

Innovative Trends: Chatbots

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Outline

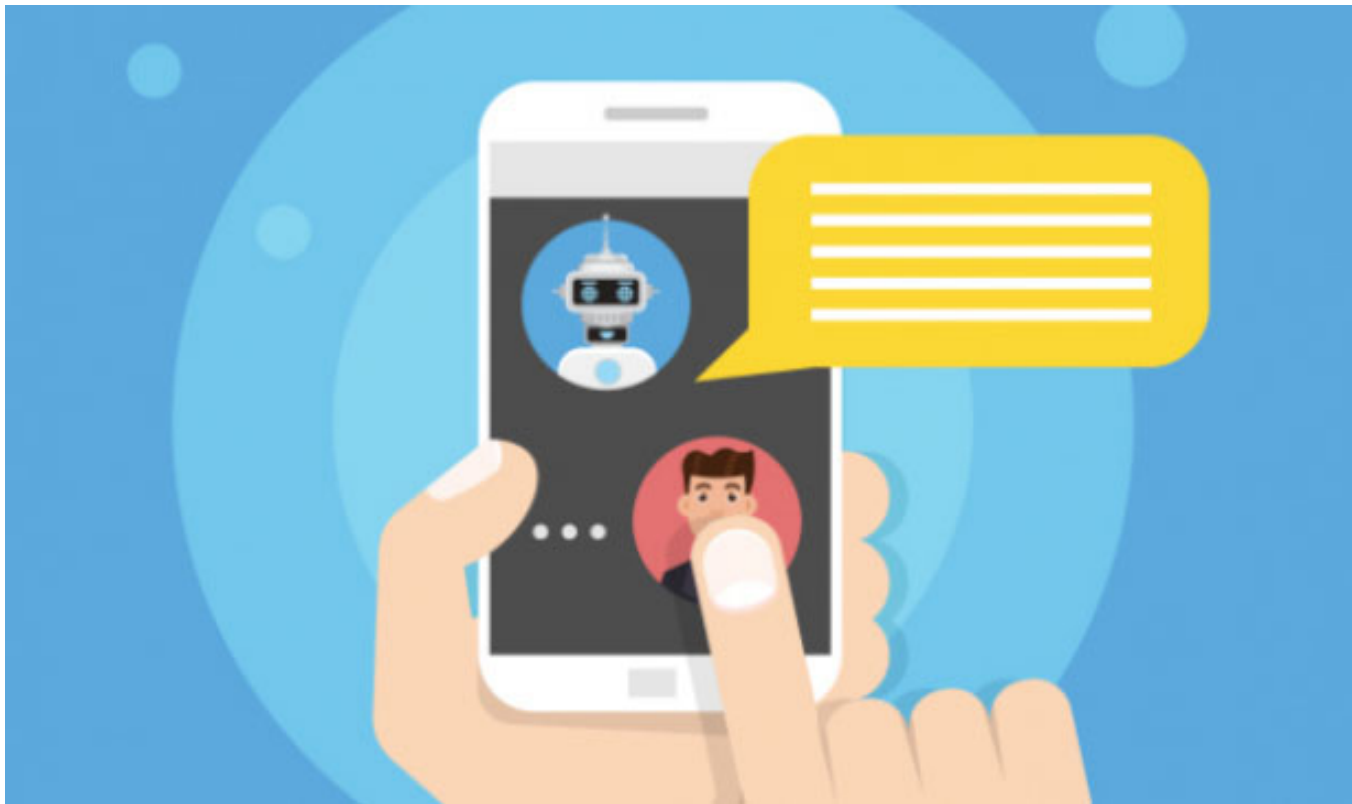
- **Introduction**
- The progress in Chatbots technology
- Chatbots in Industry
- Chatbot Implementation
- Conclusion

Introduction

- The digital era has brought many new technologies that enhanced our modern lifestyle. This new era has also brought the need of change in multiple areas like digital marketing, data collection, education and digital assistants.
- One of the type of software that marked the change in the manner that the respective areas are handled is represented by Chatbots.
- In the following slides we will be presenting these topics:
 - What are Chatbots?
 - The progress in Chatbots technology.
 - Their use in our current digital environment.
 - What can we expect in the future from Chatbots?

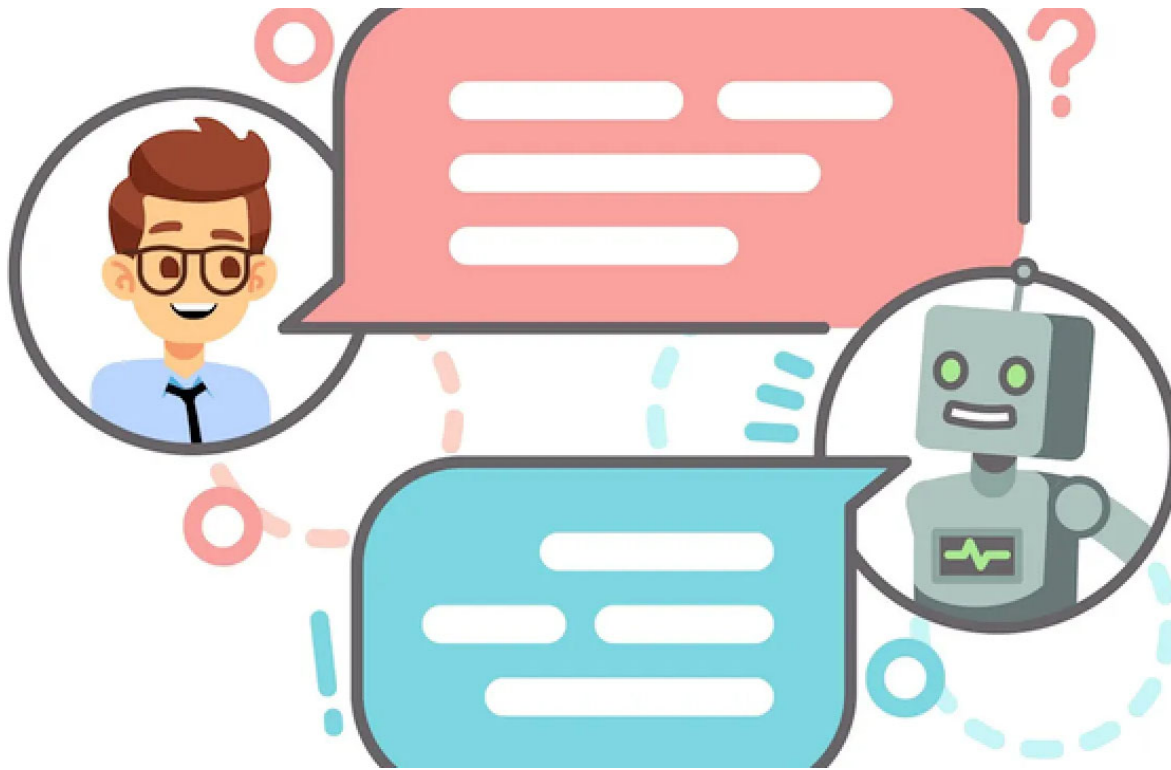
Chatbots

- Chatbots are part of a software application category with the purpose of mimicking human speech or written interaction and holding a conversation over text messaging or audio.



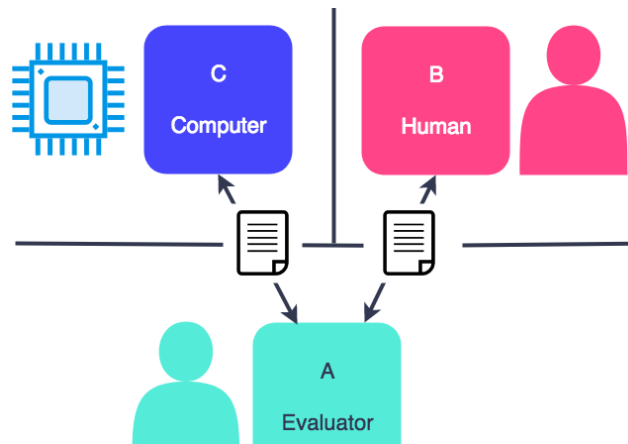
Chatbots

- The idea of chatbots has appeared since the early 1960's and its main purpose was to determine if AI could replicate human thinking process and pretend to be a real person.



Chatbots

- The chatbot testing to determine whether it can imitate human speech was usually done using the Turing test.
- The Turing test base idea was to have a human evaluator communicate with another human and a machine via text messages.
- The evaluator did not know which is the human or machine. And the result was based on how well the judge could distinguish between the machine and human.

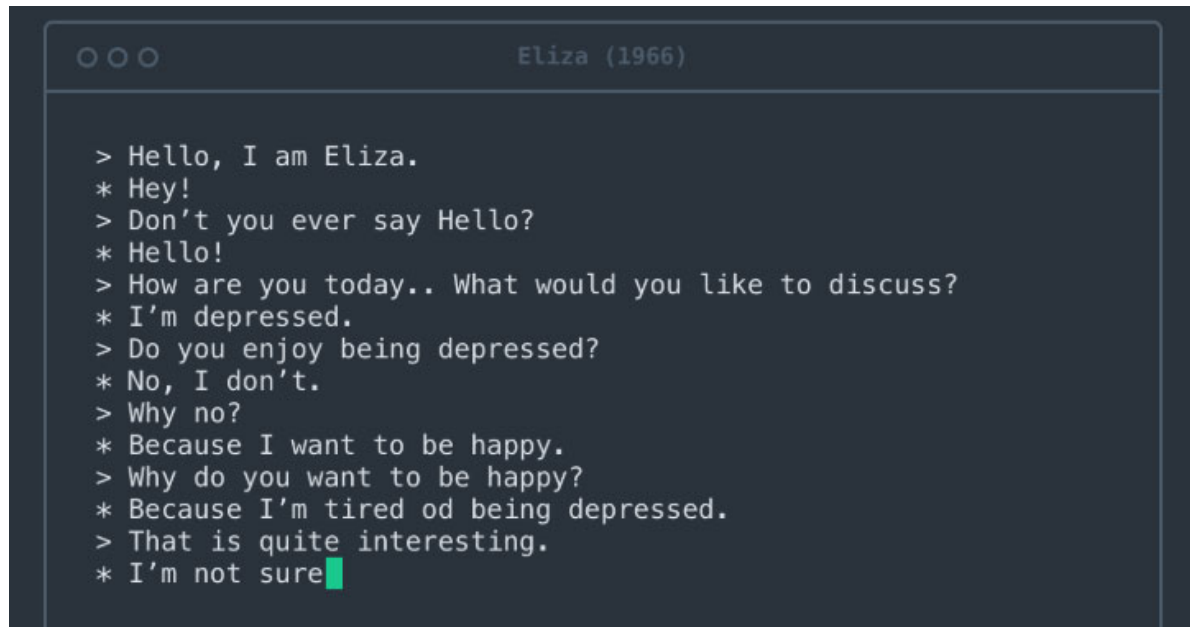


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The progress in Chatbots technology

- The first chatbot version has appeared in the 1960s called ELIZA. Its basic mechanism was based on dividing the user input sentence and change to order of questions so that it can result in a question.
- In this way it acted like a therapist and could mislead people in assuming that it is a real person.



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Eliza (1966)

> Hello, I am Eliza.
* Hey!
> Don't you ever say Hello?
* Hello!
> How are you today.. What would you like to discuss?
* I'm depressed.
> Do you enjoy being depressed?
* No, I don't.
> Why no?
* Because I want to be happy.
> Why do you want to be happy?
* Because I'm tired od being depressed.
> That is quite interesting.
* I'm not sure
```

1.Eliza Chatbot

The progress in Chatbots technology.

- Next chatbot software that made progress in the field is called PARRY that imitated the behavior of a paranoid human.
- It was based on multiple negative assumption of the intention of the evaluator or opposing person and “emotional responses” made by shifting the importance of the input. Bellow it’s a part of transcript from the famous ELIZA- PARRY conversation.

PARRY – Good Evening.

ELIZA – Tell me your problems. Please terminate input with a period or a question mark.

People get on my nerves sometimes.

I am not sure I understand you fully.

You should pay more attention.

Suppose you should pay more attention.

You're entitled to your own opinion.

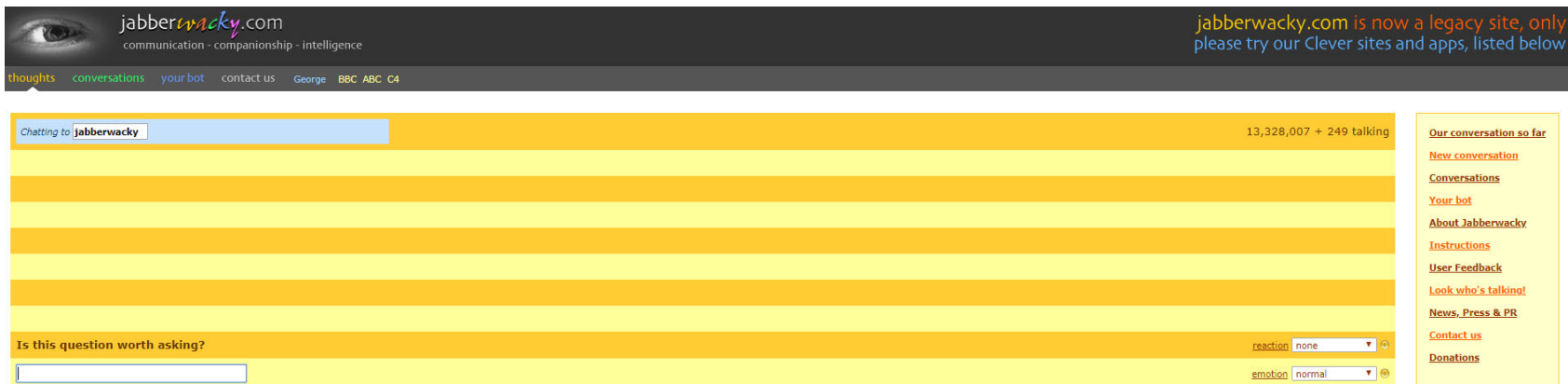
What makes you think I am entitled to my own opinion?

It bothers me just to be around people in general.

Please go on.

The progress in Chatbots technology.

- Jabberwacky chatbot is an important milestone for chatbots as its one of the first that learns. It started in 1988 and continues today under the name Cleverbot.
- It stores all the data collected and imputed from the user and tries to find the appropriate answer for your sentence from its database. It can also learn foreign languages if provided with sufficient data.



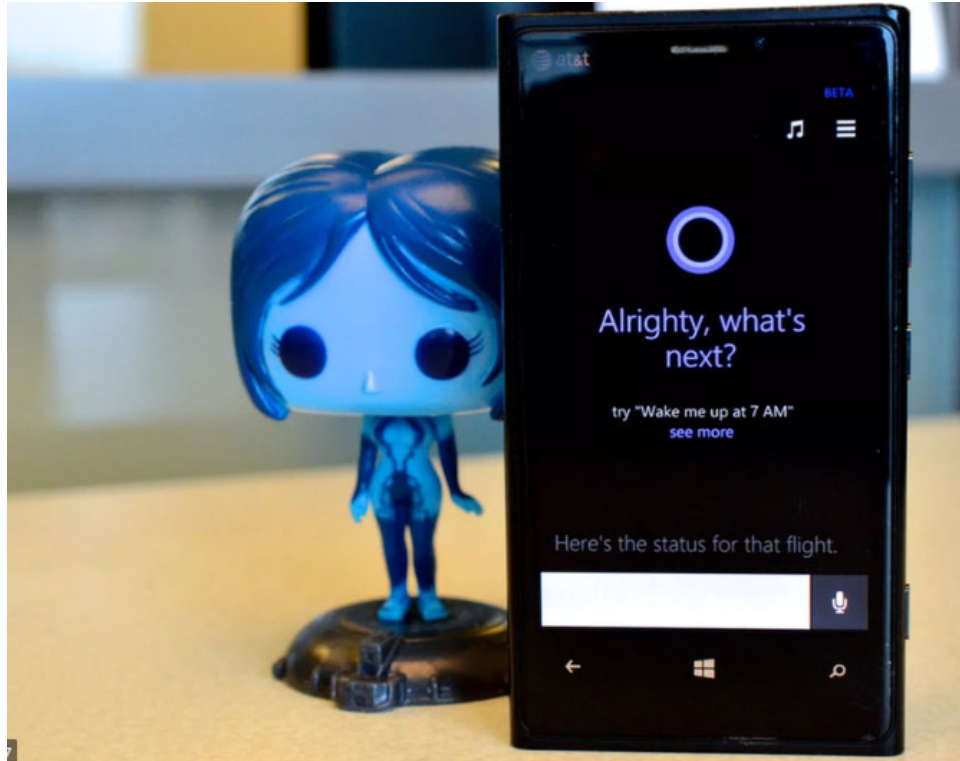
2.Jabberwacky

The progress in Chatbots technology.

- A.L.I.C.E. (Artificial Linguistic Internet Computer Entity) is a new type of chatbot from 1995 that uses as artificial intelligence markup language and heuristic patterns to hold conversations.
- After A.L.I.C.E. modern chatbots have appeared like SIRI in 2010 that uses speech recognition software, natural language processing algorithms and deep learning to reduce the errors caused by voice accents.
- SIRI also tries to understand the intent of the user in order to provide the correct feedback. Because sometimes one statement can be communicated in multiple ways.

The progress in Chatbots technology.

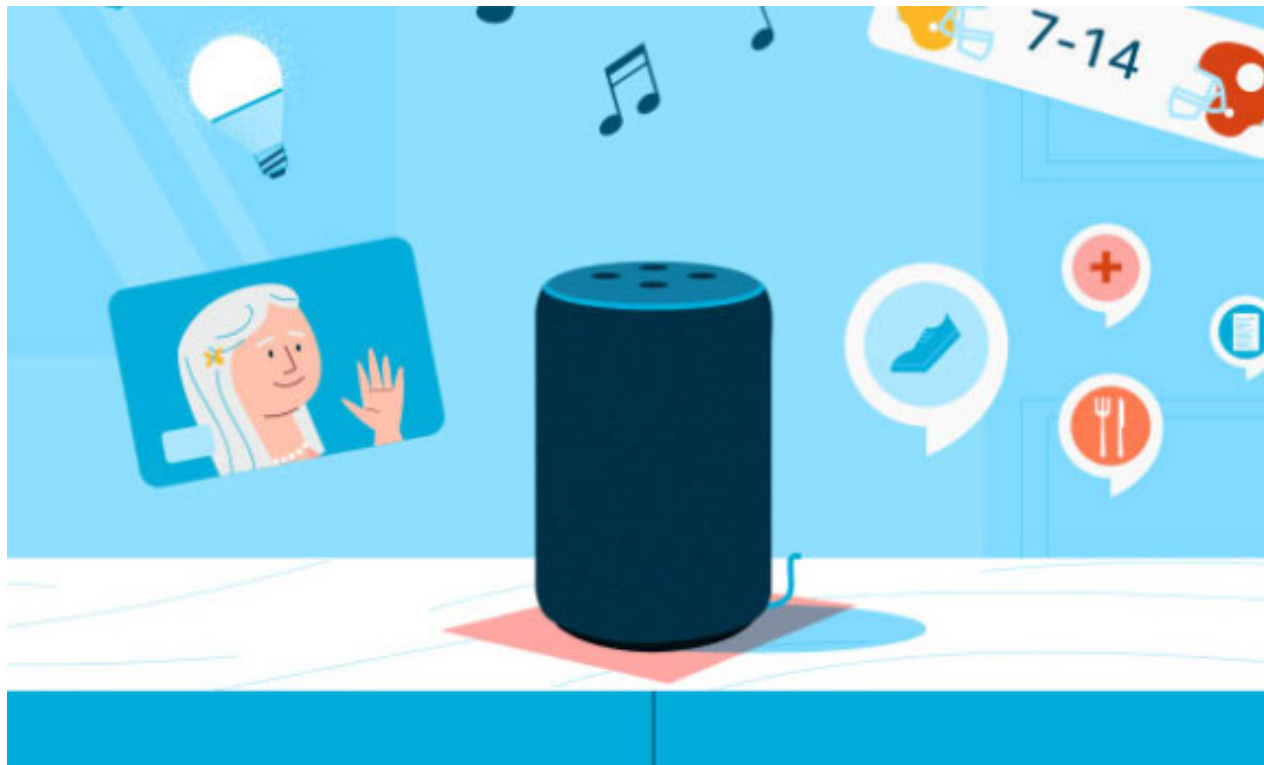
- Cortana was launched in 2014 it is based on a similar technology as SIRI and is integrated into Windows operating systems. It can search for files, communicate, set reminders and other similar tasks.



3. Cortana

The progress in Chatbots technology.

- Alexa is also in this generation of smart chatbots that uses advance AI software and voice recognition. Its basic functionalities include browsing the web in search for the requested query from the user.



4.Amazon Alexa

The progress in Chatbots technology.

- The latest generation of chatbots include the ones that can interpret human emotions and respond accordingly.
- One example of this type is NADIA virtual chatbot that scans the human facial expression for emotions via webcams and interpret the data for an appropriate response.
- This chatbot purpose was to help disabled people to access certain informations.



5.Nadia Chatbot

The progress in Chatbots technology.

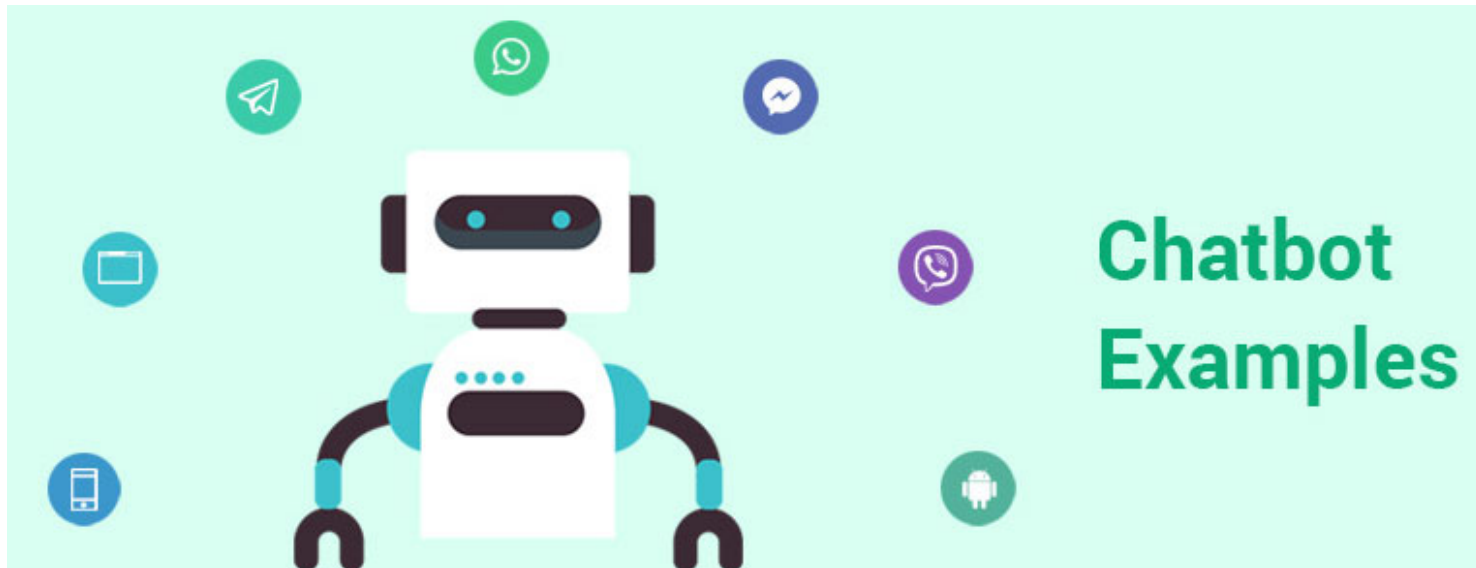
- In theory we can divide the chatbots in 3 generations:
 - Chatbots with fixed responses
 - Chatbots using advance algorithms like deep learning and voice recognition
 - Chatbots that can respond depending on user emotional state.
- Most chatbots used in our current environment are the ones with fixed scripts like the ones we often meet when scheduling an appointment or dialing to a call center for information.

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Chatbots use in our era

- The chatbot technology is currently used in multiple domains like :
 - Education
 - Advertising
 - Data Collection
 - Call Centers
 - Personal private use



**Chatbot
Examples**

Chatbots in Education

- Chatbots implementation in education can relieve the system and teachers of many recurrent queries.
- A chatbot system implementation in education would have the following benefits:
 - Increase student engagement.
 - Provide feedback regarding the student queries .
 - Provide help and clarifications for assignments.
 - Instant response at any hour.
 - Easy access to school/university public information.
 - Teaching assistant that can provide information regarding the course content, deadlines and exams.

Chatbots for Advertising

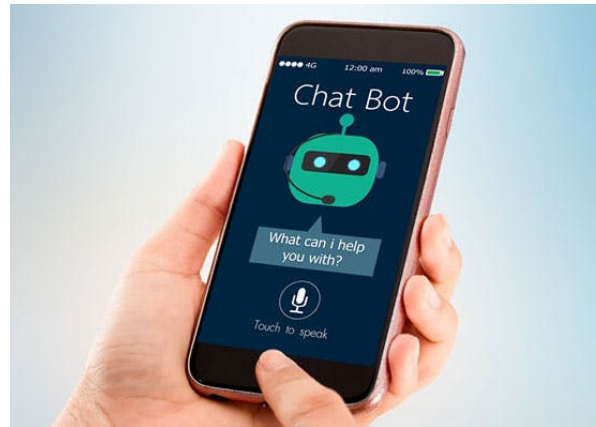
- Chatbots with predefined scripts and customization are utilized by many companies to promote their services, products or provide basic information.
- One example is Facebook chatbots. Any business can create a Facebook messenger chatbot to target their desired user by ads.
- The chatbot advantages in this market are:
 - Instant response.
 - Personalized client experience.
 - Increase probability of user interaction with your business compared to redirecting on a website.
 - Boosting sales as they can directly message you and buy through a chatbot.
 - Reaching people based on proximity to your business.

Data Collection with Chatbots

- Chatbots are not only made for answering queries or advertising. They can be used as well for collecting large volume of information at a fast rate with incredible variety.
- With the increase in data volume the chatbots have access to, they can become more intelligent and the probability of providing the right answer will increase proportionally with the amount and variety of data gathered
- They can provide insights regarding a targeted group, like preferences, schedules, common activities in order to create personalized content and answers for them.

Chatbots for Service Industry

- As we know chatbots are present in almost every service industry that has a call center and contact point.
- The chatbots provide a better customer experience as their call is instantly taken with no wait time.
- Precise caller redirection through the options scripted in the bot.
- Provide basic information's if required, respond to common queries and permanent uptime.



Chatbots for personal use

- Except advertising, call centers and data collection chatbots are also used as personal assistants.
- Common examples are Alexa, Siri, Cortana and others. Their purpose is to help the user with basic tasks like:
 - Schedule a meeting.
 - Setting an alarm.
 - Respond to basic queries like the weather, events or shops.
 - Setting reminders.
 - Playing music and others.



VIRTUAL ASSISTANT

Chatbots for personal use

Another good example would be Duolingo.

World most know multilingual chatbot that is used for learning foreign languages.

Most important traits:

- Make progress quickly.
- Personalized learning.
- Learn anytime, anywhere.



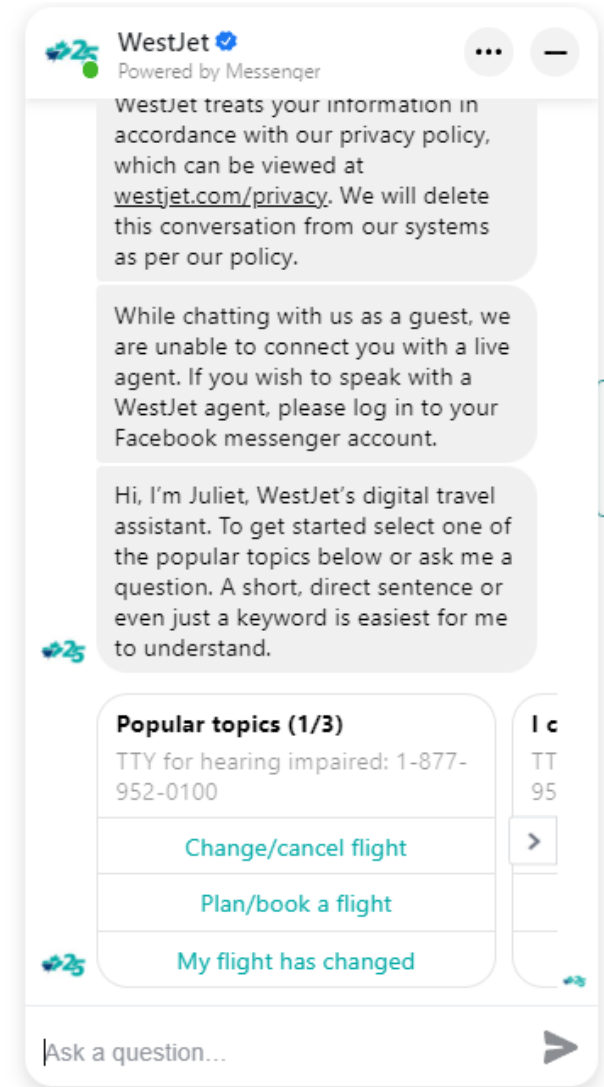
6.Duolingo

Chatbots for personal use

For Traveling, airline companies are implementing chatbots as well , one example would be Juliet of WestJet airlines.

It has multiple fast accessible topics:

- Planning/Changing flights.
- Travel Refunds.
- Trip assistance.
- Covid-19 requirements.
- Sales and offers.



7. Julia

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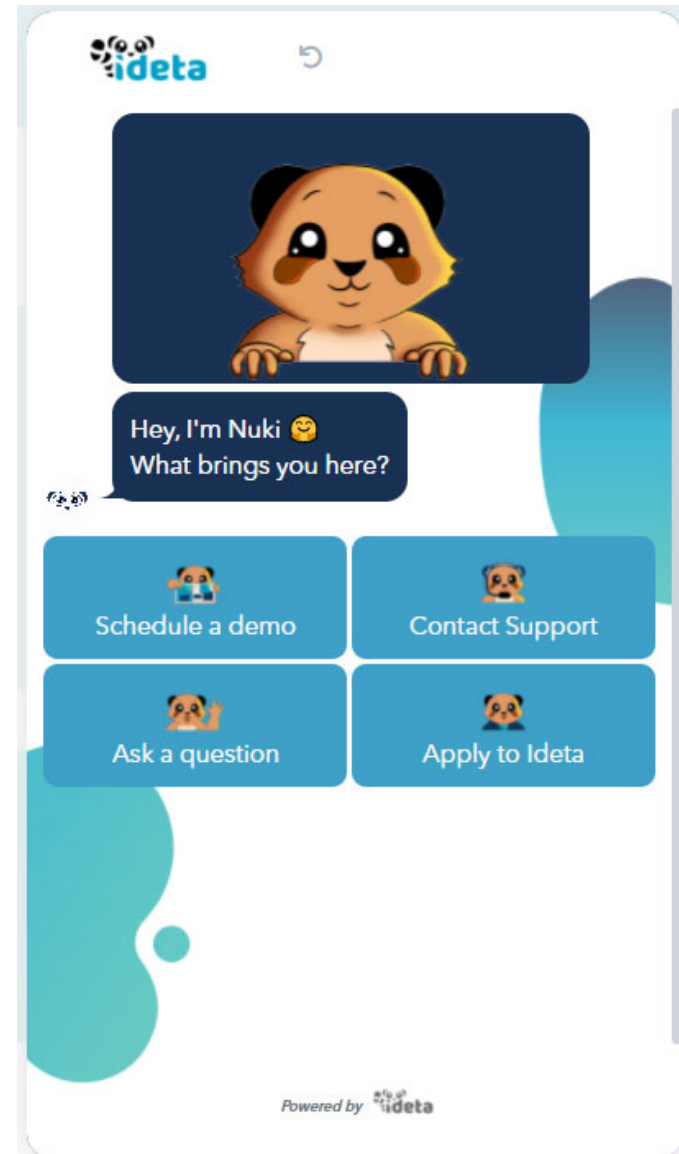
Chatbot Implementation

- Many companies offer easy and customizable chatbots AI services for your own website.
- The attraction of the services rest in fact that no coding is required for the actual AI.
- Efficient maintenance system and provide reliable and useful analytics.
- Example of such chatbots service providers: Ideta, Looper, BotsCrew, Specter, Jenny etc.

Chatbot Implementation

Ideta features:

- Connect to any API and to website .
- Analytics Dashboard.
- Saves and gathers user data and conversations.
- Human takeover.

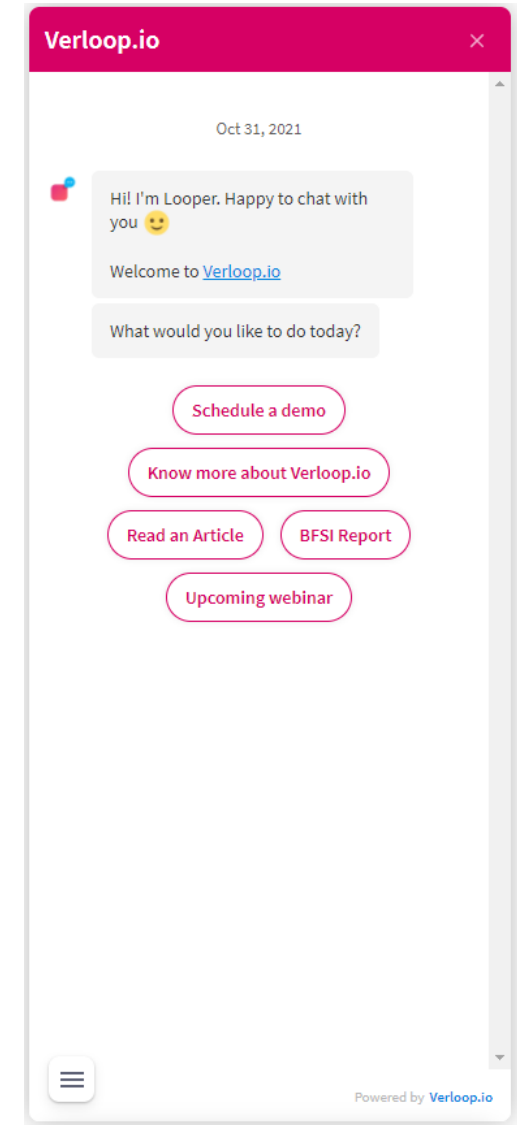


8.Ideta

Chatbot Implementation

Looper from Verloop.io, customizable chatbots for multiple industries:

- E-commerce.
- Medicine.
- Human Resources.
- Travel Industry.
- Real Estates.
- Logistics .

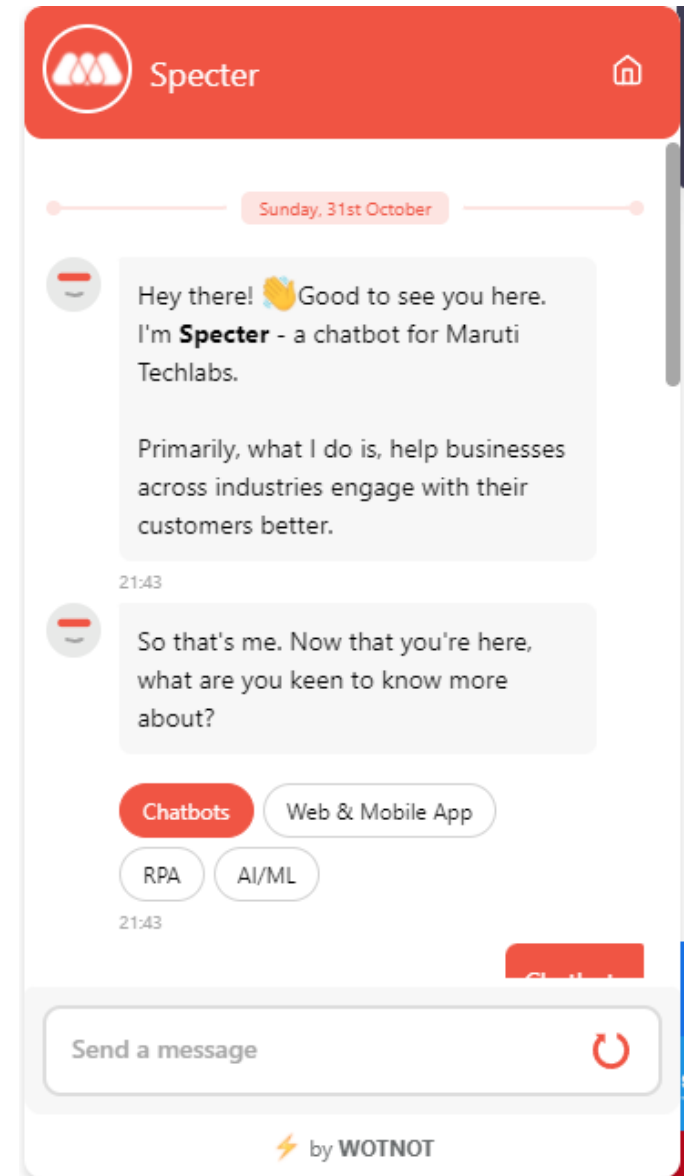


9. Looper

Chatbot Implementation

Marutitech chatbot services offer WotNot development platform that can develop an chatbot with following implementation advantages:

- Increased ROI.
- Platform-agnostic AI Flow.
- Lead Generation.
- 24/7 Service Up-Time.
- Multilingual Fluency.
- Personalized Interactions.



10.Specter

Chatbot Implementation

- Commbot AI powered chatbot for business.
- Main features:
- Intelligent.
- Ceaseless.
- Customizable “personality”.
- Reduce operation costs.
- Provides instant responses.
- Leverage the data generated from the customer interactions.

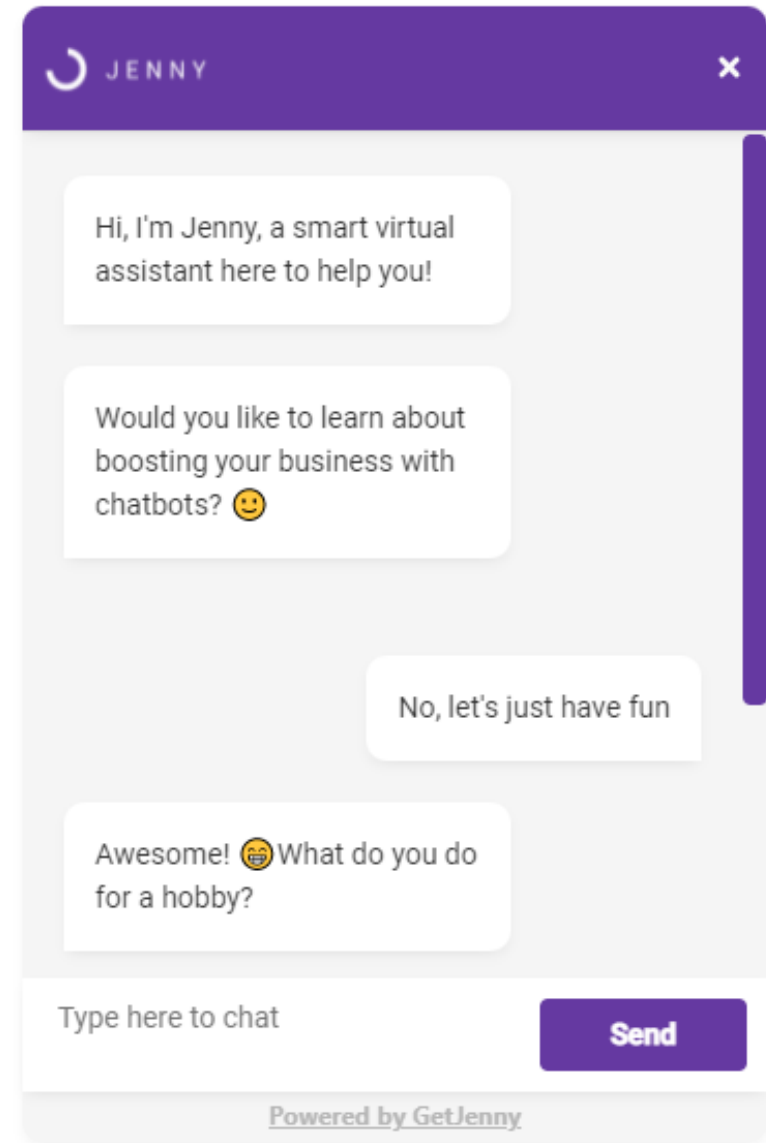


11.Commbot

Chatbot Implementation

Jenny chatbot service features:

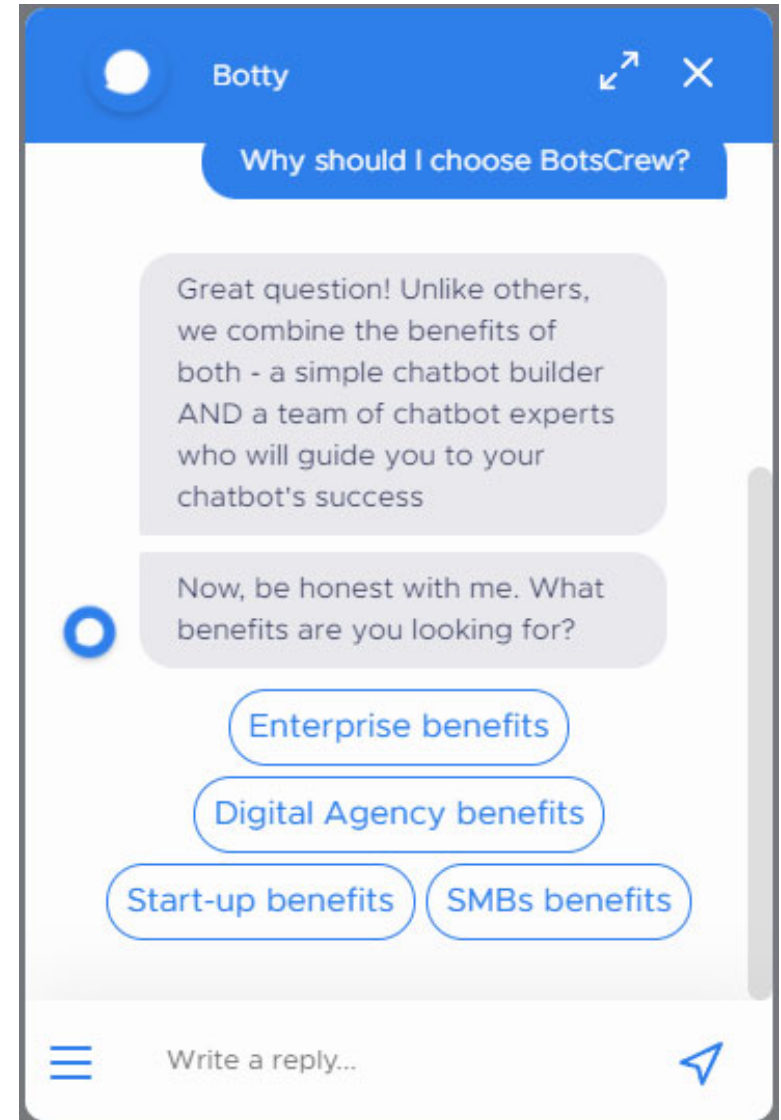
- 30+ Languages Supported.
- GDPR Compliant.
- Customer Feedback Collection.
- Agent Transfer.
- Chatbot Analytics.
- OpenAPI.



12.Jenny

Chatbot Implementation

- BotsCrew own chatbot solution provides:
- Easy connection to multiple social platforms.
- Intuitive interface for bot training.
- Integration with multiple software.
- Multilingual.
- Personalized analytics.
- Customizable solution.



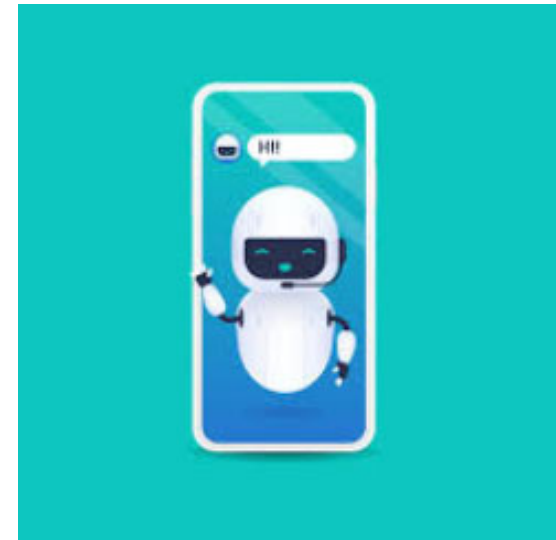
13.Botscrew

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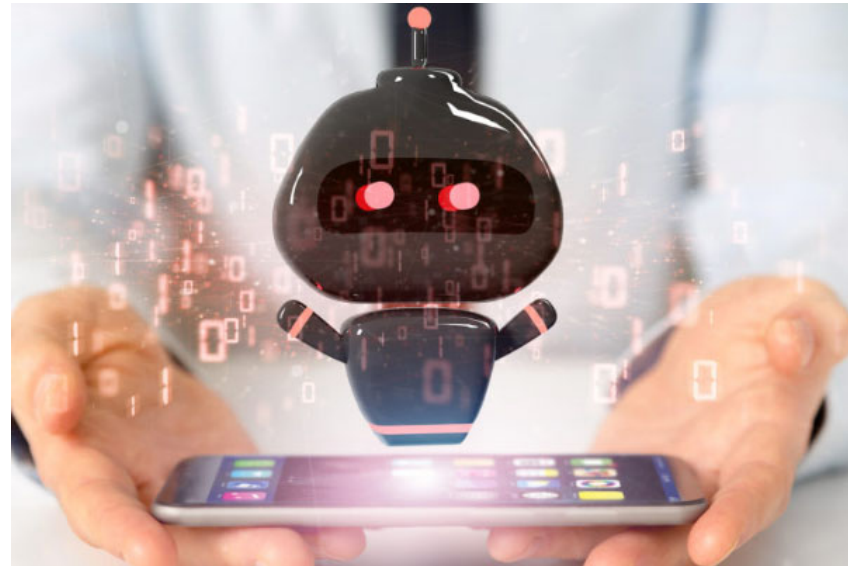
Chatbots Benefits

- Adaptability to business preferences.
- Instant replies.
- 24/7 uptime.
- Cost saving.
- Data gathering/monitoring.
- Personalized user experience.
- Provides a wide range of potential customers for advertising.
- Appeals to younger audience.



Downside of Chatbots

- Smart Chatbots and normal ones can be used as well for malicious purposes like:
 - Data fishing.
 - Unsolicited advertising.
 - Creating artificial social proof.
 - Aggressive payment reminders from companies.
 - Customer service interruption.
 - Harassment.



Future of Chatbots

- Overall Chatbots developed as an important part of our society that made our life easier.
- All types of chatbots are used from the first generation with fixed scripts to the 2nd generation that used advanced prediction and learning algorithms and finally to the 3rd generation of emotional chatbots.
- We can expect an increase demand and development in the area of emotional chatbots as this is the next step and the future of this technology.

References

- 1.Eliza Chatbot: <https://web.njit.edu/~ronkowitz/eliza.html>
- 2.Jabberwacky: <http://www.jabberwacky.com/>
- 3.Cortana: <https://www.microsoft.com/en-us/cortana>
- 4.Amazon Alexa: <https://aws.amazon.com/lex/>
- 5.Nadia Chatbot: <https://yabots.com/chatbot-history-the-nadia-chatbot/>
- 6.Duolingo: <https://www.duolingo.com/>
- 7.WestJet Julia: <https://www.westjet.com/en-ca/contact/juliet>
- 8.Ideta: <https://www.ideta.io/conversational-artificial-intelligence>
- 9.Looper: <https://verloop.io/>
- 10.Specter: <https://marutitech.com/>
- 12.Commbbox: <https://www.commbbox.io/>
- 12.Jenny: <https://www.getjenny.com/>
- 13.Botscrew: <https://botscrew.com/platform>

Bibliography (1)

- Winkler, Rainer & Söllner, Matthias: Unleashing the Potential of Chatbots in Education: A State-Of-The-Art Analysis. 2018. - Academy of Management Annual Meeting (AOM). - Chicago, USA.
- Kerlyl A., Hall P., Bull S. (2007) Bringing Chatbots into education: Towards Natural Language Negotiation of Open Learner Models. In: Ellis R., Allen T., Tuson A. (eds) Applications and Innovations in Intelligent Systems XIV. SGAI 2006. Springer, London. https://doi.org/10.1007/978-1-84628-666-7_14
- Alin-Andrei Georgescu, Chatbots for Education – Trends, Benefits and Challenges, Conference proceedings of »eLearning and Software for Education« (eLSE), 2018, pp. 195-200
- Quiroga Pérez, J, Daradoumis, T, Marquès Puig, JM. Rediscovering the use of chatbots in education: A systematic literature review. Comput Appl Eng Educ. 2020; 28: 1549– 1565. <https://doi.org/10.1002/cae.22326>
- Cunningham-Nelson, Sam, Boles, Wageeh, Trouton, Luke, & Margerison, Emily (2019) A review of chatbots in education: Practical steps forward. In 30th Annual Conference for the Australasian Association for Engineering Education (AAEE 2019):Educators Becoming Agents of Change: Innovate, Integrate, Motivate. Engineers Australia, Australia, pp. 299-306.

Bibliography (2)

- U. Arsenijevic and M. Jovic, "Artificial Intelligence Marketing: Chatbots," 2019 International Conference on Artificial Intelligence: Applications and Innovations (IC-AIAI), 2019, pp. 19-193, doi: 10.1109/IC-AIAI48757.2019.00010.
- Emi Moriuchi, V. Myles Landers, Deborah Colton & Neil Hair, Engagement with chatbots versus augmented reality interactive technology in e-commerce, *Journal of Strategic Marketing*, 2020, pp. 375-389
- Pillai, R. and Sivathanu, B. (2020), "Adoption of AI-based chatbots for hospitality and tourism", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3199-3226. <https://doi.org/10.1108/IJCHM-04-2020-0259>
- Buhalis D., Cheng E.S.Y. (2020) Exploring the Use of Chatbots in Hotels: Technology Providers' Perspective. In: Neidhardt J., Wörndl W. (eds) *Information and Communication Technologies in Tourism 2020*. Springer, Cham. https://doi.org/10.1007/978-3-030-36737-4_19
- Moonkyoung Jang, Yoonhyuk Jung, Seongcheol Kim, Investigating managers' understanding of chatbots in the Korean financial industry, *Computers in Human Behavior*, Volume 120, July 2021, 106747, <https://doi.org/10.1016/j.chb.2021.106747>