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Development of the E-Learning communication system: chatbots' impact on the student communication

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Abstract
The need of conversational agents has become intense with the extensive use of personal machines with the hope to communicate and the need of their makers to provide natural language interfaces (Wilks, 1999). Just as people use language to communicate with each other's, people also wants to use their language in order to communicate with computers. (Zadrozny, 2000) Zadrozny settled that the best way to help Human Computer Interaction (HCI) is by allowing users to communicate their interest, needs, or questions directly and logically, by talking, typing, and pointing. This was the driver behind the improvement of chatbots. A chatbot system is a software program that collaborates with users through natural language. Distinctive terms have been used for a chatbot such as: machine conversation system, virtual agent, dialogue system, and chatterbot. The purpose of a chatbot system is to simulate a human discussion; the chatbot design incorporates a language model and computational algorithm to imitate unofficial chat communication between a human user and a computer using normal language. Primarily, developers invented and used chatbots for fun, and used easy keyword matching techniques to find a link of a user input, such as ELIZA (Weizenbaum, 1966). Then the growth of texting and natural language researches began to appear (Cliff, 1987), (Wilensky, 1988). With the development of data-mining and machine-learning techniques, advanced decision-making capabilities, ease of understanding of corpora, strong linguistic observations/processing tools principles like XML and its applications, chatbots have become more useful, with many viable applications (Braun, 2003). In this project presents practical chatbot applications in LIU University, viewing that chatbots are establish in daily life, such as help desk tools, regular telephone answering systems, and tools to help in education. As chatbots are being used more and more to communicate it's time to look at how we could use this AI-driven technology in education (Hopkins, 2018).

Keywords: Chatbots, LIU, E-learning, Student's Communication, Business Intelligence

1. Introduction

Research strategy

The strategy used is an exploratory strategy according to the same reason that indicates the qualitative approach. The projects questions reveal this choice as well, being more or less open ended, without claiming a hypothesis or leaning towards any prearranged conclusion. Since the main purpose was to find what current literature is saying about the capabilities of chatbots the normal step was to perform a literature review. The literature review was not focused on setting the background for the project or justifying the study, it examined particularly the studies that have been written about using chatbots in education. The type of literature review that was performed was an integrative review. This type of review looks at the typical literature of the subject to review and combine it in a concise way. The goal of an integrative review is generally to be creating new frameworks of perspectives on the subject, this fit well with the purpose of this study as it aimed to take the perspectives of the literature and review them. The literature set in an integrative review must consist of studies correlated to the research question, in this project, literature about chatbots in educational settings. University of Southern California writes that: "A well-done integrative review meets the same standards as primary research in regard to simplicity, inflexibility, and duplication. This is the most regular form of review in the social sciences." (California, 2018) [8].

Methodology

The methodological approach is presented along with the different steps that are essential to perform throughout the approach. Since the aim of the project was to find the capabilities of chatbot in an educational environment the approach to this project was a qualitative one. A qualitative approach is better when considering everything from people's lives, life experiences, behaviors, emotions and feelings to organizational functions, social actions, cultural phenomena and relations between nations (Strauss, 1998) [22]. The project examines the current literature on the subject, trying to discover the capabilities, pros and cons of the chatbot implementation in an educational environment. This might be considered examining cultural phenomena, as the chatbots are prepared and implemented within certain cultures. So according to this fact a qualitative approach has been chosen, and in turn it was reflected on the data gathering and analysis methods.

Literature review

1. E-learning concept

In the recent decades, internet forms an indispensable trend through making resources of learning and research ready obtainable for both students and teachers allowing them to exchange and share information (Haya, 2009) [15]. A constructional approach: E-learning involves the employment of internet technologies as a learning tool to

improve knowledge and performance (Wittich, 2017) [26]. Many have defined E-learning; its definition forms a comprehensive controversy (Dublin, 2003) [12]. Some considered E-learning any electronic way of learning and some consider it the usage of digital technologies to learn (Abbad, 2009) [4]. Then it was limited to mean the ability to learn based on internet or Web (LaRose, 1998) [17] (Cernerud, 2002) [9].

E-learning according to Technology driven definition is learning online a material course through modem, wireless, or cable connection accessed from mobile phones or computers. By Delivery-System-Oriented Definitions, it was referred to as real-time transmitted information and training online through the internet into the ultimate user. Communication Oriented Definitions category illustrated e-learning as an educational way to connect, participate, communicate and exchange information and materials between guide and students (Albert Sangrà, april 2012) [5].

2. Types of E-learning

Types of e-learning was sorted distinctly, it was classified based on range of its correlation in education and on interaction time. Also, it has been divided into major types according to Algahtani: e-learning based on internet and e-learning based on computer.

The learning based on computer involves a complete framework of hardware and software usage that generally allow the obtainability of information and communication technology. However, the engagement of computer is applied for purpose of saving and recapturing information in order to manage education.

The learning on internet basis considered an evolvement of computer based learning in which it allow the information reachable on the internet, making the needed willing links as a source of knowledge which would be ready used by the learners in the presence or absence of instructor and at any time and area (example: references and email services) (Arkorful, 2015) [6].

Fully online mode of e-learning was described by Algahtani in two forms synchronous and asynchronous according to its extent of time interaction. Synchronous timing involves online access that is exchanged between teachers and students or between students, where they can communicate an alternative education through the internet simultaneously using such means: room for chatting also called videoconference having the accelerated feedback mode (Almosa, 2005) [3]

However, the asynchronous mode provides teachers and students the ability to post communicate over the internet and discussing among each other but distinctly at varied time using emails and thread discussions as a tool of communication. Here students take the advantage to educate whenever they want but they lose the ability to gain the immediate feedback from their teachers (Algahtani, 2011) [2].

3. Chatbots

3.1 Chatbot Definition

The current technological development has raised effective rejuvenation solution that serve students' educational needs by inventing applications that are considered as a resource for personalized learning. The most important e-learning innovation is the so called " Chabot technology". It is generally well known as the conversational agent probably form helping agent that facilitate the usual student educational process. (Spilka, 4 Ways For Using Chatbots For eLearning, August 18, 2017)

Chabots are defined as conversational services, known as a set of algorithm and work by imitating human conversation. They act upon the principle of interaction with user in a real-time-manner through voice or text. Chatbot are also referred to as virtual assistant, software robot, conversation user interface and more.

3.2 Chatbot Types

Chatbots are divided mainly into two major types

1. The first one destined to help in certain business goals. Designed in the form of messaging applications like whatsapp messenger, facebook messenger and wechat. For instance, ordering from a local outlet shop through selecting specific messaging application.
2. The second chatbot type serves for information hosting purpose. These virtual assistants could be Like Apple Siri, Amazon Echo, and Google Assistant.

This novel technology shows a natural and intuitive communication between these sophisticated systems and human user, it also adds a critical research point to the individual-computer-interaction. People tend more preferably to open conversation unlimited to time and place. And this has two ways impact: on customer and on markets of enterprise.

4.3 What Makes Bots Intelligent?

Nowadays, the world reaches its halfway of digital conversion and technological development. Artificial intelligence has the transformative ability like the global economy. Using digital technologies, most of the enterprises consist of technologies based on artificial intelligence to improve their learning environment. Technologies involved in AI such as voice recognizing properties, smart bots and automated cars, when involved with eLearning, turns the workplace much better efficient (Spilka, August 18, 2017).

4.4 Some Sample Use Cases of Chatbots

At the present time, adoption to chatbots shows an increasing mode over various industries.

- To provide a service instantaneously regardless of time and place, A supply retailing association initiated a chatbot and deployed the “Easy Button”. This allows gaining the ability to order supplies through different devices by via text message, voice or mail
- A firm expert in digital, social media, marketing of channels, joined campaigns, delivery of content and creation, is alternating customer's applications into Chatbots where the users are able to interact through applying natural language.
- Scotland bank tailored a flying airman with a Cognitive Chatbot which permits people to communicate with an AI-powered scheme. This saves the advisor time instead of wasting his time on simple and uncertain wonders. In this way, clients will no more face unknown questions.
- Another bank in Belgian designed a Chatbot specialized for its young customers, giving them the suitable guidelines that describes products and services engaged to the bank. Especially, that it uses their own language or jargon.

More and more examples of samples of chatbots used over several domains like HR, hotels, media and entertainment, automotive and many. (Michiels)

4. Chatbots and Education

When it comes to education and learning, there exist considerably abundant reasons that lead universities across the globe to choose chatbots as a major tool to integrate with their main social pages and their own websites. Actually, these online conversational services promote in designing future ready universities. Chatbot open an advantageous gate for universities and colleges in delivering education as follows:

5. Improve Communication

According to universities, whenever the communication is dynamic, transforming the applicants from being probable into registered students will be such simple process. Currently, the probable applicants are the ones reaching young adulthood, they present online in a long-lasting manner over many devices. So, the immediate response to their questions is the most preferred.

Every year, the admission season is considered a sharp run-up period of time. During which the likely applicant students huddle in universities with their hundreds of questions about numerous courses, charges and fees and fellowships. The college crew works to address the handled questions throughout both modes, the online and offline. These processes needs time and lots of man efforts to be covered, and encounter usual errors in communication. However, the presence of chatbots in higher education reduces these entire issues. They would be designed to automatically answer the recurred questions regardless the huge number of the students applying. Chatbots are able to chat with applicants with no cost and at the moment they choose.

Colleges that apply the online conversational services on their online pages and websites gain increasing chances of attracting the interest of their target hosts. These educational chatbots offer an absolute knowledge effectively relative to their courses.

The students applying to colleges with online chatbot will find the instant reply and live chats more convenient and effective than mails which would last longer time and show vagueness. Also, they are able to get updates on their registration and enrollment.

6. Depository Information: Detailed and up-to-date6

In higher education, the purpose of online chatbots exceeds answering the students questions. They form possession for the universities available on their websites. While the students are interacting with the university chatbot, the last collect all the data which contain further helpful marks concerning student's behaviors related to the available and unavailable information on the college website.

The live chats offer the university management facility to figure and observe student questions received; analyze them to track areas in their website that should be improved. This procedure can be recurred at regular duration of time where the college can understand student's preferences and stay updated with their changing demands.

7. Post Admission Guidance and Troubleshooting

It is known that the absence of student support and the presence of actual ignoring impression lead the student to drop out of the corresponding colleges. Continuous and effecient communication with students together with the correct specification of information needs can prevent drop out process. The best solution holding both aspects is addressed by chatbots.

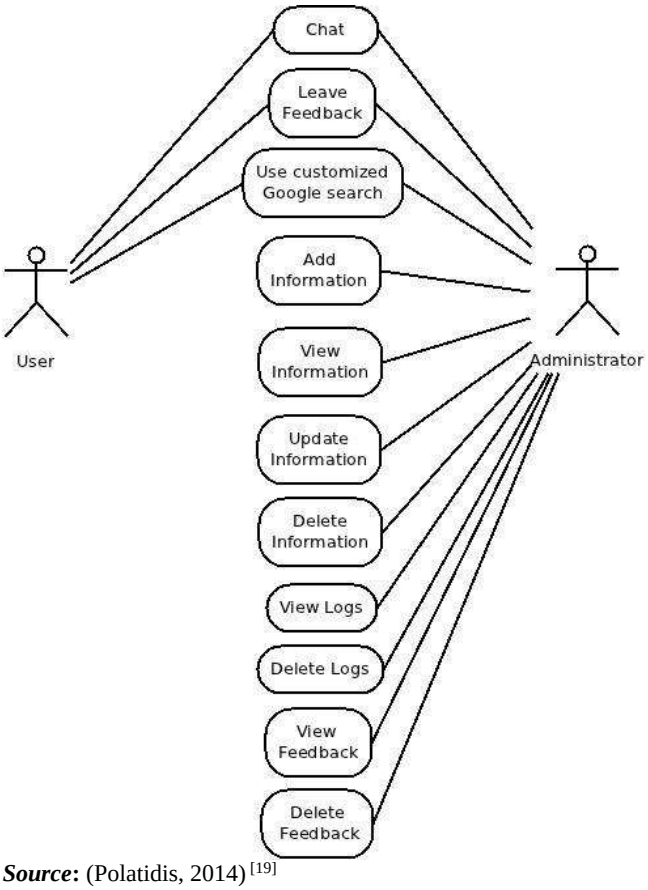
Upon proper implementation, chatbots can be considered a flexible and clear experience for students. So that it is one chatbot that do both: inform them about the courses during admission procedure and act as a campus guide.

Moreover, new students before reaching campus can search for obtainable scholarships, available dorms and corresponding services provided by the universities and if they meet their preferences. And the semester begin, chatbot can proceed to help students through online complexities like initiating university email accounts and providing their access to online library, etc..

Using this novel, the relationship between universities and their students is bridged. Also, the big load of work that is handled by the working team is reduced. Thus, universities and colleges gain, as a result, efficient and beneficial interaction promoting their further future growth. (Farkash, Feb 4, 2018) [13].

Practical part

1. Use case model: The use case diagram describes the functionality of the system as designed from the requirements and can be found below.



***Source*:** (Polatidis, 2014) [19]

Fig 1; Use case diagram

User: someone who uses the system to engage in a conversation

Administrator: the administrator of the system. He is allowed to carry out administrative tasks.

2. Chatbots in universities and colleges

There are few different ways that universities can adopt a chatbot for websites of university to help the students and staff with all of their educational and administrative responsibilities alongside different things.

2.1 Recruiting new students: The Chatbot anchors a higher number of registrations and assists with admission. Connect potential students online with the chatbot. Answer their questions 24/7; help with dilemmas, and information about the campus, services, scholarships and staffing. Combine the chatbot with your CRM (customer relation management) and send student leads straightforwardly into your recruitment procedure.

2.2 Students support: Connect your students with the university 24/7 from their desktop or mobile by using the Chatbot to support students and afford direct answers for campus services, staffing, scholarships, learning services, instructions about exams, IT services, troubleshooting and more.

2.3 Data assembling: finance department is the most complicated area for new students. On the other hand, universities can employ the chatbot about the financial details, since chatbots can collect and store a large amount of data related to the financial information. Chatbot can simply manage the information as necessary.

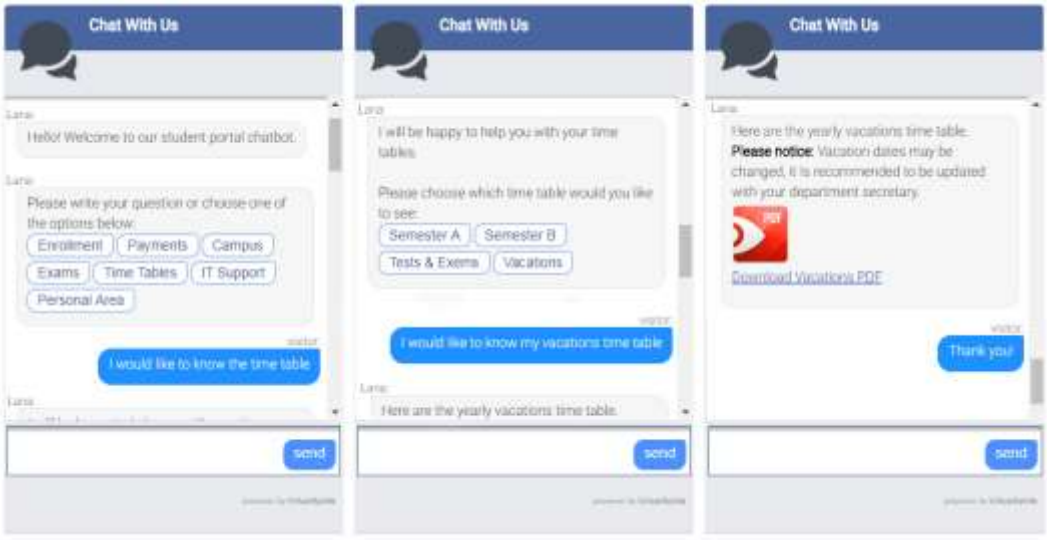
2.4 Registration of new courses: in universities, registration of new courses can be complicated and challenging. With clumsy interfaces, slow system, and complicated search features, registration can take many days. Chatbots can help smoothen up the whole system by delivering most recent information about offered classes and give recommendations based on students' preferences and qualifications.

2.5 Campus self-service chatbot: students have a wide variety of needs, ensured by constant communication. Students get 24/7 automatic guidance for e-forms, applications, campus services, campus locations, technical problems and more.

The best chatbots for colleges and universities tend to be programmed with even more detail, and can actually strike up a conversation by saying things like: "Please give me the following details so I can pull out all the scholarships that apply to you. "Which department are you in? (Please select one.) "Which course are you enrolled in? (Please select one.) "Which year of study are you in? (Please select one.) "Thank you for the details! Here's a list of all applicable scholarships. Please visit the links for detailed information and let me know if I can be of further assistance." (www.virtualspirit.com)

3. Chatbots guide students to the right sources of information

Universities that create a chatbot to answer student questions, automatically create a more simplified information exchange system. Students – both new and existing ones – don't have to spend time finding out whom to direct their tradition questions to. The university's chatbot can take these questions and point them in the right direction.



b (www.virtualspirit.com)

Fig 2: chatbot interface

Example 1: Student: "I want to register for the summer internship program at [Institute] next year. How do I make sure I qualify?"

Chatbot: "Have you read the eligibility criteria for [Institute]'s summer internship program? You can read them on this link. Prof. J. Wilson ([Department]) handles applications for the program. You can get in touch with him for detailed information. Here are his contact details."

Example 2: Student: "I have opted for the annual fee payment option. I'd like to find out if I can convert that into monthly installments for the next 6 months." Chabot: "You can send an email to our Finance department on [email ID]. You can also meet them in person at [Building], between 9:00hrs and 16:00hrs Monday through Friday." (www.virtualspirit.com)

4. Lebanese International University cases solved by chatbots

The adoption of chatbots is increasing the challenge to response digitally for the students' inquiries. The success of

chatbots systems is depending on both the administration as a reference for student's communication, and on the students as the system's end users.

The behavior to use chatbots and relying on its answer is among the obstacles that the system would face. Usually students prefer to meet their advisors face to face to get any answer for any question but to which level the chatbots will replace the human advisor is depending on the acceptance of the end user for the new technology.

However, chatbots can solve many administrational issues, and release the pressure on the administration during the registration period through the following cases.

Case1: New applicant

Students can refer to chatbots to know the needed documents for applying; potential majors according to their degree (ex, institute students they cannot register any major they want).

Case 2: Advising

Students will be able to know how to register their courses, including prerequisites, co-requisite to each course; courses semester offering; simulation for the GPA; requirements to join educational programs like worms program.

Case 3: Administration

Chatbots saves the time of administration in answering the questions of students and gives the ability to answer student's questions at any time from the website without the need to refer to the administration officers.

Conclusion

We have surveyed chatbots systems with LIU University which succeed in applying of new applicants then students will know their potential majors according to their degree, also it succeeds in advising the students about the registration of courses and semester offering, and finally it succeeds in administration by giving the students the ability to ask questions at any time and from their website or mobile without referring to the administration offices.

In general, the aim of chatbot system is to develop tools that help people, assist their work and their communication with computers using normal language; but not to replace the human role completely, or replace human conversation completely. Finally, as (colby, 1991) [11] states, "We need not take human-human conversation as the gold standard for conversational exchanges. If one had a perfect replication of a human conversant, then it would be human-human conversation and not human-computer conversation with its sometimes strange but relevant properties."

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