6e conférence conjointe Journées d'Études sur la Parole (JEP, 31e édition),
Traitement Automatique des Langues Naturelles (TALN, 27e édition),
Rencontre des Étudiants Chercheurs en Informatique pour le Traitement Automatique des Langues (RÉCITAL, 22e édition)
Nancy, France, 08-19 juin 2020

From chatbot to personal assistant.

Emma JEANNETTE Sawssen HADDED
Université de Paris, 5 Rue Thomas Mann, 75013 Paris, France
emma.jeannette08@gmail.com, saw.hadded@gmail.com

RÉSUMÉ

Les chatbots (emprunt direct de l'anglais, chat = conversation amicale et informelle; bot = un programme informatique avec un fonctionnement automatique) sont des logiciels informatiques créés pour simuler des conversations à ressemblance presque humanoïde. Ces logiciels analysent les textes ou commandes vocales pour adapter leurs réponses. Eliza est un des tout premiers chatbots crée par Weizenbaum entre 1964 et 1966. Le but initial d'Eliza était de démontrer que la communication entre les humains et les machines n'était pas nécessaire. Seulement le programme a engendré de nouvelles recherches sur les machines et le langage est devenu l'ancêtre de nos chatbots actuels. Notre expérience se concentre sur les différents chatbots de renommée au fil des années de 1964 à 2018, leurs améliorations mais aussi leurs limitations. Nous avons testés chaque chatbot (ELIZA,A.L.I.C.E. 1995,Cleverbot 1997, Mitusku 2005) sur des phrases tests.

(a) How are you ?
(b) What time is it ?
(c) What's blakmail ?
(d) Can you feel pain ?
(e) Tell me a joke.
(f) Can I eat a table ?
(g) What is a family ?
(h) What is a bae ?
(I) Do you think animals have feelings ?

Phrases de protocole 1

Tout d'abord, nous nous sommes présentées sous un faux nom et nous leur avons demandé de répéter ce nom plus tard dans la conversation pour voir s'ils enregistraient les informations sur l'utilisateur. Puis une question basique (a) pour voir s'ils pouvaient répondre à des questions simples. Nous avons aussi testé des phrases avec des fautes d'orthographes et de l'argot (c et h) pour voir si les chatbots pouvaient traiter des mots dont l'orthographe n'est pas familière au système. Nous avons aussi demandé aux chatbots la definition d'un mot assez simple (g) pour voir s'ils étaient capables d'y répondre. Durant l'expérience, nous leurs avons aussi demandé s'ils pouvaient nous donner l'heure actuelle (b). Nous leur avons aussi posé des questions plus philosophiques (i) et une question qui pourrait nous montrer s'ils étaient programmés pour répondre comme un humain le ferait plutôt qu'un robot(d). Enfin, nous avions remarqué que Mitsuku pouvait assimiler des objets à des propriétés comme la taille ou l'emploi de l'objet et était donc capable d'analyser la signification derrière chaque mot et les assembler pour comprendre la signification de la phrase. Nous avons donc créé une autre question (f) pour voir si les autres chatbots étaient capables de la même chose. Le deuxième protocole a été mis en place pour voir quels chatbots étaient les plus 'performants' ou en tout cas capables de répondre à nos questions de manière cohérente. Nous avons chacune posés ses questions aux différentes chatbot puis comparés nos résultats. Sur les questions ou nous avons toute les deux jugés que la chatbot avait repondu de facon « naturel », nous lui accordions 11 points. Si la chatbot repondait de facon satisfaisante a l'une de nous pas pas a l'autre, nous lui avons attribué 5,5 points.

MOTS-CLÉS : chatbot, assistant virtuelle, Eliza,A.L.I.C.E.,Cleverbot,Mitsuku,Siri
KEYWORDS : chatbots, virtual assistant, Eliza,A.L.I.C.E.,Cleverbot,Mitsuku,Siri

State of the Art

We will discuss the various states of chatbots, from their early versions, to their di erent ameliorations and to the modern personal assistants that uses chatbots to communicate with the user. A chatbot is a computer program that simulates a human conversation whether it is by text or voice command (or both) . Eliza is known as one of the first chatbot that existed. The project was developed by Joseph Weizenbaum between 1964 and 1966 at the MIT Artificial Intelligence Laboratory. Eliza functions as a psychotherapist: designed for the user to talk about their problem. Eliza reformulates the sentences of the user into a question triggered by keywords to keep the conversation going and if it is not able to reformulate it will use pre-made questions. Because of her almost "human like" way of answering Eliza could attempt the Turing test. A.L.I.C.E., another chatbot, was very inspired by ELIZA, and became one the best performing chatbots of its category winning the Loebner prize three time in 2000, 2001 and 2004. Alice uses a heuristic pattern matching rule to the human's input. However, it could not pass the Turing test as it was deemed "too mechanical ". Clever bot is a chatter bot web application. Siri® is a virtual assistant that answers vocal human commands. We will analyze di erent chatbots, to see their limitations throughout the years, but also how they were improved to seem almost human like, even gaining new features such as vocal recognition or a humanoid body and to see if it is possible to code a chatbot to the point where you cannot distinguish the robot from the human being.

Method

The chatbots were chosen on an extended period -from 1964 to 2011- so we could analyze and document the progress of the chatbots and later the voice recognition systems. Eliza and Alice were chosen because they were both early winners of the Loebner price and the base of their system is still used to create modern chatbots. We also decided to go for a less conventional chatbot like Cleverbot which is mainly known for its humor and sometimes nonsensical responses. Mitsuku is the five-time winner of the Loebner price and was named the "best conversational chatbot". Siri was the perfect blend of a chatbot and a voice recognition device that could show an evolution towards a new type of chatbots that could process voices inputs. The bots also work differently. Eliza was pre-programmed to answer using the inputs of the user. ALICE analyze the inputs of the user to find a fitting answer. Cleverbot is not pre-programmed but it learns from all the previous inputs it had with other users, using keywords it will search in its database for a fitting answer. Mitsuku is constantly being worked on, it uses an AIML language and learns from the conversations. Siri gets its information directly from the user's phone data or the internet. To put the chatbot to the test we used similar sentences if not the same on each chatbot to see how their output could di er.

Results

Chatbots underwent an increasing evolution over the years. Eliza was developed as a proof of the superficiality of communication between humans and machines' but has definitely exceeded the expectations and is now referred and used beyond its initial purpose. Users were now creating emotional relationship with the programs. While some of the 'older' chatbots cannot compete with most recent chatbots they are still their basis and ancestors, we also obviously don't have the same expectations between a newer program and a fifty year old one. Chatbots have now evolved into personal assistants, capable of understanding and processing voices inputs. They are now capable of having full conversation with human beings that does not seem irrelevant, they can now gather information about the user and use them later in the conversation. They have access to even more data than they use to in order to help the user: they went from being pre-programmed to answer to being able to process and find the semantic meaning being sentences and words to give answers that matches the question. Users of "smart" technology are now accustomed to chatbots and personal assistant, so companies are pushing their systems to always improve and do more. Google is now trying to develop an Al system that can engage into a conversation and make appointments for the user while resembling a human voice and conversation, it will even imitate the "hum" sound as humans does when it cannot process the inputs from the other person on the phone. However, it is only trained to carry on conversation in certain domain and cannot carry out general conversation yet, 'Duplex can only carry out natural conversations after being deeply trained in such domains. It cannot carry out general conversations'. Chatbots are also taking new appearances other than on a computer screen like Sophia the humanoid robot developed by Hanson Robotics. Sophia's speech is not pre-made but comes directly from her own system where she analyzes conversations and extract data to improve her answers. This shows that chatbots are becoming even more efficient in analyzing words but also the context of the conversation, so it is now touching the pragmatic field of language.

References

BOTPRESS. (2018) *“The Whats and Why of Chatbots”*

WEIZENBAUM J. (1966). *"ELIZA - a computer program for the study of natural language communication between man and machine."* Communications of the ACM 9.1 36-45.

COPELAND B. JACK. (2000). *"The turing test."* Minds and Machines 10.4 519-539.

ABUSHAWAR, BAYAN & ERIC ATWAL. (2015). "ALICE chatbot: Trials and outputs." Computación y Sistemas 19.4: 625-632.

MAULDIN, MICHAEL L. (1994). *"Chatterbots, tinymuds, and the turing test: Entering the loebner prize competition."* AAAI. Vol. 94.

TECHJOURNEY. (2016). A.L.I.C.E Alicebot Artificial Intelligence (AI) Chatbot

CARPENTER, ROLLO. (2011). *"Cleverbot."*

APPLE. (2018). Siri

YANIV LEVIATHAN. (2018). Google Duplex: An AI System for Accomplishing Real-World Tasks Over the Phone

YUEFANG ZHOU & MARTIN H. FISCHER. (2019). AI Love You: Developments in Human-Robot Intimate Relationships Part II chapitre 3, p.106