AluxBot - A Chatbot that Encourages the Care for the Environment

Jorge Peniche-Avilés[1], Carlos Miranda-Palma[1] , Lizzie Narváez-Díaz[1] and Erika Llanes-Castro[1]

**[1]Autonomous University of Yucatan, Faculty of Mathematics, UMT
Tizimín, Yucatán, México**

Abstract

This work presents an improved version of the software AluxBot, which is a chatbot developed in Visual Basic and that integrates the speech recognition of the O. S. Windows. AluxBot is focused on promoting the care for the environment and sustainable development in school-age children and thereby give an alternative use to new technologies, directing them to a good purpose.

Keywords: *Chatbot, Sustainable development, Environment, School-Age Children, Speech Recognition, Sustainability.*

1. Introduction

Nowadays there is a variety of computer applications to which the infant public has access, and the purposes of those applications range from mere entertainment such as games to the simulator type in which a user learns or simulates the use of some tool or machinery, including those of educational purpose, among others. There are also different technologies that go hand in hand with the creation of those applications, such as for example the bots, which are programs that have defined a routine [1], and there is also the speech recognition, technology that manipulates the data introduced in a verbal form, turning them into data that a computer can process [2].

A bot is a computer program that imitates the behavior of a human, a bot can perform routine functions of editing. At other sites, like YouTube, the Bot can answer questions about the site content (conversational bots).

Within technological means of interactive communication, there are programs that use techniques of artificial intelligence, known as chatbot or chatterbot, with the purpose of simulating the conversational ability of human beings. Chatbots are defined as programs that use natural language processing within a system of questions and answers. These systems are a kind of expert systems that use case-based reasoning [3].

Chatbots are based on "questions and answers" routines, the answers that the system produces are based on keywords provided by the user. Using this mechanism is that the first version of AluxBot emerges, which is a project whose users, scholar-age children (Tizimin), in written form can talk with an Alux (a mythological Mayan creature), about the geographical subject "Primary Activities" [4].

In order to diversify interaction with AluxBot is that arises the idea of improving the first version of AluxBot (created in XML and Flash) to a second version in the language of programation Visual Basic and with speech recognition, as well as to focus in that the interaction with AluxBot promotes in the user (child) the awareness in the "care for the environment and the sustainability". This new version of AluxBot was developed using the tools of Visual Studio 2010 Professional, Speech (speech recognition of Windows), Macromedia Flash 8, and MySQL.

This paper presents the improved AluxBot that allows users to converse using the voice as well as the keyboard. In addition, the interaction introduces the users (school-age infants) into the topic of the "care for the environment", providing from the definition of "the environment" until tips to achieve its proper care.

Figure. 1. Login interface of the AluxBot project.

2. AluxBot

AluxBot was originally developed by the LCC. Jesus Espejo-Briceño [5], it is a chatbot aimed at children in

school age and with which they conversed about several topics like "the interview" and "the primary activities". The initial interface can be observed in Figure 1, where the user writes his or her name in order to be able to interact.
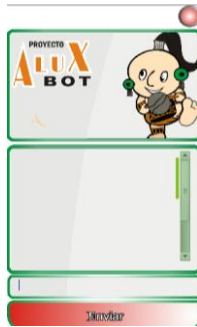

Figure. 2. Interface of the AluxBot's chat.

In Figure 2 can be seen the interface of the first version of Aluxbot, where the user interacted with the Alux writing and reading text. Both interfaces were remade and improved in this new version using Visual Basic.

3. AluxBot with speech recognition

AluxBot, since its inception was created with the purpose of including issues of concern in school-age children, who currently see technology as an entertaining way of learning. Following this same philosophy is developed the new version of AluxBot, which pretends to be a chatbot that allows interaction by means of text and voice. Also that the user learns or take conscience of "the care for the environment and sustainable development" during the interaction with this chat and in addition to do so in an easy and ludic way. Below are described the steps followed to create the new version of AluxBot.

4. Methodology

For the development of this new version of AluxBot the next steps were followed:
- Taking into account the design and content of the login interface of AluxBot (Figure 1), in XML, the same interface was developed in Visual Basic but turning the static image of the logo into an animated logo, designed with Macromedia Flash 8 (Figure 3).
- Similarly, for the AluxBot's chat interface (Figure 2) originally in XML, the same interface was developed in Visual Basic, but including an Alux animation (Figure 4).
- Finally, and most importantly, speech recognition was added to the chat interface with the tool Speech of Windows (Figure 2).

Figure 3. The logo redesigned for animation purposes.

Figure 4. The new Alux's animation.

5. Interaction with AluxBot

This section describes how the interaction with AluxBot is performed, once it was improved.

When the program AluxBot starts, the login interface that requests the user's name is displayed. After introducing it, the user gives a click on the chat button or simply press the <enter> key, immediately a window is displayed showing a personalized welcome (Figure 5), and after a confirmation by pressing the <enter> key, the chat interface will be opened.
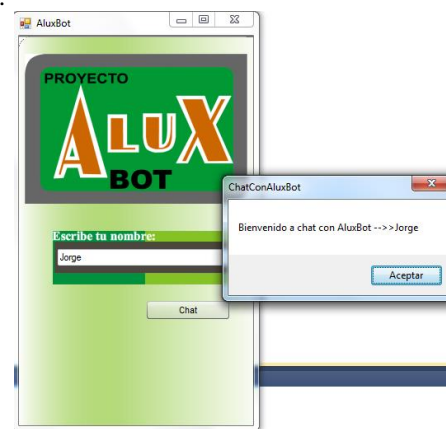

Figure 5. First interactions of the user where the name is introduced and then the program welcomes the user.

Once located in the chat interface, is displayed the area where the conversation is deployed (Point 3 of Figure 6). Under this section is the area where the user introduces his

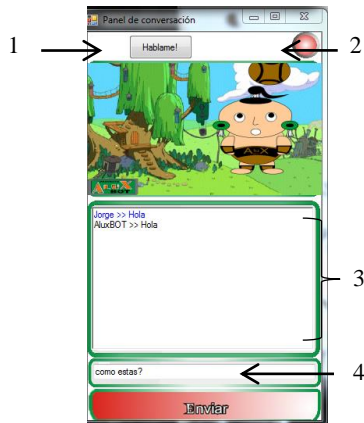or her comments in a textual (written) form. (Point 4 of Figure 6).

Figure. 6. Chat panel interface.

On top of this interface is the button "Hablame" (Talk to me) (Point 1 of Figure 6), which activates the speech recognition (Figure 7). Once started this mode, the speech recognition of Windows is opened and will be activated manually. The user can interact with voice, however, the AluxBot will answer by means of text.

Figure 7. Windows of the speech recognition that is activated manually by clicking on the button with the grey microphone.

Finally, it was added a button that allows the user to return to the first screen as a "new talk" with another (or the same) user (Point 2 of Figure 6).

6. Tests and results

In order to test the functionality of this new version so as if the users could easily use the speech recognition, a few tests were performed with school-age children. These tests were performed in a primary school of Tizimin, a city in the east of the State of Yucatan, in Mexico, with 12 students: 6 from 5th grade (11 years old, 3 boys and 3 girls) and 6 from 6th grade (12 years old, 1 boy and 5 girls). The tests included two sessions, the first one was performed with 5th grade students, and the second one with the students of 6th grade. For the test processes the group of children was reunited in the school's library, then the reason of the reunion was explained, then one after one the students went to test the software, on completion they individually answered a questionnaire with two sections:

one of multiple choice and one of open answers, this with the purpose of collecting information.

Below are the results obtained on the multiple choice section, and in some cases accompanied by a graph:

- 8 of 12 students (67%) answered that they had previously interacted with a computer.
- 4 of 12 students (33%) had chatted by computer. In the group who had not chatted were all the 6 students of 5th grade.
- 9 of 12 students (75%) knew what speech recognition was.
- 11 of the 12 students liked the design of the interfaces.
- Figure 8 shows the answers to the question of "What think about to use the software?"
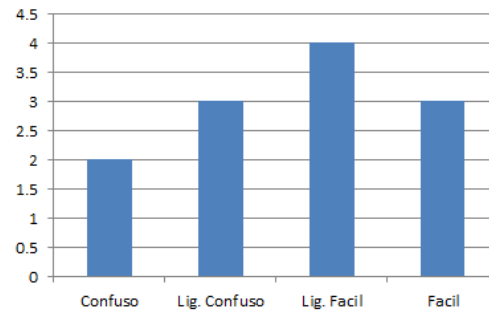

Figure. 8. Results of think about to use AluxBot.

- 11 of 12 students expressed that the experience of using the software was interesting.
- 11 of 12 students understood what the AluxBot said to them about the care for the environment.
- 9 of 12 students (75%) said that it was interesting to use their own voices to talk with the Alux.
- 11 of 12 students liked to talk through speech.
- 8 of 12 students (66%) found easy to use their voices to communicate with the program.
- 11 of 12 students commented that they learned something by talking with the Alux.

Following are presented the results of the open answer questions:

- To the question of what he or she learned by talking with AluxBot, the answers with more occurrences are:
  - To recycle.
  - Definitions like those of organic and inorganic.
  - "That it is bad to burn garbage"
- The answers with more occurrences to the question of what was it that he or she did Not like of the software:
  - "That the conversations are short"

- o "That there are few ways allowed to write your comments in AluxBot"
- o The cartoon of AluxBot, it has few movements.
- The answers with more occurrences to the question of what was it that he or she liked of the software:
  - o To talk with the Alux.
  - o The cartoon of the Alux.
  - o "That it talks about taking care of the environment"
  - o "That it explain concepts"
- About the way that he or she liked most for interacting, the results were:
  - o 8 students liked most the textual (written) form, because it worked every time, because they never have chatted like that, and because it seemed interesting.
  - o 2 students liked the speech recognition because it seemed interesting.
  - o 2 students liked both ways of interaction.
- And finally, the software improvements suggestions were:
  - o That it also talks about the outer space.
  - o That the Alux also speaks.
  - o That the Alux have more moves.
  - o That the Alux have a grandmother.
  - o More cartoons.
  - o More talk.

7. Conclusions

Nowadays to be able to interact with an application in a more natural way as is the speech, is a way to make it easier to use, and to bring technology closer to those who aren't used to a computer. Not all the school-age children of Tizimin, Yucatan, Mexico have access on a regular basis to a computer, and many times is difficult for them to use the mouse, that is why speech recognition was included into this software, for which has to be created a new version of the same that allowed to include this new form of interaction.

Today we have a software with which school-age children will be able to interact by means of keyboard or speech, and that in a fun and ludic way can foster and promote since childhood the care for the environment and sustainable development.

The complexity of managing a bot for a chat, is not in the programming (creation of the bot), but in its grammar definition, and in how to handle it, i.e., how it will interpret what the user introduces and how it will select an answer given a question, as well as to keep a conversation if the user does not enter something, and of course, to keep a link in the conversation.

Once finalized this stage, the next work is to test the software with more school-age children from other primary schools in the city of Tizimin.

References

[1] Bot https://es.wikipedia.org/wiki/Bot
[2] Reconocimiento de Voz de Windows http://windows.microsoft.com/es-es/windows/use-speech-recognition-operate-windows-programs#1TC=windows-7
[3] Wallace, R.: *A.L.I.C.E. Artificial Intelligence Foundation*. http://www.pandorabots.com/pandora/talk?botid=f5d922d97e345aa1
[4] D. Tec and C. Miranda, "Pruebas de Usabilidad de un ChatBot con niños de 5to grado de primaria" in *CcITA 2015*, Miami, Florida, 2015, pp. 410-415
[5] J. Espejo, C. Miranda and V. Chi, "Desarrollo de un Chatbot y Evaluación de su Usabilidad con Niños de Primaria de una Comunidad Rural" in *CcITA 2013*, Cancun, Quintana Roo, 2013, pp. 389–396.

Jorge Peniche-Avilés currently a student at the Faculty of Mathematic at the Autonomous University of Yucatán – Multidisciplinary Unit Tizimin. He is student in professional programs of Computer Science.

Carlos Andrés Miranda-Palma master in Computer Science for the Institute Technology of Monterrey in Mexico, is professor of the Autonomous University of Yucatán. His researcher lines: Voice recognition, Artificial Intelligence, Human Computer Interaction.

Lizzie Edmea Narváez-Díaz. Received a degree in Computer Science from the Autonomous University of Yucatán (UADY) in 1997. She received a Master of Computer Science degree from Monterrey Technological Institute (ITESM), Campus Cuernavaca, in 2007. She has been a full time teacher at the Autonomous University of Yucatán since 2000 in the Networking department in Tizimín México. She has participated in software engineering development projects. Currently she is giving courses on networks in the professional programs in the UADY.

Erika Rossana Llanes-Castro. Received a degree in Computer Science from the Autonomous University of Yucatán (UADY) in 2002. She is about to receive a Computer Science degree from Monterrey Technological Institute (ITESM), Campus Estado de México. Currently, she is a full time academic technician at the Autonomous University of Yucatán since 2002 in the department of computer in Tizimín México. She has participated in software engineering development projects. Currently she is giving courses on programming mobile devices in the professional programs in the UADY.