***Knowing Chatbots: From Simple Tool to Intelligent AI Assistance***

**Understanding Chatbots 101: A Beginner’s Guide**

Chatbots have come a long way in making our lives easier in a variety of ways, as well as ensuring that our interactions with machines are dynamic, engaging, and relevant. There is no denying fact that automation and conversational bot usage will grow in the future because of growing digital transformation and changing customer behavior.

Graphical user interface

Description automatically generated with medium confidence

**Chatbots - An Intelligent AI Assistance**

Chatbots, or automated conversational algorithms, provide people with a more tailored method to access services through a text-based interface. The latest AI-powered chatbots can identify a query (question, command, order, etc.) made by a person (or another bot, inception) in a specific environment and respond appropriately (answer, action, etc.).

However, how do chatbots function? What enables these computer programs to comprehend the objectives of their users? What's more, how can chatbots contextualize responses for different conversations? Let's see what we can find out!

**ChatBots Design and Its Working**

There are multiple types of chatbots available in the market that can work accordingly based on the needs of the user. For Instance, Question-and-answer chatbots are one kind that works simpler and require fewer abilities. They are primarily knowledge-based, and their skills are restricted to answering a limited number of queries and are completely based on using AI and machine learning to their maximum extent, to resemble exact human communication and improve user experience.

**Design Capabilities Of Chat Bots**

**Diagram

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**Pattern Matcher:**

Rule-based scripted and structured chatbots mostly fall under the pattern matcher category. Such chatbots use a knowledge base that contains documents, and each document comprises a particular <pattern> and <template>. When the bot receives an input that matches the <pattern>, it sends the message stored in the <template> as a response. The <pattern> can either be a phrase like “What’s your name?” or a pattern “My name is \*”, where the ‘\*’ is a regular expression. Typically, these <pattern> <template> pairs are manually inserted.

Also, the queries a user must ask are pre-programmed into such QA chatbots. They separate a piece of information (word or sentence) or generic tags from various categories to classify content and create appropriate responses for the end-user.

For Example, one of the first chatbots, ELIZA, founded in 1966 is a rule-based bot that can classify text by matching patterns. It parses the incoming text word by word, searching the dictionary for its meaning, ranking it by importance, and putting it on a keyword stack.

**A simple pattern matching examples looks something like the following:**

#PATTERN MATCHING

<category>

<pattern> best technical writing \\*</pattern>

<template>

<srai>Best Technical Writing Course <star/></srai>

</template>

</category>

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#PRE\_STORED PATTERNS

<category>

<pattern>Best Technical Writing Course Provider In India? </pattern>

<template>Best Technical Writing Course Provider In India, IIM Skills </template>

</category>

<category>

<pattern>Best Content Marketing Course Provider In India?</pattern>

<template>Best Content Marketing Course Provider In India Is IIM Skills .</template>

</category>

**Algorithms:**

Algorithms play a major role in chatbots and reduce the work of pattern matchers, especially while analyzing large datasets. In short, the chatbot selects the proper response from a prepared list of preset answers based on the message and context of the discussion. On the other hand, the availability of algorithms has made it easier for developers to build suitable models for their business needs, that are more practical and can be deployed to interact with their users and to deliver the right responses.

For Instance, leveraging a certain set of algorithms like Natural Language Understanding (NLU) in chatbots can help solve user queries in a way that moves them gradually to a solution.

**Artificial Neural Networks:**

In Chatbots artificial neural networks works as a computing system that consists of highly interconnected elements or nodes, called ‘neurons’ which are organized in layers, that process information using dynamic state responses to external inputs.

**Flow Chart On How Neural Networks Works in Chatbots**

**Diagram

Description automatically generated**

Chatbots follow an artificial neural network to understand user inquiries and carry on an intent-based discussion. It conceives a hidden state by creating a sequence of context nodes (Input layer) one at a time and updates it. Then, it generates a hidden layer after processing the entire information, which incorporates the sense of context and is utilized to provide the answer (output layer) and sort them into relevant levels.

Generative-based chatbots are one such type that may consider the chat history or past transactions, into account for analyzing inputs from external data points and classifying these into appropriate levels.

Amazon’s Alexa, Apple’s Siri, Google’s Google Assistant, and Microsoft’s Cortana are examples of generative chatbots that are trained using many prior conversations and then produce responses to the user. Conversational bots that use deep machine learning approaches to handle everyday problems in natural, conversational responses are made possible by AI neural networks. On the other hand, these chatbots are designed to keep the consumer's specific purpose, assist users in addressing support issues, and offer them relevant information.

**Natural Language Processing (NLP)**

NLP (Natural Language Processing) a branch of AI and machine learning, is considered the heart of a chatbot's framework as it allows to interpret of natural language. An AI-powered chatbot decodes and analyses human-understandable language within the context of speech spoken by them.

Chatbots that have been infused with natural language processing (NLP) replicate human-like communication and decode user intent to provide intelligent responses. Unlike generative models, which make it difficult for chatbots to have open-ended discussions because of the predetermined flow, AI chatbots may engage users on a wide range of topics.

On the other hand, NLP enables chatbots to understand multiple user intents and reduces errors by relying on the aspects like decoding intent, recognizing speech, dealing with the entity, contextual understanding, and much more. These, AI-powered conversational bots are capable of not only understanding a customer's intent but also of grasping the user's sentiment and behavior—regardless of how the question is expressed.

**Conclusion**

The digital connections between brands and customers are becoming increasingly complex. Chatbot architectures highlight the complexities that go into making conversational interfaces smart enough to handle these sophisticated digital interactions.

As the number of people using the internet grows, so will the number of people using chatbots. Understanding what powers these chatbots will be important for businesses to properly realize their potential in the coming years.

**Summary On Tools Used**

This article on chatbots talks about its evolution and its design capabilities and how they have reached popularity over a short period of time. Here, to make it more presentable and understandale the tools that I relied are **LUCID CHART, CANVAS, Grammarly**. With the help of Lucid Chart I drew the flow chart for reprensenting the type of design capabilities of chatbots . Canvas helped me in creating attractive infographic chart on evolution of chatbots. Finally as a creative writer I used **Grammarly** to check the quality and clearness of my writing.