



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

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**Abstract :** The society has been greatly impacted by the modern era of technology. Chatbots are a common element in conversational services thanks to the development of the ultimate virtual assistants. Bots that use natural language processing and understanding are known as chatbots. In addition to assisting users with chores like locating the nearest cinema, chatbots can also be used to entertain users, help with home automation projects, offer business strategy advice, and assist in other ways. In this paper, we'll explain what a chatbot is and the many kinds of chatbots. We also suggest a classification based on requirements, usefulness, and market trends.

**IndexTerms - Artificial Intelligence, Chatbot, Natural Language Processing, Machine Learning, AIML, etc.**

## I.INTRODUCTION

The economy and daily chores both heavily rely on technology. It is used in various ways around the world and for a number of purposes. Artificial intelligence has recently captivated the public's imagination. Artificial intelligence replicates a human's cognitive powers. The AI Chatbots are currently replacing human responses with this software since they are more accurate and closely resemble people. Widely recognized as a virtual assistant, a chatbot is a computer programme that acts as a colloquist between a human user and the bot[1]. It has gained tremendous popularity in recent years, largely as a result of significant advancements in artificial intelligence, machine learning, and other foundational technologies like neural networks and natural language processing. These chatbots use interactive questions to efficiently converse with any human. Many cloud-based chatbot services, including IBM Watson, Cleverbot, ELIZA chatbot, and many others, have recently been significantly more prevalent and made available for the growth and enhancement of the chatbot industry. Over the past few years, the art of interaction between humans and robots has significantly advanced as these conversational agents have grown more sensitive[1].

## II.LITERATURE SURVEY

The adoption of AI chatbots by businesses to interact with clients and automate customer service chores has grown in popularity in recent years. Below is a review of existing research on AI chatbots with usage examples[1].

**Creating an AI chatbot for personalized health advice by D. Kang et al:** This study investigates the usage of an AI chatbot to give people personalized health advice. The chatbot uses natural language processing to comprehend user inquiries and offer tailored responses after being trained on a sizable dataset of health-related data. As an illustration, the healthcare provider Babylon Health utilises an AI chatbot to connect users with doctors and offer them health advice[1],[2].

**A study by H. Chen et al. on chatbot design methods in speech communication systems:** The approaches used to develop chatbots for speech conversation systems, such as natural language processing, managing conversations, and response creation, are discussed in this paper. The authors highlight the need of creating chatbots that can comprehend user inquiries and give thoughtful, conversational answers. For instance, Alexa from Amazon is a AI chatbot that can comprehend and react to voice commands, enabling users to operate their smart home gadgets, play music, and acquire information[2].

**The article "Chatbot Technology: A Review of Design, Procedure, and Applications" was written by S. Ahmed et al:** With a focus on the advantages and difficulties of employing chatbots for business reasons, this article examines the design, development, and implementations of chatbot technology[2]. The authors emphasize the value of creating chatbots that can respond accurately to a range of user inquiries. As an illustration, the clothing company H&M utilises an AI chatbot to offer clients tailored fashion advice and to assist them in finding products.

**AI Chatbots in Customer Service: The Effect of Personality and Communication Style on User Satisfaction" by S. Lee et al:** The impact of chatbot personality and communication style on user satisfaction in customer service encounters is examined in this paper. The researchers discovered that consumers were happier with chatbots that talked in a conversational manner and had more

human-like personalities. An illustration is the AI chatbot used by beauty shop Sephora to assist consumers in selecting the best cosmetics and skincare goods[2],[3].

The article "A Survey of Chatbot Design Approaches in Healthcare Applications" was written by Y. Shen et al: The design methodologies utilised in chatbots for healthcare applications, such as medical diagnosis, health monitoring, and mental health assistance, are surveyed in this research[2],[3]. The authors talk about how employing chatbots in healthcare could have advantages like lower costs and better accessibility. An illustration of this is the cognitive-behavioral therapy methods used by the mental health chatbot Woebot to assist users in managing their symptoms of anxiety and sadness.

### III. TYPES OF CHATBOTS

Manual labour was very essential to every aspect of the industry before the contemporary era of technology. The development of chatbots has greatly aided modern evolution in fields like customer service[2],[3]. Yet not all chatbots fit neatly into one category. The user interface simplicity, algorithms, and underlying technology are combined to classify chatbots. According to the proposed classification in this research (**Figure.1**), there are primarily three categories of chatbots[3]. Menu/Button-Based chatbots. The menu-based chatbots, which come in the shape of buttons and top-down menus, are the most often used and the most basic variety available today. These chatbots operate on the tenets of decision trees, where you make choices to determine the final result. The user is told to choose their options and look more into the proper response from the AI in order to make these decisions[3]. These menu-based chatbots can sometimes be relied upon to provide the desired response, but they are generally slower in terms of performance.

Chatbots based on keyword recognition :These chatbots identify particular terms in order to deliver the desired outcome. They pay attention to what users enter and react appropriately. The bot chooses an acceptable response for the user using algorithms with the aid of artificial intelligence technology and a list of personal keywords[3],[4]. When there are keyword overlaps between numerous related inquiries, these chatbots will start to fail. One of the most technologically sophisticated chatbots on the market right now is contextual. To read the user's emotions, they use machine learning and artificial intelligence technologies like speech-to-text conversion algorithms and voice recognition. By interpreting the database's pattern, this form of bot seeks to understand the user's intents and respond appropriately with a smart response[4].

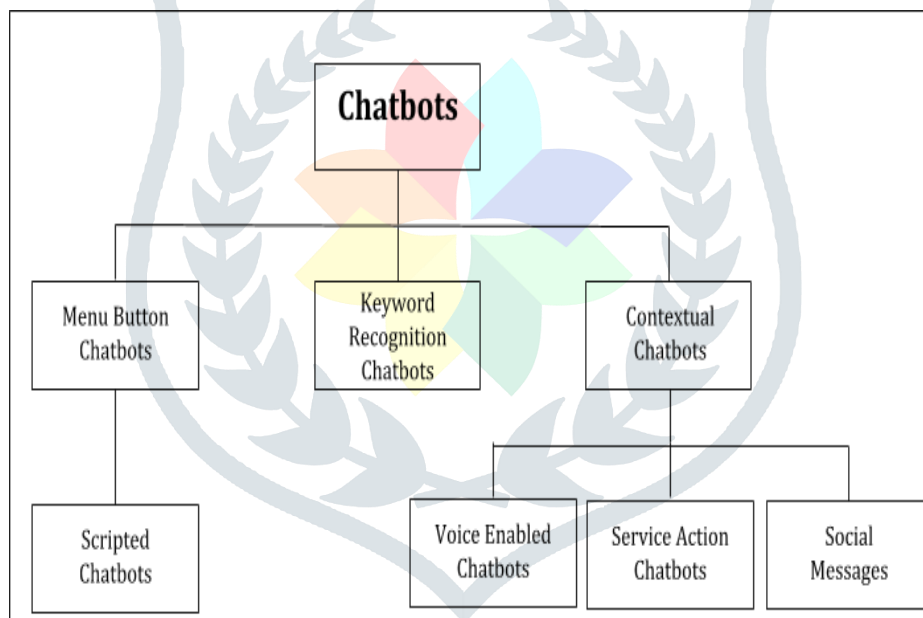


Figure 1: Classification of Chatbots

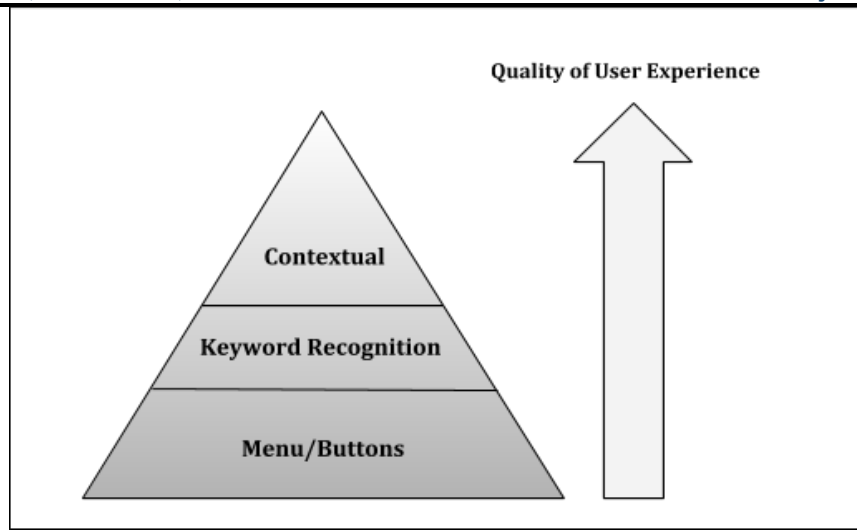


Figure 2: Preference of Chatbots

## IV.TOP 5 CHATBOTS

### 4.1 GPT-3

OpenAI's GPT-3 language generation model can produce responses that resemble those of a human being when given instructions. It has been extensively utilised in a variety of applications, including customer service, education, and healthcare. It can be used to create chatbots that can communicate with customers in natural language[4],[5].

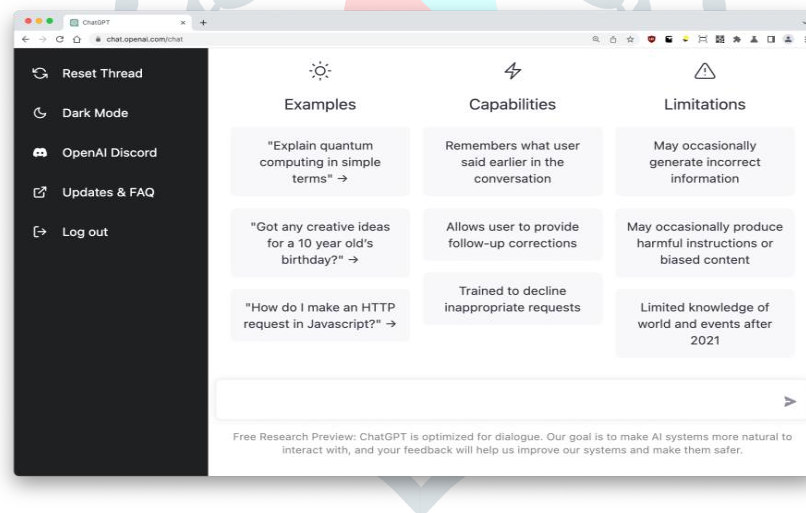


Figure 3 : ChatGPT interface

### 4.2 Mitsuku

The award-winning chatbot Mitsuku was developed by Steve Worswick. It can comprehend inputs in normal language and is designed to engage in conversation with users. It has received the Loebner Award four times, an award given for the best conversational imitation by a chatbot[5].

### 4.3 Replika

Replika is a chatbot with artificial intelligence (AI) that aims to serve as a personal AI companion for its users[5]. It may offer emotional support, guidance, and individualised dialogues while also learning from its interactions with people.

### 4.4 Cleverbot

Since 1997, AI has been the driving force behind this chatbot. It employs machine learning techniques to learn from its encounters with users and can have natural language conversations with them. It has been put to use in a variety of contexts, including entertainment and language acquisition[5].



Figure 4: Cleverbot interface

#### 4.5 Xiaoice

Microsoft created the well-known chatbot called Xiaoice. It is intended to engage in natural language discussions with users, comprehend their feelings, and offer emotional support. It has more than 660 million users and has been utilised extensively in China[5].

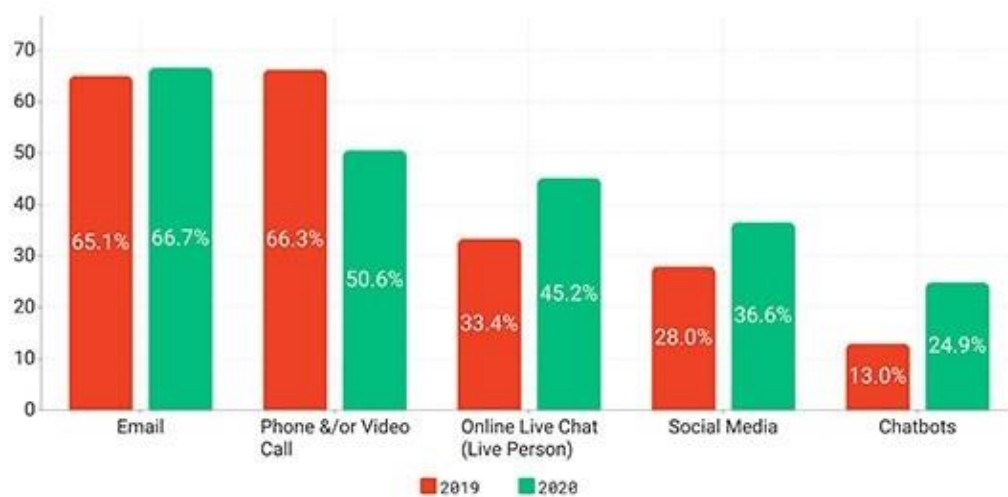


Figure 5: Usage of chatbot as communication between 2019 &amp; 2020

## V. RESEARCH METHODOLOGY

Python offers us a wide variety of libraries and features, therefore we used it to construct the chatbot. Here is the step-by-step algorithm for creating chatbots:

- **Step 1:** involves importing Python modules like nltk, numpy, pandas, warnings, etc.
- **Step 2:** Following that, we developed a dataset for various questions that was then subjected to Natural Language Processing analysis (NLP). By classifying them based on the tags and keywords present in the queries, NLP enables us to distinguish between different types of searches[5],[6].

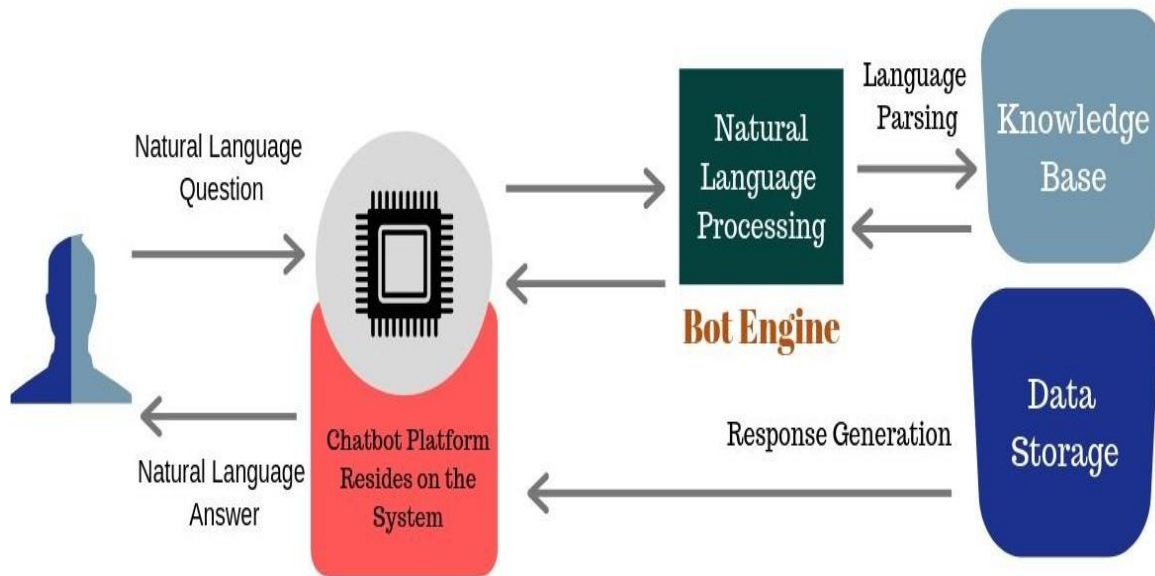


Figure 6: working of Chatbot using NLP

- **Step 3:** The collection of queries was first imported into our code. Subsequently, using our raw data, we ran the sent tokenize () function, which enables us to decompose our requests into lists or sentences[5],[6].
- **Step 4:** We created a method called response that assists us with queries that are outside the range of the dataset. With the aid of a Wikipedia search, this feature aids us in answering those kinds of queries.
- **Step 5:** We also created a function called Normalize that assists us with greeting users and handling simple keyword- and tag-based searches[5],[6].
- **Step 6:** We have set the value true for the flag variable in the main function. This will make it easier for us to repeat the code that selects the user from the options available to access the chatbot.
- **Step 7:** Next, in the while loop, we take the user's input of queries and apply NLP to them in order to categorise them and produce answers.
- **Step 8:** At the conclusion, the user can simply select the number that corresponds to this message if he wishes to go without receiving a response[6].

## VI.OBJECTIVES

**Customer service:** Chatbots are used by many businesses to quickly and effectively assist customers by responding to their questions and meeting their demands.

**User experience improvement:** Chatbots can be created to offer users a personalised and interesting experience, boosting customer happiness and loyalty.

**Automating chores:** Chatbots can automate basic tasks like making reservations, placing food orders, or making travel arrangements, freeing up time for human staff to concentrate on more difficult jobs.

**Data gathering:** Chatbots can be set up to gather and examine consumer preferences and behaviour data, which can be utilised to enhance marketing plans and product development.

**Increasing productivity:** Chatbots can make businesses run more smoothly by speeding up responses, streamlining procedures, and cutting the costs involved with hiring human employees.

## VII.IMPLEMENTATION

### 7.1 AIML

We have used AIML files to hold the question and response pair in order to build our knowledge base for informal discussion. When a user engages in conversation with our chatbot, the input is compared to pattern lists in AIML files, and the appropriate response is returned[6].

The sample AIML file structure is as:

```

aiml version = "1.0.1" encoding = "UTF-8"?>
<category>
<pattern> HELLO USER</pattern>
<template> Hi User!</template>
</category>
</aiml>
  
```

## 7.2 Lemmatization and POS Tagging Using WordNet

Keyword extraction from the input text was used to extract information. The phrases "current," "placement," and "scenario" are used in the question "What is the current placement scenario?" as an example. Lemmatization and POS tagging were used to identify the appropriate lemmas for the keywords in order to organise the many inflected forms of the words. Requiring, going to require, and required, for instance, should all map to requiring. For this, the "nltk" package of Python's WordNet was utilised[6].

## 7.3 Semantic Sentence Similarity

There are numerous ways that a user can enter the same inquiry. For instance, Q1: What is the notice regarding re-registration for PG courses? Q2: Please explain the re-registration process for PG courses at our college.

Q1 and Q2 are equivalent in meaning (same sense). Moreover, there will be numerous additional options for the same query, making it impossible to locate every possible combination[6],[7]. The system's performance and scalability will also suffer. Finding similarities between the user input and the questions in the accessible question set helps to solve this issue (whose answers are available with the system). If the score is larger than the threshold, the query that best matches the input with the highest score is chosen, and the proper response is then provided[6],[7].

The similarity between two sentences is determined by average how similar their individual keywords are. Each keyword in the first sentence is compared with each keyword in the second sentence. The similarity of the sentence is then represented by averaging the similarity scores of the individual terms. Path Similarity and Wu-Palmer (WUP) Similarity are used to determine word similarity[7].

## 7.4 Log File

We have a log file that we keep track of the inputs that the chatbot was unable to respond to. The administrator can access the log and add any pertinent responses to the knowledge base. This would aid in the database-based chatbot knowledge system's advancement[7].

## VIII.RESULT ANALYSIS

A list of measurements was used to quantify a chatbot's performances in order to evaluate their execution. The main metric is "cognizance capacities," which means a good chatbot should ensure the user can perceive simple messaging and hassle-free insight. The chatbot should think about using the "auto-right" include if a user writes an incorrect spelling or makes a mistake while structuring a statement[7],[8]. A chatbot must have "text-based comprehension" in order to quickly understand a customer's questions or orders in order to achieve this measurement.

The chatbot can distinguish between an inquiry and a request if a client messages, "I might like to organise a pizza," for example. Moreover, chatbots should have "adjusted text-use" capabilities. This gives a chatbot the opportunity to use a combination of succinct descriptions and engaging information to keep the customer's attention[7]. The next metric is "client commitment," which means that the chatbot can engage in conversation with clients to share and transmit important messages, accept direct client requests, experiment with different forms, and that's only the beginning[7].

```
Ranger : Hey! I am Corona Ranger and I am a chatbot. How Can i help?
To get answered, type the corresponding keyword.
1. What is Corona Virus ? - cvirus
2. FullForm of COVID-19 - fullform
3. Local News - local
4. International News - inter
5. Total Cases - totca
6. Total Deaths - totde
7. Total Recovered - totre
8. Self Diagnosis - selfda
9. In case you want to search anything else type - 'tell me about xxxxx' where xxxxx is your keyword
10. To exit - bye
You : selfda
Ranger : selfda
Type yes/nope if you have all the symptoms
flu
cold
sore throat.
You : yes
Ranger : yes
type ya or na
do you have a travel history.
You : ya
Ranger : ya
go see a doctor.
You : hi
Ranger : hi there, how can i help you?
You :
```

Figure 7: final output

```

You : hi
Ranger : hi there, how can i help you?
You : totda
Ranger : totda
total deaths 53251 as per 3 april.
You : local
Ranger : local
coronavirus in india live updates : prime minister narendra modi shared a video message with the nation today, amid the coronavirus crisis in the country and urged the people to battle the darkness of coronavirus by lighting diyas, candles and torchlight at 9 pm on sunday, april 5 for 9 minutes.
You : covid
Ranger : covid
coronaviruses are a family of viruses that range from the common cold to mers coronavirus, which is middle east respiratory syndrome coronavirus and sars, severe acute respiratory syndrome coronavirus.
You : inter
Ranger : inter
the white house is expected to urge people to cover their faces when going outside, after the united states suffered a record daily death toll and the country grappled with the reality of a devastating economic downturn.
You : tell me about vaccine
Checking The Web...
Ranger : A vaccine is a biological preparation that provides active acquired immunity to a particular infectious disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or killed forms of the microbe, its toxins, or one of its surface proteins. The agent stimulates the body's immune system to recognize the agent as a threat, destroy it, and to further recognize and destroy any of the microorganisms associated with that agent that it may encounter in the future.

```

Figure 8: final output 2

The exceptional ability of a chatbot is frequently used to ask customers questions (FAQs) to increase usefulness. Since the chatbot's goal is to service customers in a flash, "response speed" is undoubtedly a crucial metric. Good chatbots can respond quickly to communications that are compelling. Basic functionalities should be combined with a variety of all-around planned features, such as onboarding, the utilisation of rich media, and paths that lead to an amazing conversational stream[7],[8].

Since the chatbot's goal is to service clients as quickly as possible, "response speed" is obviously a crucial metric. Good chatbots can respond quickly to communications that are compelling[7],[8]. For instance, chatbots could greet customers with a flow of onboarding steps, employ eye-catching rich media images with text to stand out to the point of being observed, and provide training tools to assist the customers with organisation. Let's take a look at the future of chatbots to focus specifically on the effects of their use[8]. Business insiders predict that by 2020, 80% of projects will make use of chatbots. By 2022, banks will be able to automate up to 90% of their client interaction with chatbots, and 40% of large firms with more than 500 employees want to implement at least one AI-based chatbot or smart collaborator[8]. According to float, 13% of US adults over the age of 18 have at least occasionally purchased expensive items via chatbots, while 27% of adult customers are willing to make basic purchases through a chatbot[8].

## IX.CONCLUSION

In this study, we analyzed the use of an AIML, Python, and LSA-based AI chatbot that operates electronically. Chatbots fall under the category of text-based, task-fulfilling initiatives that are implemented within ongoing stages. To demonstrate how machine learning, Python, and JavaScript techniques increase client consistency with a chatbot's request for administrative input, we designed an electronic AI application for our review. By utilising the effects of machine learning and AI as the need to maintain consistency with regards to electronic business sectors and customer support, our review is thus an important step in the right direction towards better understanding how AI-based CAs might further develop client consistency. As a result, this investigation expands on past findings about CAs as human data specialists in customer help. Astute CAs will also become significantly more important in the future and have an impact on client experiences in areas like independent direction, onboarding excursions, and innovation appropriations. This is due to the rise of AI and other technological advancements. Given that the evaluation was conducted in an exploratory manner, it is necessary to confirm and improve the findings in a setting that is more appropriate, such as a field investigation. The interposition for the highly regarded chatbots provided intensification with direction.

Some guidelines for chatbot developers include outlining a chatbot's capabilities, assisting with goal-setting for exchange productivity, managing discussed disappointments, engaging in light-hearted banter, and swiftly concluding a conversation. We can create a chatbot for next work that uses latent semantic analysis and artificial intelligence markup language. A customer will be able to effectively communicate with a chatbot thanks to this invention. By combining and swapping out samples and forms for lengthy client enquiries using AIML, we may enhance the dialogue and find the correct answer significantly more frequently than LSA.

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