

Chatbot for Vignan College

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Abstract— Proposing an avant-garde solution for optimizing student inquiries within the academic institution, an advanced conversational AI agent is introduced. This cutting-edge chatbot seamlessly integrates into the university's web platform, delivering swift and insightful responses to user inquiries pertaining to admission protocols, tuition structures, and academic calendars. Harnessing state-of-the-art Natural Language Processing (NLP) methodologies, the system meticulously dissects user input, facilitating streamlined human-machine interactions through both auditory and textual modalities. The utilization of sophisticated linguistic analytics ensures not only the rapid dissemination of pertinent information but also fosters a seamless and intuitive engagement experience.

This sophisticated initiative leverages the capabilities of an Artificial Intelligence algorithm, employing an advanced Naive Bayes's methodology to comprehend and intelligently respond to a myriad of user queries. By accessing an expansive and robust database of institutional knowledge, the chatbot autonomously discerns the most pertinent and precise responses tailored to individual user inquiries. Operating as a dynamic web application, this AI-driven conversational agent not only augments the accessibility of vital college information but also alleviates the administrative burden, mitigating the necessity for manual responses to student inquiries. This visionary solution signifies a pivotal stride towards optimizing communication channels and enhancing overall administrative efficacy within the educational institution.

Index Terms— Conversational agent, Natural Language Processing (NLP), Artificial Intelligence algorithm, Dynamic web application and Administrative efficiency

I. INTRODUCTION

A dialogue system, denoted as an interactive computational application, embodies the emulation of human interaction via text or voice-based communication [1],[3]. By harnessing cutting-edge artificial intelligence methodologies and delving into the realm of Natural Language Processing (NLP) [1],[3], a sophisticated conversational agent, uniquely designed for integration with a collegiate website, can be meticulously developed. This online platform is intricately engineered to adeptly navigate and respond to user inquiries by parsing contextual information and furnishing pertinent solutions with acumen and precision. This innovative digital solution, tailored for educational institutions, reflects a nuanced approach to interactive engagement and problem resolution in the digital landscape.

User engagement unfolds seamlessly through an Intuitive User Interface (UI), mirroring the user-friendly design akin to contemporary messaging applications [1],[2]. This strategic layout promotes user familiarity with messaging interfaces, establishing an environment that is both easily accessible and user-centric. Effortlessly, users

can articulate inquiries spanning diverse realms of collegiate information, encompassing admission protocols, contact particulars, geographical coordinates, annual gatherings, athletic pursuits, enrollment statistics, and cultural festivities. This multifaceted user interface not only ensures a streamlined experience but also enhances accessibility to a comprehensive spectrum of college-related details.

The inherent adaptability of a web-based application ensures ubiquitous accessibility, providing users with the capability to interact with the chatbot irrespective of their geographic location or the time of day. The responses generated by the chatbot, delivered through an interface reminiscent of contemporary messaging applications, augment the user experience and facilitate enhanced comprehension [1],[2]. This comprehensive system addresses the informational requirements of diverse stakeholders, including students, parents, and both instructional and non-instructional personnel, furnishing a dynamic and efficient avenue for accessing pertinent information in a responsive manner.

Several extant models of conversational agents, exemplified by UNIBOT and ALICE, have been specifically tailored to cater to distinct requisites within the educational landscape. UNIBOT, for instance, is meticulously crafted to address inquiries pertaining to the university domain, while ALICE operates on a rule-based framework employing the Artificial Intelligence Markup Language (AIML). In stark contrast, our innovative system introduces an unprecedented algorithm designed to discern user intent and generate responses that are not only contextually relevant but also transcend the limitations of traditional rule-based models [2]. This groundbreaking approach signifies a departure from conventional methodologies, marking a significant stride towards more nuanced and sophisticated user interactions in the educational realm.

Integrating Natural Language Processing (NLP) and an advanced Pattern Matching Algorithm [3],[6],[7], our conversational agent adeptly processes user inquiries, ensuring a nuanced comprehension of diverse inputs [8]. The subsequent sections delineate the intricate components of this framework, encompassing an exposition of prior research, an exhaustive elucidation of the methodology through architectural schematics and flow diagrams, an investigation into the outcomes, and a conclusive contemplation with prospects for future refinements. This multifaceted approach underscores the system's sophistication and sets the stage for an in-depth exploration of its inner workings and potential advancements.

II. RELATED WORK

K. Bala, M. Kumar, S. Hulawale, and S. Pandit et al. [1] have spearheaded an innovative venture in collegiate administration by integrating advanced AI algorithms within a sophisticated Chatbot framework. This system excels in delivering insightful responses to meticulously scrutinized user inquiries, simplifying the interaction process for users who merely need to select their academic class and engage in dialogue with the bot. This academic endeavor introduces the integration of the Porter Stemmer algorithm as a pivotal element in generating accurate responses to user queries. To interact with the system, individuals are required to undergo a registration and authentication process, subsequently obtaining entry to an abundance of informative pages. Through this interface, users can effortlessly articulate inquiries related to various facets of collegiate activities, fostering an interface that is both user-friendly and dynamically engaging. This innovative approach underscores the significance of linguistic analysis in refining response precision and establishes a sophisticated user interaction framework. The salient characteristic of this initiative lies in its fusion of advanced AI algorithms, encompassing the intricate Porter Stemmer algorithm, which significantly enhances the system's adeptness in understanding and addressing user queries. The mandatory registration and authentication procedure functions as a secure gateway, ensuring that duly authenticated users can harness the system's capabilities to navigate through and inquire about diverse facets of collegiate activities. This distinctive amalgamation of cutting-edge algorithms establishes a novel paradigm in augmenting response precision and fortifying the security measures in user interactions within the system.

B. Setiaji and F. W. Wibowo et al. [3] have conceptualized a Conversational Agent featuring a robust pattern matching algorithm, exemplifying its resilient architectural design. This initiative delves into the nuances of conversational patterns specific to Indonesian language, seamlessly integrated with an infrastructure supported by a MySQL database. This innovative approach reflects an intricate interplay of linguistic and database technologies. The intricacies inherent in the pattern-matching process underscore the importance of adeptly managing knowledge representation and the nuanced execution of SQL. Governed by a knowledge base, this system introduces a dynamic interplay wherein user queries interact seamlessly with the organized data maintained within the MySQL database. The meticulous addressing of potential oversights in sentence definition and response strategies during the integration of the chat application with the database exemplifies a meticulous approach to refining the intricacies of this innovative conversational system. This strategic amalgamation emphasizes a

sophisticated synchronization of linguistic and database methodologies, portraying a meticulous commitment to enhancing the precision and fluidity of user interactions. An integral facet of this undertaking revolves around subjecting conversation patterns to a comprehensive battery of tests across various scenarios. This iterative procedure ensures the harmonization of user input with predefined conversational patterns, facilitating the dynamic augmentation of the knowledge database. Instances where input records deviate from established patterns necessitate a remodelling process, enhancing the system's responsiveness and adaptability through meticulous refinement. This methodical approach to testing and iteration underscores the commitment to continual enhancement, refining the conversational system's acuity and adaptiveness.

K. Shivam, K. Saud, M. Sharma, S. Vashishth, and S. Patil et al. [4] introduce an inventive methodology for designing a chatbot, capitalizing on the functionalities of Facebook Messenger as its principal platform. This system employs artificial intelligence to engage in intricate communication with users, seamlessly delivering the necessary information. The pivotal architectural decision lies in the incorporation of Facebook API with a Python backend, facilitated by the utilization of webhooks to efficiently transmit user queries to the server. This strategic integration showcases a forward-thinking approach to chatbot development, leveraging advanced technologies and platform-specific features for an enriched user interaction experience. A notable characteristic of this architectural framework involves the assimilation of WIT and AI as pre-configured neural network modules. This innovative integration underscores a sophisticated approach to leveraging pre-existing neural models, augmenting the chatbot's cognitive capacity for enhanced responsiveness in user interactions.

E. Haller and T. Rebedea et al. [5] explore the intricacies of extracting vital information from textual portrayals chronicling the life narratives of historical figures. The primary goal is to devise a conversational agent tailored for deployment in Computer-Supported Collaborative Learning (CSCL) scenarios within middle-school educational environments. The research introduces a novel approach to constructing a chat-bot that emulates a historical figure, proficient in comprehending input in the form of coherent text or web pages elucidating the life journey of the historical persona. The end result is a meticulously trained conversational agent adept in addressing a diverse range of inquiries regarding the life experiences of the historical figure under consideration.

S. B. Sonawane, A. S. Badwar, R. H. Dalvi, G. N. More, and S. A. Talekar et al. [6] provide a detailed exposition of an innovative AI-driven conversational agent tailored to address the counseling requirements of students, with a specific emphasis on career guidance. This advanced system seamlessly integrates Natural Language Processing (NLP) in collaboration with a sophisticated Keyword Matching Algorithm to adeptly analyze and respond to user queries. The system's architectural framework is modular, incorporating discrete components featuring knowledge-based initiation mechanisms and logical structures, ensuring the effective handling of a myriad of user requests in a seamlessly orchestrated manner. This pioneering solution signifies a notable stride in the realm of student counseling, leveraging cutting-edge technologies to provide comprehensive and personalized support in career decision-making processes. This comprehensive approach guarantees that students receive individualized and pertinent guidance, nurturing well-informed decision-making regarding their academic and professional journey. This intricate system, thus, exemplifies an advanced method in providing tailored support for students in navigating their educational and vocational choices.

P. Nikhila, G. Jyothi, K. Mounika and Mr. K. K. Reddy et al. [7] have introduced UNIBOT, an intelligently engineered conversational agent meticulously designed to cater to the information needs of students inquiring about universities. This cutting-edge system is grounded in the principles of Artificial Intelligence (AI) and Machine Learning (ML), harnessing the PHP programming language for its resilient and sophisticated development. Distinguished by the integration of a pioneering algorithm, UNIBOT adeptly manages user queries by minimizing memory consumption and optimizing interactions with the database. The graphical user interface (GUI) closely mirrors the design of contemporary messaging applications, fostering a seamless and user-centric interaction paradigm. Through the infusion of sophisticated principles in Artificial Intelligence (AI) and Machine Learning (ML), UNIBOT furnishes responses that not only align contextually but also exhibit a heightened efficiency, thereby enhancing the overall user experience through state-of-the-art computational methodologies.

III. PROPOSED SYSTEM

The conceptualized conversational system epitomizes a web-centric application engineered to engage in dynamic exchanges with users through an interactive interface. This pioneering framework endeavors to streamline discourse by employing intricate artificial algorithms, notably the Bayesian inference-based Naive Bayes algorithm, to thoroughly scrutinize user inquiries and decipher the intricacies embedded within their textual inputs [9]. Operating at the confluence of Natural Language Processing (NLP) and amalgamated artificial intelligence,

the system proficiently navigates user interrogations through the judicious application of advanced linguistic comprehension, offering nuanced and bespoke responses that align precisely with the semantic nuances encapsulated in the user's input. In this manner, the system seamlessly integrates cutting-edge language understanding capabilities to furnish responses that are not only contextually relevant but also imbued with a level of sophistication reflective of its advanced computational underpinnings.

Within the framework of chatbot development, the Python programming language emerged as the foundational toolset, harnessing the capabilities of the Django framework and the Chatterbot library. This technological amalgamation orchestrates the orchestration of automated rejoinders to user inputs, leveraging a machine learning algorithm for the diversification of response modalities. Learners can seamlessly engage with the bot through tailored inquiries crafted for conversational intent. The chatbot, operating as a cognitive agent, exploits artificial intelligence methodologies to conceptualize and dispense responses to user queries, thereby exemplifying its role as a sophisticated conversational interface imbued with advanced computational intelligence.

The envisaged system aims to alleviate administrative burdens significantly, providing a seamless online avenue for students and parents to access requisite information. This obviates the need for students to physically visit the college administration for every inquiry, as the system ensures the expeditious resolution of their queries without necessitating a visit to the administrative offices. Operating around the clock, the system offers continuous availability, ensuring that students and parents can access pertinent details at any time, thereby enhancing the overall accessibility and efficiency of administrative processes [4].

A. User Login

Individuals, be they students, educators, or parents, are tasked with merely submitting their educational institution-related queries to the automated agent. This streamlined process involves the transmission of inquiries to the automated entity, fostering a simplified and efficient mechanism for engaging with the educational system. By leveraging this automated interface, users can seamlessly articulate their questions, thereby contributing to a more streamlined and user-friendly interaction with the educational institution's systems and services.

B. Automated Conversational Response Mechanism

Following the initiation of a user inquiry into the system, the application of Natural Language Processing (NLP) is triggered to decipher the intrinsic semantic essence embedded within the query. This nuanced application of NLP endows the chatbot with the capability to intelligently grasp the underlying significance inherent in user messages, thereby facilitating the generation of contextually fitting responses. The adept utilization of Natural Language Processing not only enhances the system's interpretative prowess but also ensures the provision of responses that are not only contextually pertinent but also reflect a sophisticated comprehension of user input nuances.

Upon the submission of a user's inquiry, a subsequent procedural stage unfolds, involving a meticulous quest for the precise response within our pre-established knowledge repository, systematically pre-conditioned for a diverse spectrum of query formulations. Owing to the inherent variability in how questions are articulated by distinct users, even when the core content remains invariant, the imperative arises to judiciously discern the accurate resolution for each submitted query. This adaptability proves indispensable given users' proclivity to express questions with varying levels of simplicity and clarity, thereby necessitating a discerning and nuanced approach to precisely identify the optimal solution. This intricate and precise methodology underscores the system's unwavering commitment to delivering tailored and accurate responses in alignment with the dynamic nature of user inquiries. As expounded earlier, following the submission of a user complaint, an evaluation is conducted to determine the presence of a corresponding inquiry in the database. If a match is identified, the correlated response is communicated to the user. In instances where the submitted inquiry lacks a pre-existing solution in the database, administrative personnel are entrusted with furnishing resolutions. Subsequent to the administrator addressing the inquiry, the response is dispatched to the user and concurrently archived within the database. This strategic methodology guarantees that for recurrent inquiries of a comparable nature, the database functions as a repository, mitigating the need for repetitive administrative interventions. This operational streamlining is facilitated through the implementation of a robust Sequential Algorithm [9], optimizing the efficiency of the system in managing and responding to user queries.

C. Architecture Diagram of Chabot System

The diagrammatic representation of the system elucidates the operational intricacies of the chatbot. Initially, the user's input undergoes preprocessing, establishing a connection with the database. Following this, contingent upon the satisfaction of specific conditions, the chatbot's procedural trajectory unfolds, culminating in the issuance of a

response to the user. In situations where the user encounters difficulty in finding a resolution to a query, the chatbot, under such circumstances, provides the user with the contact information of the administrator. The administrator is then endowed with the capability to review and address the corresponding inquiry, thereby ensuring a comprehensive and user-centric approach to query resolution.

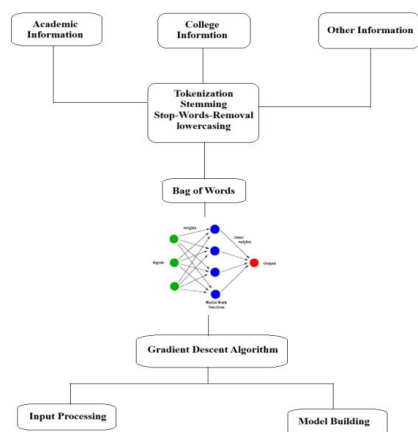


Figure 1. Architecture of the chatbot system for college website.

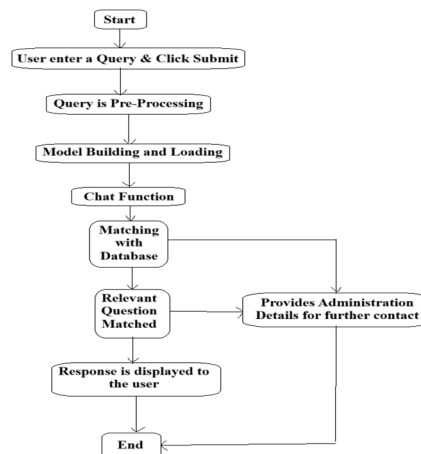


Figure 2. Chatbot Operational Workflow

IV. THE EXECUTED COMPUTATIONAL PROCEDURE

In the landscape of chatbot genesis, the phrase "Sequential Model" conventionally signifies a neural network configuration within the machine learning sphere. This structural design is often associated with frameworks like TensorFlow or Keras.

A. Incorporate Frameworks and Modules

The initiation process necessitates the incorporation of fundamental components. Within the realm of the Python programming language, this involves the amalgamation of frameworks such as TensorFlow or Keras to facilitate the instantiation and training of the neural network. This critical phase encompasses the integration of sophisticated modules and algorithms, fostering a comprehensive foundation for the establishment and optimization of the computational model.

B. Lexical Segmentation and Vector Representation

The essential process of textual data metamorphosis is indispensable for enhancing model understanding, compelling the translation of linguistic elements into numerical tokens via tokenization. Following this, the phenomenon of embedding unfolds, enabling the portrayal of these tokens within a densely structured vector space characterized by intricate mathematical configurations. This intricate transformation is paramount, fostering a nuanced comprehension of textual nuances by the machine learning model, marking a pivotal step in the trajectory toward sophisticated natural language processing capabilities.

C. Incorporating Strata

In the structural paradigm of the Sequential Model, the commonplace procedure involves the gradual assimilation of strata. Specifically in the domain of chatbot construction, strata incorporating Recurrent Neural Networks (RNN), particularly those harnessing Long Short-Term Memory (LSTM) architectures, are frequently enlisted for the discernment and generation of sequential motifs. This conventional strategy entails the systematic incorporation of strata within the Sequential Model, demonstrating a prevalent methodology in the development of sophisticated chatbot systems, where the utilization of Recurrent Neural Networks, particularly those integrating Long Short-Term Memory mechanisms, prevails as a recurring theme for adeptly comprehending and generating intricate sequential patterns.

D. Terminal Stratum

The conclusive stratum is meticulously crafted to produce the output of the model. In the realm of chatbot development, this might encompass the deployment of a Dense stratum featuring a soft-max activation function,

adeptly enabling the prognostication of the succeeding word within a designated sequence. This ultimate layer, finely tuned for output generation, operates within the context of chatbot architecture, employing a Dense configuration augmented by the soft-max activation function to skillfully predict the forthcoming word in a given sequence.

E. Establish the Model Configuration

Before embarking on the training phase of the model, a crucial precursor entails the compilation procedure, during which pivotal parameters like the optimizer, loss function, and monitored metrics are explicitly specified. This preliminary step, preceding the initiation of model training, encompasses the compilation process where essential parameters, including the optimizer, loss function, and monitored metrics, are explicitly articulated to establish a refined configuration for subsequent neural network optimization.

F. Conducting Model Training

Commence the procedural commencement of model training utilizing your dataset, wherein the training dataset is constituted by input sequences coupled with their respective output sequences. In this phase of neural network optimization, initiate the training procedure with a dataset comprising input sequences intricately linked to their corresponding output sequences.

G. Inference Phase

Upon the efficacious conclusion of the training regimen, the model is skillfully deployed for generating responses by inputting sequential data. Subsequent to the triumphant accomplishment of the training regime, the adept utilization of the model comes to fruition as it proficiently generates responses based on provided input sequences, showcasing the culmination of its acquired knowledge.

H. Operational Implementation

Following the completion of the training and validation phases, advance to the deployment of the chatbot model onto a platform conducive to engaging in real-time interactions with users. The presented overview offers a streamlined outlook, acknowledging that the actual implementation may involve additional procedures. These may include the handling of user inputs, seamless integration with external Application Programming Interfaces (APIs), and the enhancement of model efficiency through the intricate fine-tuning of hyper parameters. Additionally, the integration of cutting-edge advancements in natural language processing, such as transformers, may be contemplated for the progressive evolution of chatbot frameworks, signifying a forward-looking approach to the continual refinement of conversational AI systems.

V. DATASET DETAILS

Certainly! The JSON schema presented encapsulates a foundational framework for a rudimentary chatbot training dataset. The JSON structure delineates the foundational blueprint for a basic training dataset intended for chatbot development. This intricate schema comprises key-value pairs orchestrating the essential components necessary for instructing and enhancing the cognitive capabilities of the conversational model. Moreover, it serves as a structured representation, laying the groundwork for the systematic assimilation of input-output pairs, thereby fostering the iterative learning process to the model's evolutionary trajectory.

A. intents

This comprises an array housing distinct intent entities, wherein each intent encapsulates the underlying objective or aim associated with a user's input. Within this array, diverse intent objects coalesce, each encapsulating the inherent purpose or objective underlying a user's input. This intricately organized structure serves as a comprehensive repository, systematically cataloging varied user intents, thereby facilitating a nuanced and contextually rich understanding within the chatbot's cognitive framework.

B. tag

Each intent within the dataset is allocated a singular identification marker, exemplified in this case by the "greeting" intent. This unique identifier serves as a categorical tag, enabling precise classification and differentiation, a fundamental aspect of organizing and managing diverse intents within the broader context of the chatbot's training dataset.

C. patterns

Encompassed within the dataset is an assemblage of user inputs, forming an array that precisely correlates with the assigned intent. These exemplify instances wherein users articulate various expressions specifically tailored for initiating a greeting interaction with the chatbot, providing diverse contextual examples for the model's comprehension and training.

D. responses

Contained within the dataset is an array denoting potential retorts that the chatbot can furnish upon identification of the pertinent intent. The selection of a response follows a stochastic process, either through randomized selection or adherence to a preordained sequence. Evident within the dataset is a compilation of conceivable responses at the disposal of the chatbot upon discerning the relevant intent. The deterministic procedure governing response selection operates through stochasticity, wherein responses are either randomly chosen or follow a predetermined sequence, underscoring the chatbot's capacity for adaptive and diverse conversational interactions.

E. context_set

This attribute is frequently employed to delineate a contextual framework that requires establishment upon the recognition of a particular intent. Context, in this context, functions as a mechanism for the persistent retention of information or state throughout a series of interconnected interactions. This field is commonly utilized to articulate a specified contextual framework that necessitates instantiation upon the identification of a distinct intent.

```

1 intents.json X
2 D > delete > {} intents.json > {} intents > {} 0
3
4 {
5   "intents": [
6     {
7       "tag": "greeting",
8       "patterns": [
9         "Hi",
10        "How are you?",
11        "Is anyone there?",
12        "Hello",
13        "Good day",
14        "Whats up",
15        "How are ya",
16        "hey",
17        "whatsup",
18        "Hi!"
19      ],
20      "responses": [
21        "Hello!",
22        "Good to see you again!",
23        "Hi there, how can I help?"
24      ],
25      "context_set": ""
26    }
27  ],
28  "context_set": ""
29 }

```

Figure 3. Dataset details

```

{
  "intents": [
    {
      "tag": "greeting",
      "patterns": [
        "Hi",
        "How are you?",
        "Is anyone there?",
        "Hello",
        "Good day",
        "Whats up",
        "How are ya",
        "hey",
        "whatsup",
        "Hi!"
      ],
      "responses": [
        "Hello!",
        "Good to see you again!",
        "Hi there, how can I help?"
      ],
      "context_set": ""
    }
  ],
  "context_set": ""
}
// More intent objects can be added here for different
purposes
}

```

Figure 4. Data Set for Single Query

In overview, this dataset is formulated to instruct a chatbot in the recognition and formulation of responses to salutations. The augmentation of the chatbot's functionalities can be achieved by introducing additional intents into the "intents" array, encompassing diverse capabilities such as addressing queries, dispensing information, or aiding in specific tasks. Each distinct intent within this array necessitates its own repertoire of patterns and corresponding responses, thereby enhancing the chatbot's adaptability across a spectrum of conversational scenarios.

VI. RESULTS AND DISCUSSION

The interactive exchange facilitated by the Chatbot transpires within an interface showcased in Figure 4, presenting a user-friendly pop-up design incorporated into the College Chatbot System. Upon the initiation of a conversation, the chatbot commences with a salutation, and users can input and submit inquiries, eliciting appropriate responses from the chatbot. Figure 4 illustrates a user seeking information on the principal's name and receiving an accurate reply from the chatbot. This system allows users to pose inquiries pertaining to diverse college activities, enhancing the versatility of the chatbot interaction.

VII. CONCLUSION AND FEATURE SCOPE

The system's primary goal is to provide an intuitive and efficient chatbot platform tailored for collegiate use. This chatbot proves indispensable in aiding students by delivering precise and up-to-date information. It functions as a valuable resource for students, educators, and parents, obviating the necessity for repetitive visits to the college administrative office. As part of the prospective expansion endeavours for the project, the system aims to integrate voice-driven interactions, enabling users to submit queries and receive responses through vocal inputs, with the chatbot possessing the capability to convert text to speech and vice versa, enhancing the overall user experience.

```

+ Code + Text
Chatbot: Hi, how can I assist you today? (type 'exit' to end the conversation)
You: Hi
1/1 [=====] - 0s 25ms/step
VITS: Hi there, how can I help?
You: ds hod name
1/1 [=====] - 0s 23ms/step
VITS: Mrs. P. Lavanya Kumari, the head of the department, oversees a dedicated team of faculty members, including Mr.M.Shiva,Mr.K.Rajendraprasad,Mr.J.V. principal
You: principal
1/1 [=====] - 0s 21ms/step
VITS: Dr.G.Durga Sukumar Ph.D(IIT-R) is the college principal whose office is available on Ground floor
You: about library
1/1 [=====] - 0s 23ms/step
VITS: There is library located at ground floor.It supports research, learning, and teaching by providing access to academic resources.
You: admissions
1/1 [=====] - 0s 28ms/step
VITS: Original Transfer Certificate with 2 photocopies; Original 10th Grade marks sheet and two copies of the same attested by the Head of the Institut
You: fee details
1/1 [=====] - 0s 31ms/step
VITS: For Fee details visit <a target="_blank" href="https://vignan.ac.in/feebtech.php"> here</a>
You: college established date
1/1 [=====] - 0s 32ms/step
VITS: The Institute, Vignan Institute of Technology and Science was established in the year 1999.
You: 

```

Figure 5. Chatbot Response

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