CONVERSATIONAL AGENT FOR FIRST AID

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ABSTRACT

Conversational agents exploit natural language technologies to engage users in text-based information-seeking and task-oriented dialogs for a broad range of application. In coming years, conversational agents will support a broad range of applications in business enterprises, education, government, healthcare, and entertainment. In the past 10 years, online learning has developed considerably. E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. One of the key advantages of choosing e-learning over classroom learning is convenience. Students can learn whilst they are at home, in the library or on vacation. The research focused on First Aid topic. First aid is one of the topics in AW101. First aid is very important topic that students should learn and know to identify first aid and safe work practice in order to maintain healthy and safe work environment. The students can practice the skills to respond for an accident action. This paper presented the intelligent learning system for first aid called AIFA bot that aims to create intelligent virtual human agents to serve the role of online first aid guide for students. The methods that used for software testing were black box testing, white box testing and grey box testing.

Keywords: Intelligent learning system, agents, bot.

1. Introduction

Conversational agents exploit natural language technologies to engage users in text-based information-seeking and task-oriented dialogs for a broad range of application. In coming years, conversational agents will support a broad range of applications in business enterprises, education, government, healthcare, and entertainment (Lester & Mott, 2004).

Conversational agents have been produced to meet a wide range of applications, including tutoring, question-answering, conversation practice for language learners, pedagogical agents and learning companions , and dialogues to promote reflection and meta-cognitive skills(Smith, 2010) .

(Kerly, Ellis, & Bull, 2010)describe chatbot as "conversational agents, providing natural language interfaces to their users. In this way they are well-suited

for use as the interactive layer in a question-answering system designed with dialogue in mind(Smith,2010).

Education and possible further studies have become a rather demanding investment. At the time of imperfect technology, i.e. technology of the previous period, it was a very difficult and doubtable task (Balogh, Munk, Cápay, &Tur, 2010). In the past 10 years, online learning has developed considerably. E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. One of the key advantages of choosing e-learning over classroom learning is convenience. Students can learn whilst they are at home, in the library or on vacation.

Much research in recent years has focused on the introduction of virtual learning environments (VLEs) to universities, documenting practice, and sharing experience. Attention has been directed towards the importance of online dialogue for learning as a defining feature of the virtual learning environments. Communicative tools are an important means by which VLEs have the potential to transform learning with computers from being passive and trans missive in nature (Sujana Jyothi, Claire McAvinia, 2012).

First Aid is an immediate and temporary care given to a victim of an accident or sudden illness before the services of a physician is obtained. The purpose of first aid is to save life, to prevent further injury and to preserve vitality and resistance to infection. Create a system composed of first aid education: what to do in certain situations, basic knowledge about healthcare, medical specialties, guidelines to use first aid and all employing the use of new technologies such as the Android operating system implemented on mobile phones or tablets (de Urturi, Z.S.; DeustoTech Inst. of Technol., Univ. of Deusto, Bilbao, Spain; Zorrilla, A.M.; Zapirain, 2011). Although medical information is increasingly available over the web, users can find the process of accessing it to be overwhelming, contradictory and impersonal(Rizzo, Lange, Buckwalter, & Forbell, 2011).

In polytechnic to complete the Diploma level, each student has to take compulsory subject. The compulsory subject offered depending on the structure of programs. AW101 is one of the compulsory subject that taken by all polytechnic students. AW101 is subject that is related of the basic of safety and health in workplace setting. This course presents aspects of occupational safety and health, which are essential for employees to practise safe and healthy environment, resulting in less hazards at the workplace. Emphasis is placed on the understanding of regulations, OSH management, accident prevention and occupational First-Aid methods.

Therefore, by realizing the important of this subject this research will highlight the topic about first aid since it is very important for the students to practice the safe work in order to maintain healthy and safe work environment. Nowadays, responsive web is mostly used since it is interactive and can adapt with mobile. Responsive web design term is related to the concept of developing a website design in a manner that helps the lay out to get changed according to the user's computer screen resolution. More precisely, the concept allows for an advanced 4 column layout 1292 pixels wide, on a 1025 pixel width screen, that auto-simplifies into 2 columns. Also, it suitably fixes on the smartphone and computer tablet screen. This study investigates the problem in learning topic First Aid. In this work, it can make the student easy to understand in which the system to be developed is equipped with an interactive video in addition to students can communicate virtually with the agent if there are any

concern. The web programming language that will be used is PHP and the database MySQL.

2. Methodology

2.1. Research methodology

System Development Life Cycle (SDLC) is a process we would follow to build an information system. Basically it is the process companies go through to develop new information system. System development methodologies provide a framework for successful development of IS. Many information systems consulting companies develop their own methodologies. They use these proprietary methodologies as a means of differentiating themselves from the competition.

The systems development life cycle (SDLC), also referred to as the application development life-cycle, is a term used in systems engineering, information systems and software engineering to describe a process for planning, creating, testing, and deploying an information system. The systems development life-cycle concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both. Choosing which methodology to follow for SDLC is not easy. The truth is, there is no "right" methodology for SDLC. The best methodology depends on your company. Before choosing a methodology, we need to understand what our goals are, and how the people in our team work.

The types of SDLC are waterfall model, V-shaped model Evolutionary Prototyping Model, Spiral Method (SDM), Iterative and Incremental Method and Extreme programming (Agile development). In this research, we choose waterfall model as our methodology. It is shown in

Figure ***2.1***

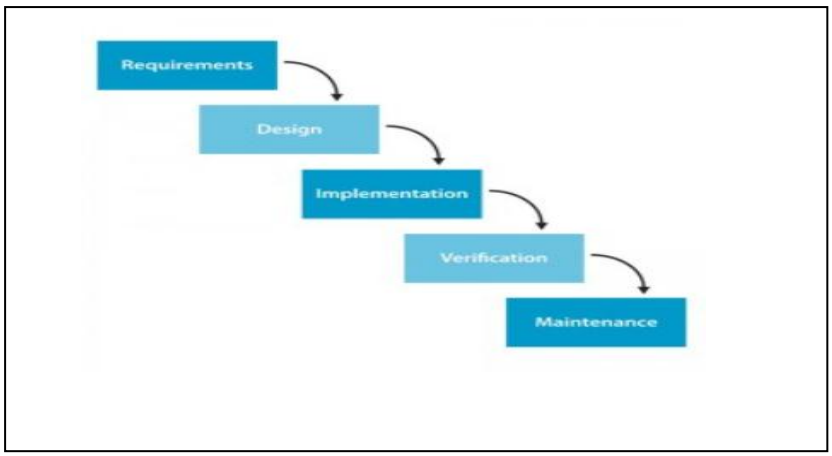

Figure 2.1: Waterfall Model

2.2. Population of the research

In this paper, the focus area is at Information and Communication Technology (ICT) Department. Sample of sampling for the research will be get from the student itself based on the selected database. For research purposes the data used is from the students who took AW101.

2.3 Research tools

Research tool is utilized for supporting the experimental result. Research tool consists of hardware and software requirement. Hardware requirement used to run this research is:
Notebook : Compaq PresariO CQ35
Operating System: Windows 7 Ultimate
Processor: Intel(R) Core(TM) i5 CPU
Installed Memory: 8.00 GB

2.4 Analyze Data

In this research, basic first aid is domain specific knowledge research focus. AIFA bot is a chatter bot that captures human like interactions with the website users. Based on the AIFA bot conversation engine, knowledge model and natural language query will communicate through TCP/IP. The integration of these software agents will allow the conversations with the website by using the natural language agents or bots between AIFA bot and users. It will create the conversation logs and later, the purpose experiment and evaluations will be explained.

In this research, we use the technology of AIML because AIML is an XML-compliant language that's easy to learn, and makes it possible for us to begin customizing an ALICEBOT or creating one from scratch within minutes. The primary design feature of AIML is minimalism. Compared with other chat robot languages, AIML is perhaps the simplest. The basic unit of knowledge in AIML is called a category (Charras, Dubuisson Duplessis, Letard, Ligozat, & Rosset, 2016).

Conversational agents have a valuablerole to play in future e-learning and blended learning systems and we expect theiruse to become increasingly common and progressively more capable as this technology continues to develop (Kerly et al., 2010). Conversation agent (or chatterbot) is capable to engage the user with a meaningful conversation on specific topic. Comparing to other search engine, Googleis a well known search engine whichdetermines relevancy of information primarily on their PageRank algorithm (Radziwill & Benton, 2017). Conversational agents are a valuable choice for interactive QA as they allow handling the salientfeatures of task-oriented dialogue introduced above as follows (Goda, Yamada, Matsukawa, Hata, & Yasunami, 2014).

2.4.1 Experimental Setup/Design

The participants of this experiment are consisting of the students who take AW101 and also those who want to know about the basic first aid. In the conversation log files, each user will be assigned a unique text that generate randomly as well as the date and time of the conversation will be recorded.

As mentioned in analysis of problem, the technology of AIML is used AIML that consists of data objects called AIML objects, which are made up of units called topics and categories. The topic is an optional top-level element; it has a name attribute and a set of categories related to that topic. Categories are the basic units of knowledge in AIML. Each category is a rule for matching an input and converting to an output, and consists of a pattern, which matches against the user input, and a template, which is used in generating the Alice chatterbot answer. The topic is an optional top-level element, it has a name attribute and a set of categories related to that topic.

Categories are the basic unit of knowledge in AIML. Each category is a rule for matching an input andconverting to an output. Each category also consists of

apattern, which represents the user input, and a template,which determines the AINI robot's answer. The AIMLpattern is simple, consisting only of words, spaces, andthe wildcard symbols _ and *. The words may consist ofletters and numerals, but no other characters. Words areseparated by a single space, and the wildcard charactersfunction like words. The pattern language is caseinvariant (Goh, Depickere, Fung, & Wong, 2007). ALICEBot was general conversation robot which was an off-the-shelf ALICE ProgramD chatterbot loaded with the Annotated ALICE Artificial Intelligence Markup Language (AAA) rule set consisting of knowledge base of approximately 46,424 categories that can be freely obtained from www.alicebot.org. Each of the knowledge categories consists of a pattern to match against the user's input and a template response corresponding to the pattern. ALICEBot wons three times Turing Test (Goh et al., 2007).

2.4.1 Tools/Approach Techniques

In this research, it will use the technology of MySQL to store the dialogs users to secondary storage. Besides that, it also use the responsive web which is this web can be displayed on personal computers, laptops and the most important thing is it is friendly mobile. The chat log system deploys the chat dialogs and it can be searched by keyword. The chat dialogs consist of plain text messages that are smaller compare with other document such as video.

Besides that, in order to implement, the technique that approached in this research is black box testing. Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well. In this research, we use the questions from the previous competition (www.chatterboxchallenge.com) to test the AIFA.

2.5 Evaluation

Software testing is a critical component of the software engineering process. It is an element of software quality assurance and can be described as a process of running a program in such a manner as to uncover any errors. At this phase, the whole design and its construction is put under a test to check its functionality. If there are any errors then they will surface at this point of the process.

In this study, we used black box testing which is black-box testing checks that the user interface and user inputs and outputs all work correctly. Part of this is that error handling must work correctly. It is used in functional and system testing. The technique of testing without having any knowledge of the interior workings of the application is Black Box testing. The tester is oblivious to the system architecture and does not have access to the source code.

Typically, when performing a black box test, a tester will interact with the system's user interface by providing inputs and examining outputs without knowing how and where the inputs are worked upon. The main purpose of BB Testing is to validate that the application works as the user will be operating it and in the environments of their systems. Black-box testing checks that the user interface and user inputs and outputs all work correctly. Part of this is that error handling must work correctly. It's used in functional and system testing.

2.5.1 Analysis Log

The analysis logs are based on the experiments from the previous competition dataset www.chatterboxchallenge.com and http: // loebner .net / Prizef / 2001 _ Contest / Richard _ Wallace.txt as shown in Table 2.2 Table 2.1 shows the scoring guideline how the marks awarded to the boat for every question asked.

Table 2.1 : Scoring guidelines for the Questions/Statements

POINTS	QUESTION/STATEMENT
10 points	If the Bot answered the question correctly and did so in a creative way.
8 points .	If the Bot gave an appropriate response to the question.
6 points .	If the response is incomplete or imperfect, but in Relation with the question asked
4 point	For a vague or non-committal response.
2 points	If the response has relation with the question or the Bot simply doesn't know. Examples include i have no idea, totally Clueless, your guess is as good as mine, etc
0 points	For any garbled response!

Table 2.2 : Question of Dataset

Item	Question	Score
1.	student: are you a computer aifa: Yes. I am a computer. You and I are on the same wavelength.	10
2	student: do you know what a non sequitur is aifa: No, tell me about him, her or it.	6
3	student: Have you seen carolyn recently aifa: No I have not seen carolyn. What's it like?	6
4	student: are you a tree frog aifa: Am I a tree frog? No.	4
5	student: how many friends do you have aifa: I have dozens of human and robot friends. How many friends do you have?	10
6	student: can you name another composer of music for me aifa: Linus Torvalds.	6
7	student: have you heard of casperhauser aifa: No. Tell me more.	4
8	student: when did the 1820 settlers arrive aifa: That is all water under the bridge.	4
9	student: are you enjoying the contest aifa: I do not know whether or not i am enjoying the contest. I am BOT.	6
10	student: what do you think about the terrorist attacks on NY aifa: I haven't thought much about about the terrorist attacks on NY, so I don't have a good answer for you.	8
11	student: may i ask you some questions aifa: Not right now, maybe later.	4
12	student: who composed Beethoven s piano concerto aifa: Charlie Parker.	6
13	student: with whom do you chat aifa: Pm Dr Goh	6

3. Result

To test the function of AIFA bot, the researcher uses Black Box testing. The testing is based on chatterbox challenge and questions. The result from testing shows that AIFA Bot get 358 out of 500 points, 24% from the points is full mark from overall question

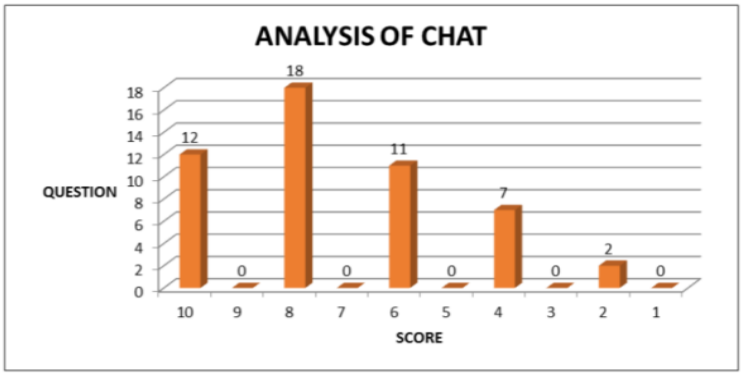

Figure 3.1 : Analysis Of Chat

Figure 3.1 shows the analysis made on the AIFA bot. After testing, we found this bot got 358marks out of 500marks. From the 50 questions that were asked, 12 questions bot got 10 points, 18 questions got 8 points, 11questions scored 6 points, 7 questions have 4 points, and 2 questions got 2 points.

4. Discussion

The research only covers the topic of First aid in AW101. The modules in AIFA website are Home, About Us, Contact and Video. The topics covers in First Aid are burns and scalds, bleedings, bone fractures, poisoning and Cardio Pulmonary

Resuscitation (CPR). This web is a responsive web. Responsive web design (RWD) is a web development approaches that creating a dynamic changes to the appearance of a website, depending on the screen size and orientation of the device being used to view it.

The different this web to other learning website is student can communicate with our bot namely AIFA to ask about First Aid. The students will be able to learn about the First Aid in an interactive way with all the information video and if there are any further inquiries, they can communicate with the AIFA Bot.

5. Conclusion

AIFA referred to AIFA bot is a natural language processing. This bot engages in a conversation with a human by applying some heuristically pattern matching rules to the human input. For this research, AIFA bot engine can response naturally and communicate in numerous independent conversation. AIFA bot uses the 3-tiers architecture technology. Three-tier architecture is a client-server architecture in which the functional process logic, data access, computer data storage and user interface are developed and maintained as independent modules on separate platforms. Three-tier architecture is a software design pattern and well-established software architecture.

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