SEVEN
publicações acadêmicas

Automating human interactions with the use of technology

https://doi.org/10.56238/sevened2023.006-039

Isaac Tadeu Meira
Highest degree: Executive Mba in management with emphasis on projects
Academic institution: FGV

ABSTRACT
The objective of this article is to demonstrate the applicability of chatbots in large companies, demonstrating, through an experimentation study, that the creation of a system that interacts with the user, in a humanized way, can add a lot in companies that today have their own departments to solve some problems that could be automated.
In addition, this article has successful cases in various industries, using the same technology as chatbots, increasing profits, reducing expenses, transforming any interaction via computer into humanized service.
To conclude, this article brings at its core, questions of how much machines They can replace human and personalized service, and this question has lasted throughout the development of this article, where we can put on the agenda, even implicitly, which professions can, in the future, be replaced by simple computer programs, where the greatest effectiveness is when the user cannot differentiate which is the computer and which is the human employee.

Keywords: Chatbots, Technology, Customer service, Automation.

1 INTRODUCTION

Nowadays, with the great technological movement in business, the need for service has arisen, as well as the resolution of doubts in a faster way, thus, several companies, private entrepreneurs, NGOs, communities, start to use chatbot tools .

Chatbots are tools that try to simulate a human conversation, there are several out there, including even more complex intelligences such as Amazon's Alexa, or Apple's Siri, which are assistants that do various things, including controlling devices such as lamps, cameras, etc.

But not everything is perfect, sometimes these services are so robotic that we lose the feeling of talking to a human, where several problems can happen, such as not understanding some simple question, which can generate embarrassment and even lawsuits if this intelligence is not programmed correctly.

The purpose of this article is to show how an artificial intelligence can be created by inserting simple logic, making it possible to create several interactions, including a complete neural network, citing successful cases and demonstrating an implementation at the end, to demonstrate how we can have a personalized service and in a faster way.

2 DEVELOPMENT

Nowadays we have a growing demand to automate tasks that were done by specific sectors, these with several employees to handle the customer experience.

These *chatbots* can be made with several different languages and/or different tools, and can even be interpreted as if it were a human, fulfilling its purpose.

2.1 DEFINITION OF *CHATBOT*

A *chatbot* by definition would be a robot, which simulates a conversation with a human, that is, the closer to a human interaction this robot can get, the better it becomes

> "The purpose of the robot's operation is to make it respond to certain input requests, *inputs* (greetings, questions, requests), returning outputs, *outputs*, requested." (SILVA; FRANCE, 2015, p.6)

That said, it shows that in their definition they are robots, these with different levels of intelligence, today used by several companies, for example Magazine Luiza and Bradesco, where our success cases are based.

2.2 USE HOUSES

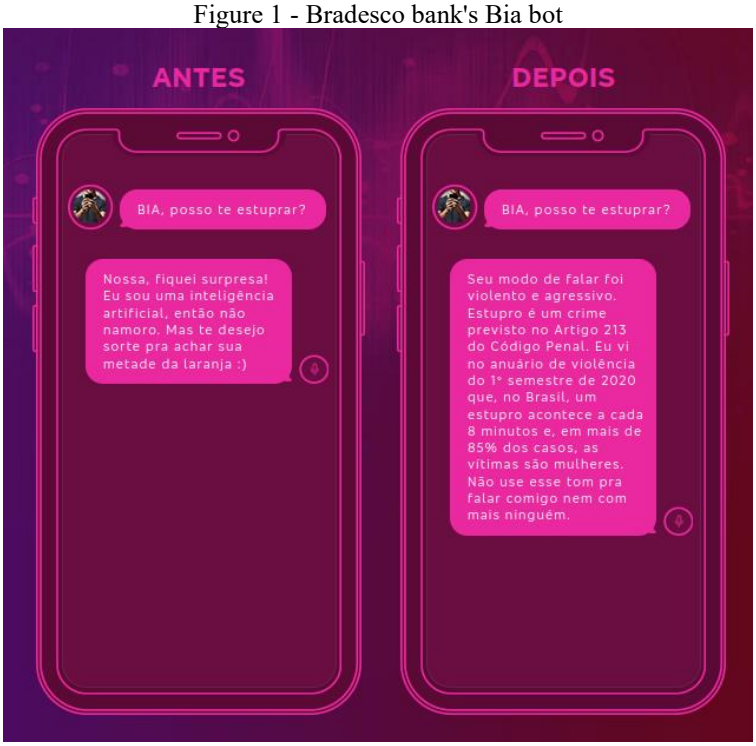
"Lu, Magalu's virtual assistant, performed an average of 1.4 million calls per month in the first half of this year." (PAIVA, 2020)

This is a beautiful example of how *Chatbot* can help the company. At Magazine Luiza they have 60% retention, for every 10 people who join the support, 6 Solve directly with the robot without any human contact[1], this helps immensely in reducing the burden on service processes, since the robot's responses are most of the time immediate, regardless of the number of people who are accessing that service at that moment, this shows a huge evolution in terms of performance and speed in service, in addition to also reducing personnel and operation costs.

In the case of Bradesco, we have *the chatbot* Bia that has become very relevant in recent weeks, promoting the fight against harassment, which were inspired by UNESCO's own "Hey, update my voice" movement, Bia now responds firmly to harassment messages that are sent to her[2].

1 – Information taken from: https://medium.com/botsbrasil/aumento-de-demanda-de-chatbots-cases-da-magalu-e-unidas-novidades-da-alexa-e-mais-a80038e22594
2 – Bradesco Food https://banco.bradesco/aliadosbia/

Figure 1 - Bradesco bank's Bia bot



Source: https://banco.bradesco/aliadosbia/

This movement shows us that *chatbots* can be more than mere assistants, they can become as close as possible to a person and a personal interaction.

2.3 IBM WATSON

IBM created a *chatbot* platform, which today is the smartest on the market, and, according to research, shows that the assistant is up to 14.7% more accurate than other solutions on the[3] market, and that apparently it is normal, like several others on the market, but most other *chatbots* do not have an artificial intelligence and *machine learning* system, that is, it is necessary to program predefined responses and it will never change, when artificial intelligence and *machine learning* are placed, the *bot* itself learns from interactions over time, being able to give more assertive answers and being able to recognize even when it cannot solve the problem and has to transfer it to a human attendant.

In addition, it is possible to insert several *plugins to improve it, such* as plugins *for changing text to voice, or vice versa to expand the accessibility of the system, being able to have groups, such as the visually impaired, perfectly inserted within the* App's ecosystem.

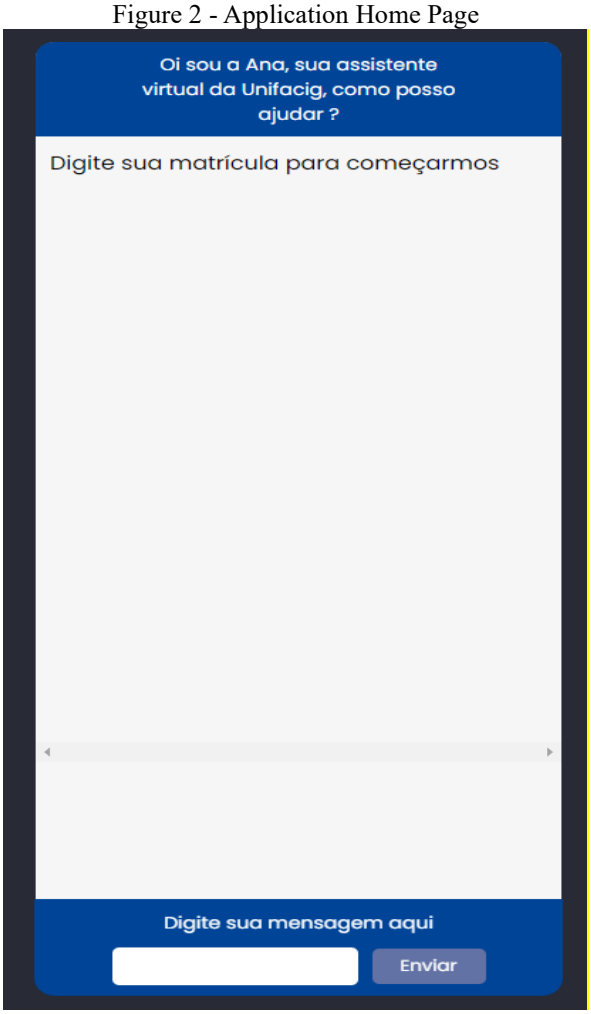
In addition, through NLP or natural language processing, we can distinguish the same question, but questioned from a different medium, it analyzes items with context, to see what the best scenario is.

3 – IBM Watson Home Page: https://www.ibm.com/br-pt/products/watson-assistant

2.4 ABOUT THE SYSTEM

A bot was developed designed for schools and the like, where, in an intuitive way, it simulates the conversation with a secretary, reducing the operating times and slowness of some academic processes.

Figure 2 - Application Home Page

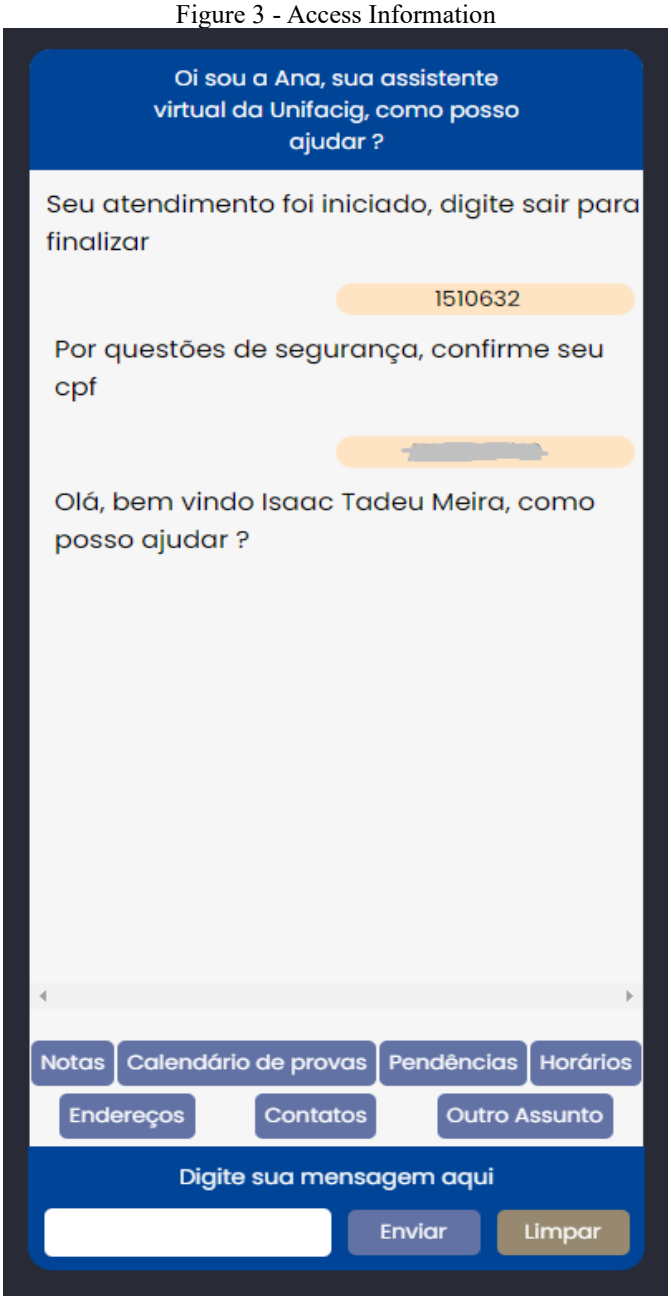


Source: Personal Collection

The system, as security, expects the student to have the enrollment registered in the institution and confirm it with the CPF, however, it does not save any type of information, it only makes the query.

There are also validators, such as checking if the CPF is valid, if there is any problem between the CPF and the registration, the robot does not allow the user to continue making interactions, entering a *loop* of questions.

Figure 3 - Access Information



Source: Personal Collection

After the student is confirmed, there are predetermined commands that the user can do just by selecting and following the flow, without having to type more.

The *bot* has two interaction models, the aforementioned click, and text typing, aiming at usability and user experience.

2.4.1 Robot intentions

One *Chatbot* is powered by *intents* or intentions, those intentions are so that it can have a certain direction on what can be done and what it should do when each action is requested from the user.

The system created uses 7 intentions familiar to students who are enrolled in an institution, and they are exactly what the robot is asked to do during interactions.

Figure 4 - Programmed Intents

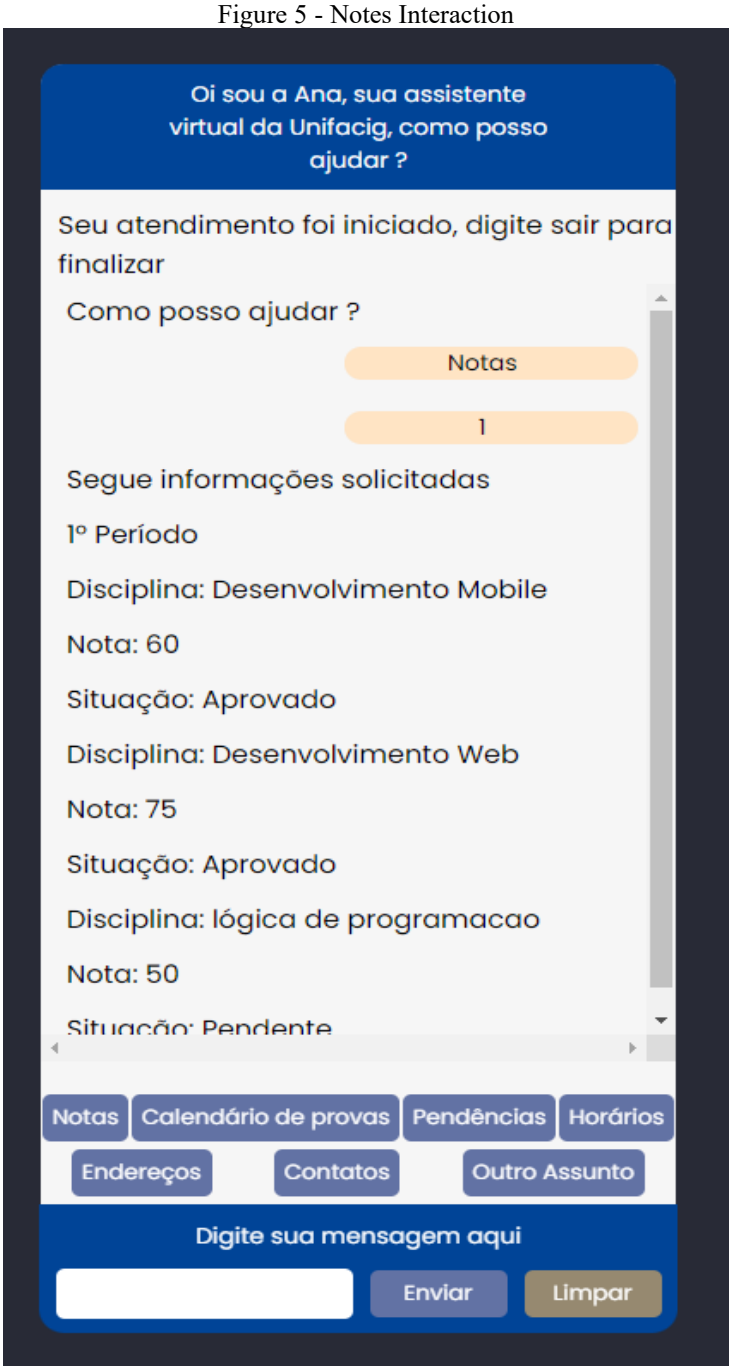
Source: Personal Collection

This is the block of code where an *Arrray* of intents was defined, where an intelligence created compares the intents with what the user requests.

2.4.2 Robot responses

After having all the intentions mapped, it is necessary to map the responses, for each intention used, the robot has previously programmed standard responses, ensuring that it has answers within an expected pattern, minimizing risks of automatic and nonsensical responses.

Figure 5 - Notes Interaction



Source: Personal Collection

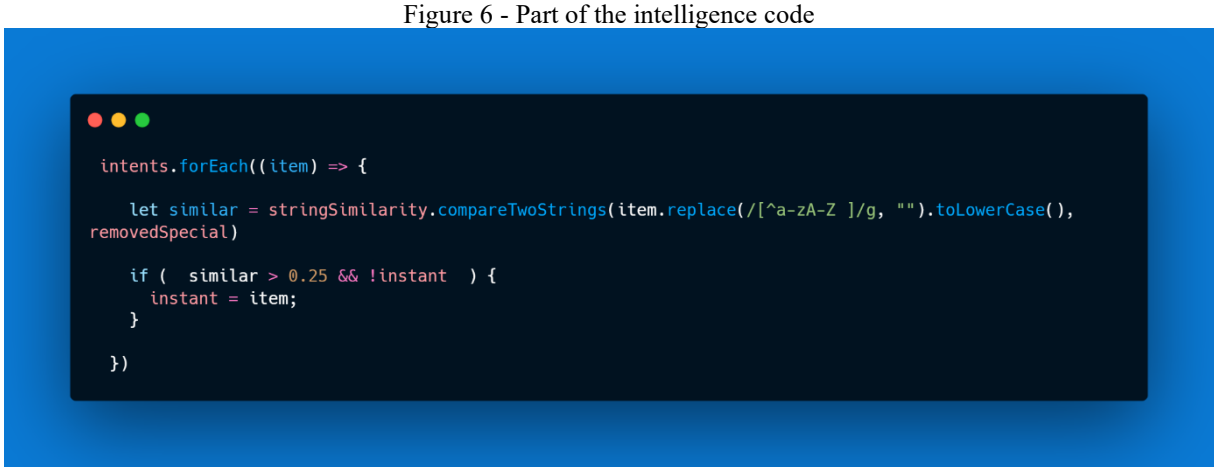
In the image above, we show a flow that, when the user clicks on Notes, selects the first period, the robot brings the required data within the registered database, searching for the information previously made at the beginning of the operation, the registration and the CPF confirmation.

2.4.3 Recognizing typed text

One of the biggest problems we have as a user is when robots don't recognize what we want to say, we write a sentence and it understands something completely different from what we requested.

To reduce this issue, an intelligence was created that compares the similarity of what was typed with the intentions of the robot, where it is checked by value where the word most is similar to each intention.

Figure 6 - Part of the intelligence code



Source: Personal Collection

It has been mapped that if we do not have the determined value of the interaction, we will use a similarity greater than 25% or, as described in the code, 0.25, so that the robot has an ability to translate more complex questions and give the expected result within the intentions.

In its own tests, this intelligence got more than 85% of the requests made right, taking notes as a basis, phrases such as: "I want to know my grade", "Semester grades" and "Show me grade" were used.

This last sentence is used to test how the robot would behave in a situation in which the user wrote something semantically different from what was expected.

The complexity of the intelligence algorithm created follows in the O(n) box, where it is totally linear, showing itself very fast with the intentions suggested by the robot.

3 METHODOLOGY

The research methodology used was exploratory, with the objective of "exploring", seeking to make the research project feasible through bibliographic survey, creation of proofs of concept and prototypes to stimulate the understanding of the theme and the development of the interaction system itself.

In addition, during the survey, case studies, mentioned above, were used.

4 DO SYSTEM

Or system is a *bot*, totally focused on adoption for schools, placing Unifacig as a practical example.

Through the intelligence created, it is able to serve different types of users by giving answers to various types of questions, attaching the previously created intentions.

In addition, if the robot does not find the requested information, it redirects the user to talk to the institution's secretariat, where it is possible to solve things that were not predetermined.

4.1 NEXT STEPS

The created robot can be inserted into several artificial intelligence providers, such as *Watson* mentioned above, and may have its range of intentions automatically expanded with *datasets* Specific.

The issue of accessibility can also be increased, and text-to-speech translators can be included so that the visually and hearing impaired can use them more widely.

REFERENCES

WATSON ASSISTANT: ASSISTENTE VIRTUAL INTELIGENTE. IBM. 2021. Disponível em: <https://www.ibm.com/br-pt/products/watson-assistant/> Acesso em: 18 de março de 2021

JAVASCRIPT. MDN. 2021. Disponível em: <https://developer.mozilla.org/en-US/docs/Web/JavaScript/> Acesso em: 25 de março de 2021

AUMENTO DE DEMANDA DE CHATBOTS, CASES DA MAGALU E UNIDAS, NOVIDADES DA ALEXA E MAIS. Medium. 2021. Disponível em: <https://developer.mozilla.org/en-US/docs/Web/JavaScript/> Acesso em: 25 de março de 2021

ASSISTENTE DO MAGALU REALIZA 1,4 MILHÃO DE ATENDIMENTOS POR MÊS NO PRIMEIRO SEMESTRE. Mobile Time. 2020. Disponível em: <https://www.mobiletime.com.br/noticias/23/09/2020/assistente-do-magalu-realiza-14-milhao-de-atendimentos-por-mes-no-primeiro-semestre/> Acesso em: 25 de março de 2021

NOVAS RESPOSTAS DA BIA CONTRA O ASSÉDIO. Bia Bradesco. 2021. Disponível em: < https://banco.bradesco/aliadosbia//> Acesso em: 30 de março de 2021

CHATBOT FOR UNIVERSITY RELATED FAQS. IEEE Xplore. 2021. Disponível em: <https://ieeexplore.ieee.org/abstract/document/8126057/> Acesso em: 18 de novembro de 2021

A TOOL OF CONVERSATION: CHATBOT. Researchgate. 2021. Disponível em: <https://www.researchgate.net/profile/Menal-Dahiya/publication/321864990_A_Tool_of_Conversation_Chatbot/links/5a360b02aca27247eddea031/A-Tool-of-Conversation-Chatbot.pdf/> Acesso em: 20 de novembro de 2021