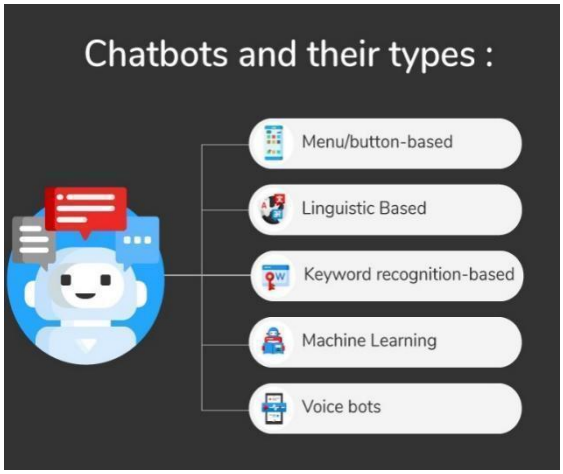

Fig.1. Chatbot and their types

The completely included JavaScript libraries like AngularJS furthermore, Ember empower JavaScript web designers to add usefulness to complex web applications without composing extra code.

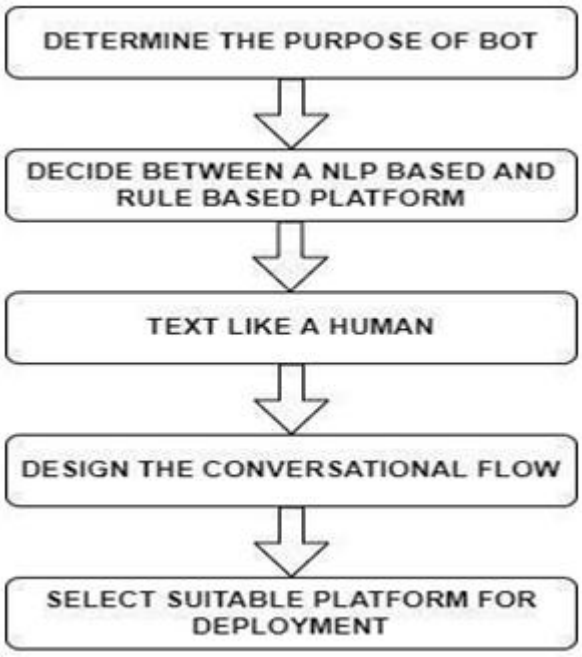

Fig.2. Designing Chatbot

It might make you a quip or answer to the way your day is, yet doing some other undertakings, considering that isn't implied, its responsibility is to book a flight and give the client all the essential data about the booked flight [9].

III. EXPERIMENTS

A. Python

Python is the most adored language for creating a chatbot. The main reason behind this is the involvement of Artificial Intelligence Markup Language which makes it low demanding for experts to create grammar. This result in eliminating the hardships faced during coding and decreases the probability of mistakes.As referenced above, Application Program Interface(API) is a tool that helps in intercommunicating between at least two computer programs, the role is to guide developers with getting to beforehand defined capacities from different applications [11]. Developers actually utilize the quality solicitation module to interact with an API, (in this case) a python API, to which a reaction(response) is received in JSON(JSON is a method of putting data in a synchronized, permitted way). The JSON module simplifies the information to work with and it is additionally an inherent python module. For more profound arrangement, we could examine a couple of purposes of making use of an API with python follows these means:

• Get an API key (an extraordinary series of letters and numbers).

• Insert an API key to each demand to be recognized by API.

• When we receive an API key by consuming API endpoints, we can check that everything is functioning correctly.

• As soon as everything executes in the same way as we expected, we can start constructing the application, which includes calls to the essential API. From our inventions, we could close a couple of focuses as API inside layer to layer between your application and outside assistance. It's not compulsory to know the highlights of your assistance, instead you can send a specific basic order and get information in a legitimate arrangement. It consumes HTTP demands for correspondence with web administrations [17]. Programming interface consent to specific requirements which are as per the following:

1.Client-Server architecture - here Client is answerable for the user interface, and the server is responsible for the backend and information storage.

2. Stateless - Client-side information is not put on the server side. Client-side requests are settled on the client side itself not on server

3. Cacheable - clients can store server reactions to develop execution.

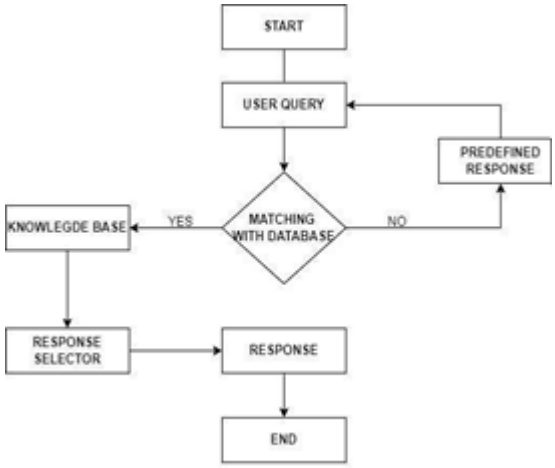

Fig.3. Flow chart diagram for covid related queries

• GET: Fetch data (like list items). This is the most popular sort of supplication. Consuming it, we can get the information we want from those to which API is being prepared to share.

• POST: Adds information to the server. Utilizing this sort of supplication, we can, for example, add things to our stock.

Retrieval Number: 100.1/ijsce.C35660712322
DOI: 10.35940/ijsce.C3566.0712322
Journal Website: www.ijsce.org

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)

• PUT: Changes existing data. For example, utilizing this kind of supplication, it would be feasible to change the shading or worth of a current item.
• DELETE: Deletes, or say, erases already existing data. A few techniques that are created inside API: Create Device: Register one gadget, return the gadget if succeed or mistake assuming the gadget as of now exists or fizzled. Create Device Model: Create a 3p device model. Delete Device: Deletes a specific device user owns.

B. Delete Device Model

Delete a 3p machine model. Get Device: Get information of a particular gadget client claims, return the gadget whenever succeeded or on the other hand whenever fizzled. It uncovered a low-level API that allows the client straightforwardly to control the sound bites of an associate solicitation and reaction. Ties for API can be created for languages like Node.js, Go, C++, Java for all stages that help gRPC. A few highlights of gRPC are it is an advanced open-source exhibition RPC structure that can run in any climate.
It can proficiently associate administrations in and across server farms with pluggable help for load adjusting, following, wellbeing checking and confirmation. Furthermore, we want to comprehend that we are not coordinating business gadgets with Google Assistant SDK. The Google Assistant allows us to add voice, normal language understanding and Google's smarts to your thoughts. We could say JavaScript is a script-based programming language consumed by both the client side and server-side that allows us to make website pages dynamic. The design and style of pages is given by HTML and CSS. JavaScript allows site pages to have intelligent components. Consolidating JavaScript works on the site page by changing the client's experience of it from a normal paper into an unique one. To recap, JavaScript adds conduct to site pages. Designers can similarly utilize JavaScript to fabricate basic web servers and foster the back-end foundation utilizing Node.js. It assists with making the site pages intelligent, answer clients momentarily and make more interactive user interface, without low server involvement and also decreases load on server. It guides with improving on complex web advancement applications as designers can utilize libraries to make shadow DOM limits. Nonetheless, parts of the MEAN stack are as yet interoperable. MongoDB is an advanced and blueprint-less NoSQL information base, while Angular.js is a famous JavaScript structure upheld by Google. Simultaneously, Node.js is a cross-stage and server-side runtime climate, while Express.js is planned with highlights to work on advancement of single page and different pages sites[7]. Simultaneously, lightweight JavaScript libraries like React.js make it more straightforward for software engineers to achieve explicit assignments. Thus concluded, the expert level web designers should utilize JavaScript to cause their web applications to convey ideal client experience across different gadgets, working frameworks, and programs. Be that as it may, they should be acquainted with different JavaScript libraries, structures, and apparatuses. They could actually join different libraries and structures to improve and stretch out JavaScript as per prerequisites of huge tasks.

C. AI-ML

AI-ML and LSA are utilized for making chatbots. Man-made reasoning Markup Language (AIML) and Latent Semantic Analysis (LSA) are utilized for creating chatbots, which are utilized to characterize general example-based inquiries.

IV. COMPARISON MATRIX

Table- I: Comparison of different chatbots

Chatbot Name	Features	Programming Language	Technical Details	Channels	Fields
Agent Bot (2005)	Understands natural language. It collects user data to provide customized solutions. Allocates memory to keep up the consistency during big conversations.	Use REST API to integrate with CRM (Customer Relation Management) and other platforms.	Combines with any CRM, system, human chat and third-party apps.	Voice or messenger channel.	Bank and financial services Telecommunication and Cable operators.
Twyla (2007)	Grasp knowledge from agent/user live chatting. Combines Machine learning and rule-based engines. Provide answers to the questions.	Analyses data via the API via chat solution or a secure file upload.	Combined majorly with live chat solutions. So, no presence of new processes.	Web Facebook Telegram	Automation and self-service customer support.
Pypestream (2008)	It uses a framework of Pypes and Streams, NLP and keyword processing.	The Pypestream mobile app is the smart messaging framework which makes use of API plug-ins and integrations.	API platform that allows custom integrations and development of 3rd plugins & extension and party connectors.	Pypestream mobile app Webchat Messenger IOT	The company has 500+ businesses signed.

Live Agent (2011)	https://www.liveagent.com /features/	https://www.liveagent.com /Integrations-and-plugins/		Email Voice Social Chat	Live agent is the ultimate software that provides customer support. It also provides a portal for chatting.
Digital Genius (2015)	Uses word vectors, statistical operations, Deep learning algorithms and deep neural network models. Every agent interaction helps to improve the AI model. AI suggests the right answers to our questions with the help of meta-data gathered through analysis.	A layer that consists of AI Customer Service + Human is installed in the form of a layer into existing customer service software.	Existing software of contact center is integrated with the Human and AI customer service.	Email Voice Social Media Messaging Live Chat	Customer Services
Semantic Machines (2019)	Understands conversations Extract semantic intent. Uses various technologies along with NLG.	Focused in imposing Conversational AI technology in our product or platform.	Focusing in imposing Conversational AI technology in our product or platform.	Voice Text	E-Commerce Travel Business Search Productivity Automotive
Microsoft Bot Framework (2014)	Understand the intention of the user. By incorporating LUIS that is used for natural language understanding, you can give your bot more human-like senses.	Bot Directory. Bot Connector Developer Portal SDK and node.js Bot builder SDK.	To host your bot In an website or app, the framework provides the direct line Representational State transfer API,	Other popular services, Teams and. Slack. From your app or website to text.	High quality bots can be built and deployed using this framework.

V. METHODOLOGY

We have used Python for developing Chatbot as it provides us with many libraries and functionalities. The stepwise algorithm for designing chatbot is as follows:

Step 1: We have imported Python libraries such as nltk. numpy, pandas, warnings etc.

Step 2: Then, we created a dataset for different queries which are analyzed with the help of Natural Language Processing (NLP). NLP helps us to differentiate the queries by categorizing them according to the tags and keywords present in queries

Step 3: First, we have imported the dataset of queries in our code. Then, we have called the sent tokenize () function on our raw data which helps us to break our queries into sentences or list of sentences.

Step 4: We have made a method named response which helps us in questions that do not lie in the scope of the dataset. This function helps us in dealing with those types of questions with the help of Wikipedia search.

Step 5: We have also made a function named Normalize, which helps us in greeting purpose and handling basic queries based on keywords and tags.

Step 6: In the main function, we have set the value true for a variable named flag. This will help us in reiterating the code which asks for the user from the list of options available for accessing the chatbot.

Step 7: Then in the while loop, we have taken the input of queries from the user and then run NLP over it for categorization purposes and generate responses.

Step 8: Then at the end if the user wants to exit he can simply choose the number corresponding to this message and a response will be given to him.

VI. FEASIBILITY STUDY

The term 'Discussion Agent' describes assortment of frameworks with changing capacities, with the fundamental presumption that the specialist takes part in a cibernética exchange. Licklider's 'Man-machine beneficial interactions [12] was perhaps the premature talk according to a HCI point of view that envisioned people cooperating with machines in a characteristic way. Research in discussion specialists began with informing based chatbots, whose design was to keep a discussion with a human client. To be sure, effortlessness was the main measurement for assessing chatbots. In 1990, the Loebner Prize was founded as a yearly contest to grant the most human-like chatbot. ELIZA chipped away at straightforward definitive guidelines: if a specific catchphrase was distinguished in the client text, it reacted with at least one predefined yield. In this way, in the last chatbots, the guidelines utilized for both normal language understanding and regular language age were enhanced. Ontologies were utilized to address word implications, thinking was utilized to distinguish client aim, and memory was utilized to proceed with a context-oriented exchange [15]. The outstanding investigation of chatbots included MegaHAL [26], ALICE [1], and Elizabeth [18]. Ongoing models from the Loebner champions are Mitsuku [2] and Rose [3]. Somewhat recently, conversational specialists began zeroing in on utility, determined to achieve explicit task(s). Humanoid attribution, when it exists, tries to expand the productivity of the undertaking addressing process. These days, conversational specialists' range across a few modalities, including discourse, text-informing, and as multichannel epitomized specialists.

Encapsulated CAs have a representational interface rather than a mechanical figure, and endeavour to be humanoid by utilizing gestural practices, like signals and articulations, notwithstanding discourse [13]. Epitomized specialists are yet to arrive at the more extensive populace.

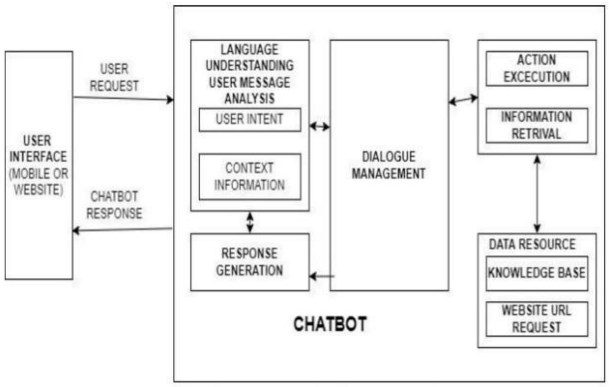

Fig.4. Architecture of Chatbot

Then again, the simplicity of improvement, commonality of utilization, and the protection managed by absolutely informing based specialists has guaranteed that most advancement endeavors have fixated on building conversational specialists with no arrangement for signals or discourse. This paper centers around such text-informing based CAs, called chatbots.

An e-business chatbot using AIML and LSA Author**:** N. Thomas tells us about the way in which we can plan a chatbot in such a manner for a type of template it can give varying results whereas for LSA based queries the right responses were shown.

The anatomy of ALICE Author: Wallace, Richard S. In this paper, Dr. Richard S. AIML and A.L.I.C.E were proposed technically in this paper. They are set to prepare answers in the background on the basis of historical and philosophical contemplation developing in human conscience.

CHARLIE: An AIML-based Chatterbot as an Interface in ONES Author: Mikic, Burguillo, Llamas, Rodr´ıguez, Rodr´ıguez in this paper the description of a chatbot CHARLIE is given. The main quality of CHARLIE is it can answer general or area specific questions and students can also communicate with CHARLIE in natural language.

VII. RESULTS

To assess the execution of a chatbot, a rundown of measurements was applied to quantify its exhibitions. There are devices and techniques which were utilized to follow the general exhibition of a chatbot. The primary measurement is "cognizance capacities", this implies a decent chatbot ought to guarantee perception abilities of a simple messaging and hassle-free insight for the user. If a user types a wrong spelling or does a mistake while framing a sentence, at that point the chatbot should consider using the 'auto-right' include. To accomplish this measurement, a chatbot initially ought to have 'text-based comprehension' to rapidly comprehend the inquiries or an order from the client. For instance, if the client texts "I might want to arrange a pizza", the chatbot can know about the contrast between an inquiry and a request. Also, chatbots ought to be equipped for 'adjusted text-use'. This permits a chatbot to have the option to utilize a mix of both short depictions and connecting with content to hold the client's consideration. The subsequent measurement is "client commitment", so the chatbot can start discussion and communicate with the clients to share and convey significant messages, take direct requests from clients, and explore to formats and that's just the beginning.

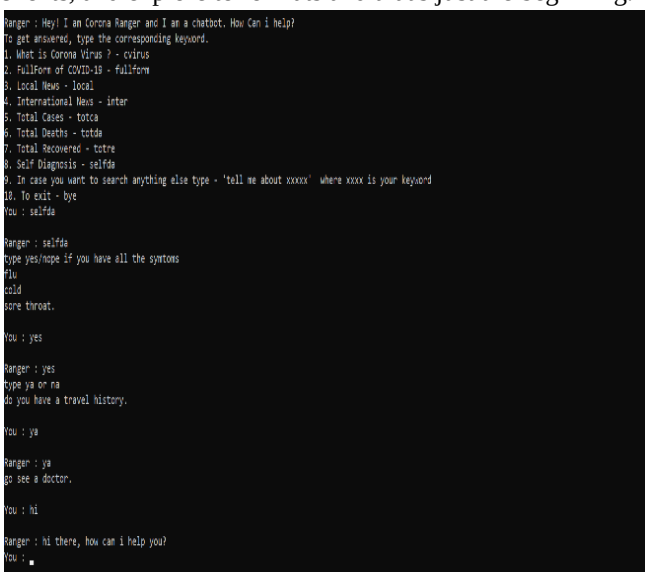

Fig.5. Final Output 1

The extraordinary capacity of a chatbot is regularly posed inquiries (FAQs) of clients to build usefulness. Obviously, "reaction speed" is a fundamental measurement as the chatbot intention is to serve the clients in a split second. Quality chatbots can convey reactions promptly for compelling communications. Chatbots should incorporate fundamental functionalities with an assortment of all around planned functionalities, for example, onboarding, rich media use, and routes that lead to an incredible conversational stream.

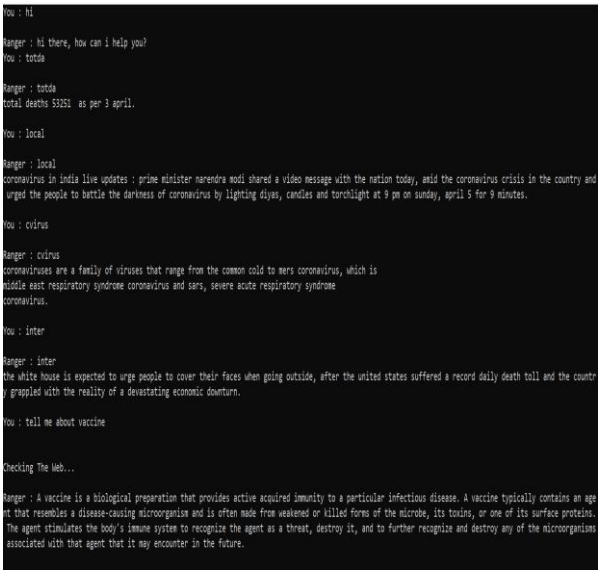

Fig.6. Final Output 2

Obviously, "reaction speed" is a fundamental measurement as the chatbot intention is to serve the clients in a split second. Quality chatbots can convey reactions promptly for compelling communications.

Retrieval Number: 100.1/ijsce.C35660712322
DOI: 10.35940/ijsce.C3566.0712322
Journal Website: www.ijsce.org

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For instance, chatbots should welcome clients with a movement of onboarding steps, use attracting rich media pictures with text to stand apart to the point of being seen and give course gadgets to help the clients with the organization. Just to zero in on the ramifications of chatbot use, how about we have a look at the chatbot future. It has been anticipated by business insiders that by 2020, 80% of undertakings will utilize chatbots. Till 2022 banks can computerize up to 90% of their client collaboration utilizing chatbots and 40% of enormous organizations utilizing in excess of 500 individuals intend to carry out at least one canny collaborator or AI-based chatbots. As indicated by float, 27% of grown-up clients in the United States are prepared to buy fundamental products through a chatbot, 13% of grown-ups in the US have something like once purchased costly things utilizing chatbots.

VIII. DISCUSSION

We have introduced ways to deal with creating a chatbot which is associated with different innovations such as API, web stage, prearranging language and so forth.

Different improvement techniques follow various systems to react to the client's responses. As per business reason advancement organizations pick which technique is more successful and cost limiting. Anything that strategy we pick, the intention is similar which is reacting to more precise solutions to customers. All strategies follow similar advances, however they pick various stages for bringing information, for example, picking API, characterizing intransigent install replies in JavaScript work, getting information from data set or refreshed innovations utilizing AI language. Steps which are followed by all these techniques are:

1. Importing Various Libraries
2. Start Making Dataset
3. Writing Code
4. Building Chatbot Frontend
5. Running Chatbot.

IX. CONCLUSION AND FUTURE WORK

In this paper, we investigated with regards to an electronic AI chatbot which depends on AIML, Python and LSA. We categorize chatbots as text-based, task-fulfilling projects, instated inside subsisting stages. In our review we planned an electronic AI application to show how Machine Learning, Python and JavaScript procedures increment client consistency with a chatbot's solicitation for administration input. Our review is in this manner an underlying advance towards better agreement on how AI-based CAs might further develop client consistency by utilizing the impacts of Machine learning and AI as the need to remain steady with regards to electronic business sectors and client support. Thus, this piece of examination reaches out earlier information on CAs as human data specialists in client assistance. Also, with the ascent of AI and other innovative advances, astute CAs will turn out to be much more significant later and will additionally impact client encounters in, for instance, independent direction, onboarding excursions, and innovation appropriations. Since the review was led in an exploratory setting with an improved adaptation of a texting application, future examination needs to affirm and refine the outcomes in a more reasonable setting, for example, in a field study. The interpose for the highly evaluated chatbots gave headings to intensification.

Explaining a chatbot's capacities, supporting setting goals for exchange productivity, overseeing discourse disappointments, taking part in casual banter, and finishing discussion nimbly, are a portion of the rules for chatbot creators. For forthcoming work, we can make a chatbot that depends on artificial intelligence markup language and latent semantic analysis. This innovation will empower a client to communicate with a chatbot in an effective way. We can improve the conversation by comprising and replacing examples and formats for extensive client inquiries utilizing AIML and the right reaction is delivered much more frequently than LSA.

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