AI-Powered Chatbots for Health Counseling and Support

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Many students in our culture today, ranging in age from 17 to 23, don't know why they are here. Peer pressure, lack of study focus, depression, social misconduct, insensitive behaviour, drug and alcohol addiction, technological gadget addiction, and a host of other issues are all ongoing for them. Parents, teachers, and concerned members of the public are pleading with society for assistance in turning this worrying trend around. Despite all of the advancements in science, technology, and the educational system, students' conduct and character have not changed. Machine learning algorithms were used in the development of the chatbot, which then use ensemble learning and polling to identify the type of student inquiry and provides answers based on a variety of knowledge-based instructions and teachings. Most likely, the chatbot will mimic a licenced counsellor. This method will help students build life-changing values and character on a personal level, which will benefit the country and society as a whole. This chatbot will help students who are not directed to avoid being duped.

Keywords: Health care, Chatbot, Machine learning.

1. Introduction

A student's ability to cope socially and cognitively with the mounting demands of college and contemporary life is critical to their overall development. Students' lives seem to be affected in some way by this new environment, and those effects could either positively or negatively impact their general quality of life [1]. Many students have risky and poor lifestyle choices, like abusing alcohol, smoking cigarettes, not exercising, and following unhealthful food habits, all of which can have long-term detrimental effects on their health. Studies on lifestyle determinants and student health are scarce in India. a cross-sectional study to evaluate the lifestyle and health of Mumbai, India's student population. to comprehend lifestyle and health issues, quality of life, and demographic traits. As far as quality-of-life metrics go, the majority of students were in the abnormal group for stress, anxiety, and depression [6]. In terms of psychiatric problems, college students appear to be the most aware, perceptive, and vulnerable group in today's society. Anxiety, despair, and suicidal thoughts have increased recently due to increased peer competitiveness, which includes a variety of pressures like exams,

assessments, financial loss, emotional loss, and job loss [2]. Academic success is the product of a complex interplay between a number of variables, including the research habits, interests, and personality traits of the students as well as the faculty members involved [11]. Nonetheless, research indicates that today's college students are not meeting expectations in the classroom [18]. They are becoming more and more anxious, frustrated, and perplexed about their personal and professional lives. 10,159 students committed suicide in 2018, according to the National Crime Report Bureau's (NCRB) most recent numbers. The goal of this is to develop an expert system that can help victims by responding to their inquiries. Because the expert system is virtual, victims can rely on the confidentiality of their inquiry [13]. The goal of this project is to create, develop, and implement a question-answering system for college students between the ages of 17 and 23 [15].

The rest of the paper is organized as follows: Section 2 provides the classification scheme for the survey; Section 3 provides an overview of proposed architecture. Section 4 provides a summary and comparison of the results of the various papers discussed in this taxonomy. Finally, Section 5 concludes the paper.

2. Related Works

In [4] author looked into the relationship between student smartphone ownership and hands-on learning and mobile use in the classroom. An approach known as comparative case research was used to consider it [12]. An online survey was used to get students at a certain university involved. The data indicates that students are dependent on their electronic devices [3]. Further authors [5] concentrated on college students' mental health issues and psychological well-being. The researchers suggested a system that makes use of deep segmentation techniques and the Takagi-Sugeno-Kang (TSK) fuzzy method to automatically assess the anxiety levels of college students. Strategies for building open domain chatbots that score highly in human tests were provided by [16]. They have talked about how crucial pre-training on large corpora is for conversational bots in particular and for NLP in general [14]. The author looked into ways to lessen gender bias in dialogue production and improve safety from potentially harmful language.

Table 1: Existing chatbot models and purpose

Authors	Purpose	Technique
Su, M.-H. et.al., (2017)	Chatbot to interact with elderly people	LSTM
Shaikh, A., et.al. (2019)	Chatbot to guide stressful adolescents	NLP, RNN
Tsai, M.-H. et.al., (2019)	Ask Diana- waterrelated emergency management chatbot	Decision Tree
Zahour, O. (2020)	Bot for University Students	Artificial Intelligence
Yu, S., et.al., (2020)	financial investment customer service	Deep Bidirectional Transformer
KS, S., et.al., (2020)	Railway reservation	Artificial Intelligence

In [7] used Deep Bidirectional Transformer models (BERT) to develop a chatbot to respond to customer inquiries around financial investments. With 381 distinct intentions recognised, the bot learns when to answer "I don't know" and when to pass along irrelevant or confusing requests to human operators [9]. The discussion of uncertainty measures for BERT, in which

three different approaches were carefully assessed on practical applications, was the most important contribution. Information entropy and dropout sampling variance are two uncertainty metrics that we examined in BERT. We then employed mixed-integer programming to enhance the decision thresholds. Another novel addition was the automatic spelling correction system that uses BERT as a language model. Most of the railway chatbots were reviewed by [8]. Because it can be spoken to in any human language, the chatbot is quite user-friendly. However, the text class might need some improvement by showing the best threat of the following word. Using the chatbot, purchasing rail tickets is simple and quick.

3. Methodologies

A method for automatically assessing enormous volumes of data is called machine learning. The two main subfields of machine learning are supervised and unsupervised learning [17]. While finding accurate predictions is the aim of unsupervised learning, succinct representations of the data are the aim of supervised learning. This module predicts the type of inquiry a student will make. It reacts in five areas: relationships, personality, spirituality, academics, and addictions. This module makes use of the concept of ensemble learning in order to predict the category. This module of the suggested model is composed of other submodules [10]. This module consists of five fundamental steps. Figure 1 shows how this module functions internally.

stage 1: Loading the dataset: In this stage, student queries—which are saved in CSV (Comma Separated Values) file format—are fed into data analysis and manipulation programmes.

Step 2: Information Prior to processing: On the other side, the idea behind word embeddings is to record the semantic connections between words. Consequently, we employed the below pre-processing techniques to get our input dataset ready for the bag-of-words models:

- Rewriting the language to represent the same terms as a single word, i.e., mobile addiction, in many situations, such as MOBILE Addictions and Mobile Addictions.
- Text is tokenized to generate a function f, and for each word w, the function f is associated with an integer index j.
- Eliminate all commas and digits from the text.
- The lemmatization of tokens.
- A TF-IDF matrix created from input data is used to convert each clinical note into a feature vector.

Step 3: Feature extraction: When classifying text, terms are regarded as features. A phrase's constituent words make up a term. The traits are extracted using the questions posed by each student. Tokenization and TfidfVectorizer techniques were employed to extract the features. Tokenization is the technique of employing delimiters to break sentences up into distinct phrases. The dataset is transformed into a TF-IDF matrix (Term-Frequency and Inverse-Document-Frequency) using TfidfVectorizer.

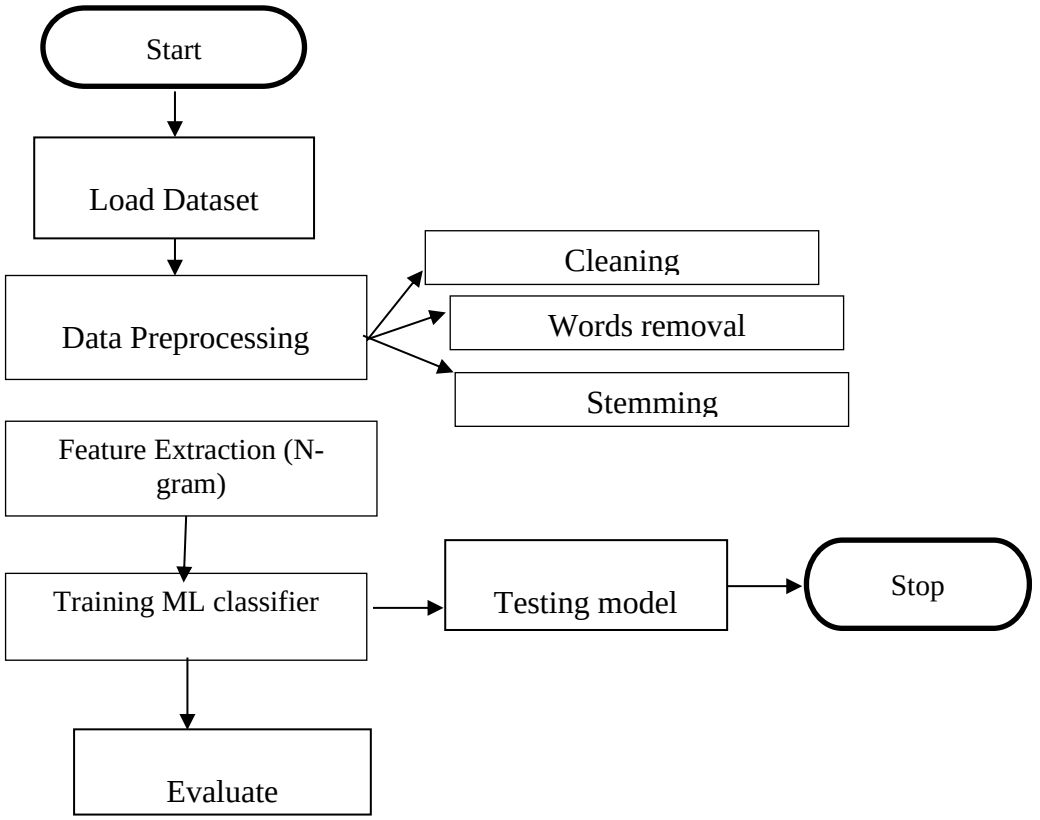

Figure 1: Framework of Proposed Method

Step 4: Training and Model Development At this point, the model is trained using machine learning algorithms that are fed extracted text features along with class labels.

4. Results and Discussion

One of the functions of the suggested chatbot paradigm is to categorise student inquiries. Its foundation is the multi-class text categorization issue. In order to comprehend the precision, recall, and f1-score of this model, let's assume that it has a high precision when it comes to forecasting student queries related to academics and addictions. In a same vein, a model has a high recall if it predicts academic addictions with few errors. In the F1-score, recall and precision are both considered, and a good balance is achieved between the two. If the model does an excellent job of accurately forecasting both academics and addictions, it will have a high F1 score. We have assigned an acronym for each category such as, Academic- ACD, Personality- PCR, Addictions- ADB, Relationship- PCR and Spiritual- SPR.

Table 2: Ensemble classifier simulation results

Types	F1-score	Precision	Recall
ACD	0.97	90	92
ADB	0.98	92.2	91.7
FMR	0.91	93.8	91.5

PCR	0.92	98.4	98.1
SPR	0.92	98	97
Accuracy	98.75		
Macro avg.	98	92	91
Weighted avg.	91	93	91

The proposed ensemble classifier attains 98.75% accuracy in classification. The sample Step-wise-step print screen of output is described below.

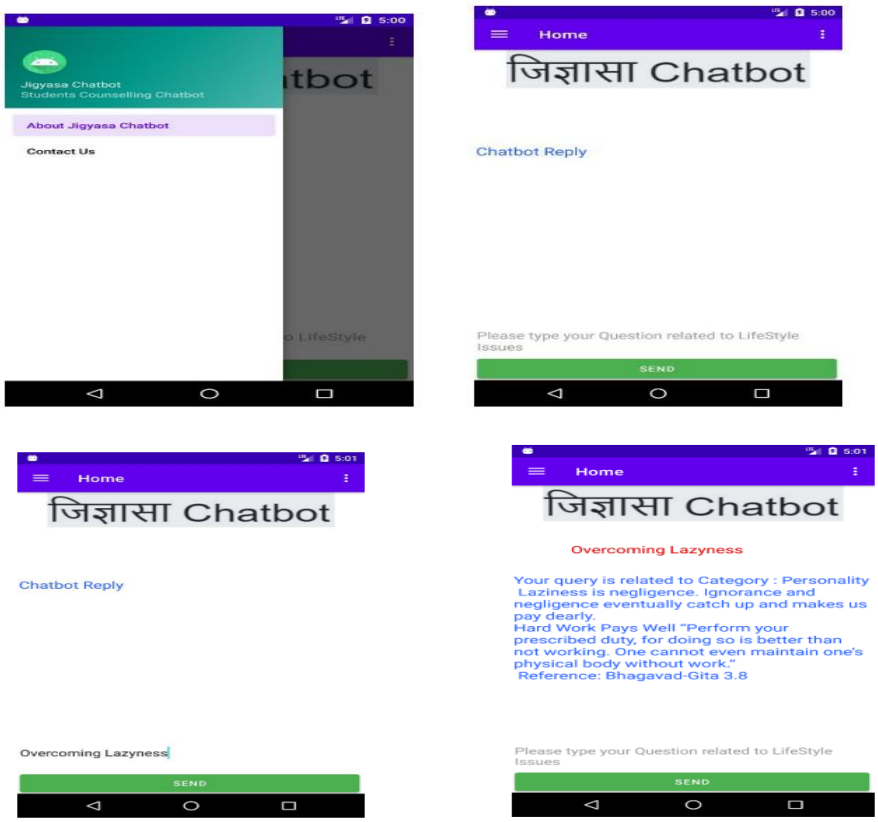

Figure 2 Main Home page screen of JIGYASA chatbot (Android)

In this research project, we created a machine learning-based chatbot system to answer inquiries from college students about lifestyle. A programme that functions like a chatbot and assists college students with lifestyle problems could be helpful. Our creation, the " (Jigyasa) system, is a chatbot. There are nine machine learning algorithms that fuel the chatbot. Student lifestyle inquiries are answered by using the lessons and directives found in the Bhagavad Gita.

5. Conclusions

The chatbot's design mimics that of a licenced therapist. Students who use this technique will develop positive character traits and transformative attitudes that will benefit the nation and society as a whole. The use of this chatbot will help pupils who are not directed to avoid getting

duped. Based on the principles of the Bhagavad Gita, students can use chatbots to help them overcome obstacles in life. This chatbot system's useful solution can assist kids in forming and growing their personalities. Pupils can gain knowledge about significant life obligations. They can, in certain cases, find answers to issues including controlling cravings, rage, and addictions. In a student's life, a chatbot system can serve in several capacities such as a virtual life coach, spiritual mentor, guide, friend, and expert advisor.

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