Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 169 (2020) 652–655

Procedia Computer Science

www.elsevier.com/locate/procedia

Postproceedings of the 10th Annual International Conference on Biologically Inspired Cognitive Architectures, BICA 2019 (Tenth Annual Meeting of the BICA Society)

Use of chat bots in Learning Management Systems

Eugeny Bezverhny, Kazbek Dadteev, Leonid Barykin, Sergey Nemeshaev*, Valentin Klimov

National Research Nuclear University MEPhI, Kashirskoe shosse 31,Moscow 115409, Russian Federation

Abstract

The main purpose of this article is to describe how to use chat bots in learning management systems. The substantiation of the importance of using chat bots, as well as the tasks that they can solve in the learning process. The classification of bots is given depending on the types of tasks they perform and their place in educational processes. In addition, methods and approaches to training chat bots operating in LMS are described.

Keywords: Chat bot; E-learning; Learning management system

1. Introduction

Life-long education is becoming more and more popular in all sectors of the economy [1]. To implement this concept, various LMS are used, which leads to a significant increase in competition between products of this type. The main advantage is the use of AI in such programs. This makes it possible to personify training, for example, to build individual educational trajectories, to identify strong and weak areas of knowledge among students and to build individual development plans. However, the use of AI is not limited to personalizing training. The

* Corresponding author. Tel.: +7-909-919-49-59;
E-mail address: sergey.nemeshaev@gmail.com

10.1016/j.procs.2020.02.195

proliferation and use of chat bots has led to the messaging-as-an-interface user interaction paradigm. It was in instant messengers, whose audience in the world is growing steadily, that chat bots found a fertile development environment. In the near future, chat bots will be of increasing importance. For example, they may well replace the classic search engines and social networks. The advantages of bots will be the ease of interaction with them, the speed of their reaction and the ability to configure them for user. Using a bot greatly simplifies interaction with services, providing a universal interface.

Chat bots play a particularly significant role in the so-called intelligent learning system - programs that simulate teacher behaviour. Such programs can test students' knowledge by analyzing their answers, provide feedback, and create personalized learning plans.

2. Using chat bot in LMS Vector

2.1. LMS Vector

The LMS Vector combines the functions of LMS and TMS, being a multifunctional software product designed to automate the process of integrated learning, student testing, statistical processing of results and talent development [2]. These make system perfect for both corporate and university education. The main feature is wide range of opportunities to create test questions that can then be used to monitor students' knowledge. LMS includes all popular types of questions: single choice, multiple choice, open answer, question with blocks, and question for correspondence. In addition, all questions can be accessed from special "question bank" and be used to create highly customized test for different groups of students.

2.2. Chat bot aims and goals

The reality is: managers of educational programs spend 70–80% of the work time for repetitive tasks, such as polls, reminders, answers on the same questions sending mail [3]. In modern conditions such a routine work is easier to automate via chat bots. They are able to solve both simple organizational issues and more complex ones, turning in fact into a full-fledged "junior" partner manager program or student. It is clearly visible on the example of the five most important tasks of educational programs, for the solution of which it is effective bots are used.

Alert Reminder. The bot reminds the user of the necessary actions: refresh the studied material, pass task, and come to the seminar, and so on - until the user completes the task. This function becomes especially useful given that students can be assigned personal dates and time for passing tests that do not coincide with the time for passing the test by the main group of students.

Notifications with new information. The bot sends new information on topics of interest to the user. An important step in building an individual development plan is to identify the strong and weak areas of the user's knowledge. After passing the tests, the student's portrait is updated and the chat bot can provide information on new materials recommended for study. It is also convenient to inform the user about the appointment of new courses with the help of such a bot if he is currently working in the system. Email is used to send such messages offline to users.

Continuous education. Bot responds to user questions upon first request in 24/7 mode. Since educational manager are not able to communicate with users any time of the day, chat bots are of a great use to answer simple questions immediately.

Collection of information and performance evaluation. The bot may ask the user to evaluate their own successes, tell about the specific application of the knowledge gained, about successes and failures. Gathering feedback is very important when developing and supporting courses, as it allows you to constantly improve the quality of the training material.

Personalized training. The bot analyzes the student's activity and sends individual learning paths with suitable materials.

2.3. Types of LMS Vector chat bots

The chat bot tasks discussed above were divided into 2 categories: answers to general questions on training and answers to questions on a specific course. These topics are extremely weakly interconnected, so two chat bots were developed for the system. The first is able to answer organizational questions and give tips on training, and the second answers questions on a specific training course. Due to some features of the training of chat bots, the second bot was used only in three courses that are devoted to topics that have a lot in common with each other. Thus, two chat bots were added to the system, each of which solves its specific tasks.

It is important that people perceive the bot as a living interlocutor, maintaining a dialogue with him even with his awkward answers. With a well-structured material, you can start training even with a raw bot, modifying it based on instant feedback. At the same time, any flaws can be attributed to the bot and thereby neutralize the negative reaction of users.

A bot that answers questions about the course is also able to collect feedback. Note that before that, feedback on training courses was collected in the traditional way, that is, on the course page there was a link to the corresponding survey. However, this method proved to be not the best way, since many users simply ignored this feature. The chat bot, in turn, suggested that the user use the feedback form after they mastered 75% of the course. The result was impressive. Previously, feedback was provided by an average of about 30% of users. In courses that used the chat bot, the necessary information was collected from almost 70% of users. Thus, the involvement of users in the dialogue increased twice.

2.4. Chat bots education

Now, training of chat bots in LMS Vector is carried out in a traditional way, that is, manually. This approach has its pros and cons. Of the advantages, it is worth highlighting simplicity and transparency. Since this functionality is fundamentally new, it is important to quickly create an MVP and get feedback on it. Traditional training allows you to quickly create a bot that can really communicate with the user and perform tasks. However, the knowledge base of such a bot will be small, which will not allow it to be scaled for use in a variety of courses loaded in the LMS. In addition, a manually trained bot will help reduce the number of errors and minimize the non-determinism of its behaviour in various situations.

The bot was trained on typical questions related to the organization of the educational process, such as: test results, upcoming events, and so on. In addition, the bot was trained on popular issues in several courses. In these courses, the bot can answer students' questions regarding the subject of study.

LMS Vector is multilanguage and currently supports 3 languages: English, Russian and Spanish. This fact significantly complicates the development of the chat bot, as it also needs to support the ability to communicate in different languages. Due to the fact that this functional is fundamentally new to the system, it was decided that at first the bot will only communicate in one language. Therefore, in the current version, only one language is used - English.

Support for several languages and the transition to new ways of learning should be considered as the next tasks for the development of these chat bots. Manual training is difficult, since the system has a large number of different training courses, the data on them are constantly updated, and new courses are added. The transition to new AI technologies, which include self-training in automatic mode on certain arrays, typical answers and questions, will allow you to scale the capabilities of the chat bot for all courses that are in the system.

3. Conclusion

The use of learning management systems in itself can significantly increase the effectiveness of the educational process, however, the integration of chat bots helps to bring this process to a new level. This will increase the involvement of users in the process, make it smoother, allows to make learning more lively.

LMS Vector is a multifunctional educational product that uses modern approaches to the educational process. It combines all the experience of classical teaching techniques, and also uses the latest developments in the field of chat bots to make learning as effective and comfortable as possible. Using highly specialized chat bots allows them

to better solve specific problems. However, the use of chat bots in multilingual systems is hindered by the need for additional training in each language. Further development of chat bots will further improve the quality of the educational process.

Acknowledgements

This work was supported by Competitiveness Growth Program of the Federal Autonomous Educational Institution of Higher Education National Research Nuclear University MEPhI (Moscow Engineering Physics Institute). The funding for this research was provided by the Council on grants of the President of the Russian Federation, Grant of the President of the Russian Federation for the state support of young Russian scientists - candidates of sciences MK-6888.2018.9

References

[1] Siryj, Y.: Satisfying the Needs of Enterprises and Organizations of Different Ownership Types in the Providement of Qualitative Education Services. Public policy and economic development, vol. 3, pp. 72-77. (2012).

[2] Barykin L.R., Bezverhny E.V., Dadteyev K.M., Lukashevich N.U., Mehryakov V.V., Nemeshayev S.A., Fomichyov N.A. Learning management system “Vector”. International journal of applied engineering research, vol 11. pp. 7583-7587. (2016).

[3] Fuller, R. Using a learning management system to support blended professional learning at Polytech High School. Doctoral dissertation, University of Delaware. (2016).