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Sentence

Proposal for the Student Innovative Project under Center for Technology Development and Transfer Research Support Scheme Design and Implementation of Intelligent Teaching Chatbot P. S. Sanmuga Mithra (710020106024) G. Shriram (710020106025) G. S. Shruthi (710020106027) II- year ECE (2020-2024 Batch) Department of Electronics and Communication Engineering Anna University Regional Campus Coimbatore Mentors: 1. Dr.V.R.Vijay Kumar, Associate Professor & Head, Department of Electronics and Communication Engineering Anna University Regional Campus Coimbatore. 2. Dr.S.Saravanakumar, Assistant Professor, Department of Electronics and Communication Engineering Anna University Regional Campus Coimbatore. Design and Implementation of Intelligent Teaching Chatbot OBJECTIVES Ideally, the chatbot should be able : ● To provide means to automatically extract summarized content from the input data. ● To auto-evaluate answers from given data. ● To allow authors to create literature that one can navigate using the chatbot. ● To be able to reply to users in real-time. ● To ask the user for more information if their intent is not clear enough. ● To request human intervention when appropriate. ● To allow tuning of the bot’s responses. INTRODUCTION The 21st century students are tech savvy, and they expect the learning system to be seamless, real-time and customized. Social media has become a preferred tool of communication for connecting and bringing students closer despite the geographical and time boundary that limits the traditional forms of communication. Online pedagogy and utilizing the world of software and the internet has become vital in advancing standards of education and making educational material and information open source and accessible to all. Chatbot: A computer program which was designed to simulate conversation with human users. It functions as an automated tool that can be implemented in a customizable fashion such that it learns based on input as per the user’s needs using Machine Learning (ML) models and the algorithms that now work at the frontier of advancing Artificial Intelligence (AI). A chatbot is an AI that can serve as a conversational tool that is the pinnacle of achievements in the domain of Natural Language Processing (NLP). Chatbots today are implemented in e-commerce websites to answer repeated customer queries to save the time and resources of companies and ease the experience of customer service from clients etc. Chatbots have risen to prominence during the COVID-19 pandemic to facilitate the online education needs of both the faculty and the students. However, the scope of the applications of Natural Language Processing goes beyond the classroom if we were to truly harness the power of Text Analysis and Summarization, Sentiment Analysis, plagiarism detection etc. This project will aim to rectify the pre-existing issues identified in our research to improve our existing applications of chatbots in academia. LITERATURE SURVEY Amelina Nasharuddin et al, notes that chatbots can scaffold and give feedback by answering the queries students have and assessing their understanding.[1] The students can then exchange opinions with their friends and further co-construct new knowledge. [1] Other purposes used for chatbots include: Providing students with access to information, providing administrative support, offering proactive feedback, reminders and assistance, acting as personal tutors, engaging students etc. [1]. The results from the usability and user interface evaluation testing involving the Human Computer Interaction expert for the CikGU chatbot [1] noted the following requirements that students expected from the chatbot are : User control and freedom, aesthetic and minimalist design, help users recognize, diagnose and recover from errors. Dayana Priscilla et all proposes a chatbot to help high school students learn general knowledge of the subjects they study, for this you can access the chatbot through web browsers as a user interface[2] and the tool as a natural language processing platform to handle the intentions of the texts entered by the student so that you can process the query to give rise to a response.[2] Eric Hsiao et al concludes [3] that current chatbots fall short in the aspect of responding to open ended questions and cite lack of rich educational materials as an issue which can be rectified at the level of university academia by constant feedback from professors, students and authors of the educational material, where the chatbot can do self correction[3] of answers over time. The questions also need to better consider the psychology of user.[3] Very often chatbots tend to imitate the tone of the author of the given input data, which when involving only educational material, can sound less friendly and distantly professional in nature which does not intrigue the student to interact in a friendly fashion with the chatbot.[3] Lijia Chen et al[4] note that Teachers or instructors using AI or leveraging AI wish to achieve greater efficiency and effectiveness in the performance of different tasks, including completion of administrative tasks, such as reviewing, grading, and providing feedback to students on submitted assignments.[4] Rectification of above mentioned drawbacks and challenges in prior implementations of educational chatbots aside from existing use cases in the industry [1-4] are in urgent need in educational institutions. PROPOSED WORK WITH METHODOLOGY i) Lack of features in existing systems that are available in this project as a whole: Requirement of a mock questioner: Chatbot auto generates questions and auto evaluates answers given by the user for student’s practice. Machine-to-human transition: Analyzing the nature of the responses and deciding whether human intervention is required. Understanding user intention: Understanding the queries of the

students is essential to prevent miscommunication. Ethical issues: Most chatbot apps use telemetry, but this project does not collect user's personal data for marketing purposes to address security concerns. Imitation: Chatbots end up imitating the style of the author of the input data. However, the proposed chatbot will strictly adhere to professional language for output generation. Supervision: This chatbot will have inbuilt features that avoid input of inappropriate data that can be classified as spam, or done with malintent by using spam filter features tailored for educational material. Personalisation: A lack of less or more adequate replies is constantly seen. ii) Methodology: The stages of this project include text pre-processing and model training. Text preprocessing stages involve multiple levels like Stemming, Lemmatization, Tokenization, Part of Speech Tagging, Word Vectorization, Identifying Regular Expressions (Regex), Named Entity Recognition, Feature Extraction etc. Above stages are involved in the Syntactic, Morphological, Lexical and Semantic Analysis of Text. After this, Discourse Integration and Pragmatic Analysis is done. This is followed by implementing artificial neural networks to train the model for standard response generation and understanding. Epoch analysis, also known as Chree analysis, is a statistical tool used in data analysis to detect periodicities within a time sequence or to reveal a correlation between two data sequences. It is used overtime to re-evaluate model input and output overtime to identify common phrases and requested answers to give quick and optimized answers and remove redundant information. During training of the model, adjustments and tests are made to resolve issues. Finally, backend simulation, console execution and manual testing is done to resolve production issues. IMPLEMENTATION: ● The chatbot will be implemented as a web service as the web is accessible from all environments such as an Android, iOS, Linux OS, Windows OS, Mac OS etc and does not depend on the nature of the platform the student wishes to use. ● The chatbot will be using Python as the working programming language as it is open-source and is the industry standard for Machine Learning model development across the world. It has a rich library of resources tailored specifically to the Machine Learning field. ● The website will be developed with the Flask-Python Micro-framework as it is highly modifiable and extensible for backend development of a website. ● A cloud web hosting platform such as Heroku and Replit, will be used to host the user data. ● Other open-source Machine Learning Libraries used to develop the chatbot will be Tensorflow, Scikit-learn, Natural Language Toolkit (NLTK) and Gensim. ● The chatbot will function using the Bidirectional Encoder Representations from Transformers (BERT) model developed and published by Google as an open source pre-trained transformer ML technique. WORK PLAN: The work plan to develop this chatbot are as follows: 1. Defining the chatbot's purpose and managing expectations. 2. Understanding the audience. 3. Defining the personality of the chatbot. 4. Designing the user journey and conversations. 5. Integrating Natural Language Processing algorithms for text pre-processing. 6. Implementing Machine Learning algorithms for model training. 7. Testing the relevance of output for the respective user input. 8. Analyzing user feedback and upgrading the software. EXPECTED OUTCOME/ RESULTS: The project will function as an optimized tool tailored to the purposes of student usage as a web service to all students in need of NLP tools to aid and assist them in their learning curve for quick summarization and revision of concepts, clarification of queries with the input knowledge that the student has supplied to the NLP model. APPLICATIONS: The proposed chatbot is ideal to be used by the students as it provides multiple benefits and aids as a perfect tool for online pedagogy. It can also be used by faculties and administrators for easy management. CONCLUSION: In conclusion, the chatbot is a web service that uses emerging Artificial Intelligence technology known as "NLP", which will provide answers to the analyzed queries and assist the user in multiple other regards. It can also be used as a normal and traditional message system as well. The main purpose of building this web service is to make the chatbot faster, easier and highly customizable to the user (Students). This web service tries to break this barrier and allows the user to perform interaction and other activities and enhance the web service among the students. If this chatbot is to be further developed, this could be something to draw upon. REFERENCES 1. Nurul Amelina Nasharuddin, Designing an Educational Chatbot: A Case Study of CikguAIBot, in 2021 Fifth International Conference on Information Retrieval and Knowledge Management (CAMP) 2. Dayana Priscilla Peve Villanueva et al, A Chatbot as a Support System for Educational Institutions 3. 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