Application of Chatbots in Education

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Summary

This project's aims were to investigate whether chatbots can be used in an educational context as a tool to assist teaching staff. Requirements for such a system were proposed.

A review of academic literature on the relevant technologies to the creation of chatbots was carried out. Artificial Intelligence techniques were studied. Popular chatbots throughout the years were also researched.

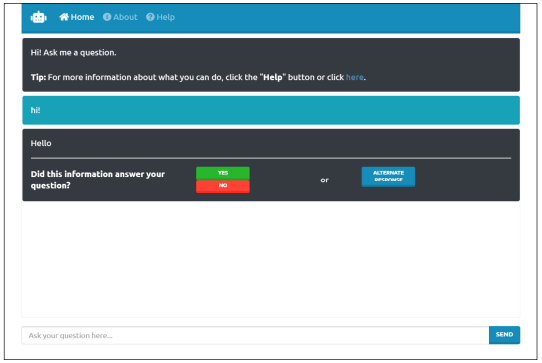
A combination of Machine Learning and Natural Language processing techniques were utilised in the development of a prototype of the system.

The application was evaluated by a group of users who completed a questionnaire. The majority of participants were representatives of the target audience of the application: beginner programmers. The results were analysed and improvements were made based on the feedback.

Architecture

The application consists of two main elements: the **back-end** and the **front-end**.

The **back-end** processes the input received by the user and generates a response.



The user interacts with the **front-end** which allows them to input their questions.

The features of the application can be used by typing **textual commands** or by clicking the corresponding **GUI elements**.

The interface resembles a messaging application.

Features

- The responsive design of the user interface adapts to the screen size of the device used to view the application. It allows the user to access the application from both mobile devices and PCs.
- An "**alternate response**" feature allows the user to ask for another response to a previous question.
- A "**feedback**" feature allows the users to rate answers, which improves the chatbot's ability to respond.

"Rating" a response helps the chatbot answer future questions more accurately.

The alternate response feature is used when the answer returned by the chatbot was not helpful.

Evaluation

Two evaluation approaches were taken:

- The chatbot was compared with a similar application.
- A group of students was asked to test the prototype and provide feedback by completing a questionnaire.

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The user interface is easy to understand and use.	7	5	0	0	0
The user interface is visually pleasing.	6	5	0	1	0
I was able to understand how to use all the features of the application.	8	4	0	0	0
I was able to use the alternate response feature.	6	3	2	1	0
I was able to use the feedback feature.	6	5	1	0	0
Appropriate error messages are shown.	7	5	0	0	0
The chatbot answered my question(s) quickly.	9	3	0	0	0
The chatbot response(s) answered my question(s) accurately.	5	5	2	0	0
I am overall satisfied with the functionality of the application.	8	4	0	0	0
Number of Responses	**62**	**39**	**5**	**2**	**0**
Percentage of Responses	57.4	36.1	4.6	1.9	0

Conclusions & Future Work

The developed application met its initial goals. In addition, extra features were implemented.

The evaluation process proved that while issues existed, the application had potential.

Some improvements that can be made are:

- Better processing of paraphrased input.
- The addition of an administrator page where the chatbot can be configured.
- The addition of a system which searches for relevant information online when the chatbot is unable to answer a question