

University of Luxembourg

Sviatlana Höhn

Chatbots: myths and reality

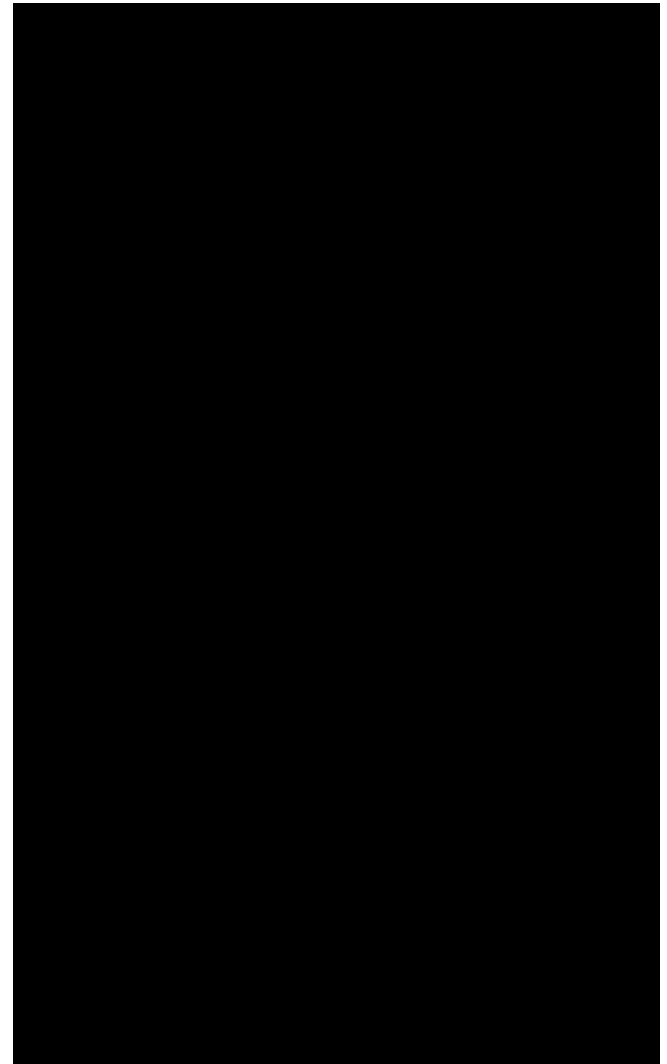
**Kuki (ex-Mitsuku) won the Loebner Prize in
2013, 2016, 2017, 2018, 2019**

Chatbots

Dialogue Systems

Conversational agents

Conversational interfaces



7 “standard” misconceptions

Bots have to talk

Bots replace apps

Building bots is cheap


Bots are new
technology

Bots pretend to be
humans

Bots replace people

All bots are Artificial
Intelligence

Bots were “born” in late 60th

<  **Eliza Bot** ✓

Hi Sveta Please tell me what's been bothering you.

oh, the traffic this morning was so terrible

Ok. Tell me more about yourself!

oh no, i am not important

Are you saying no just to be negative?

of course!

Right

and now?

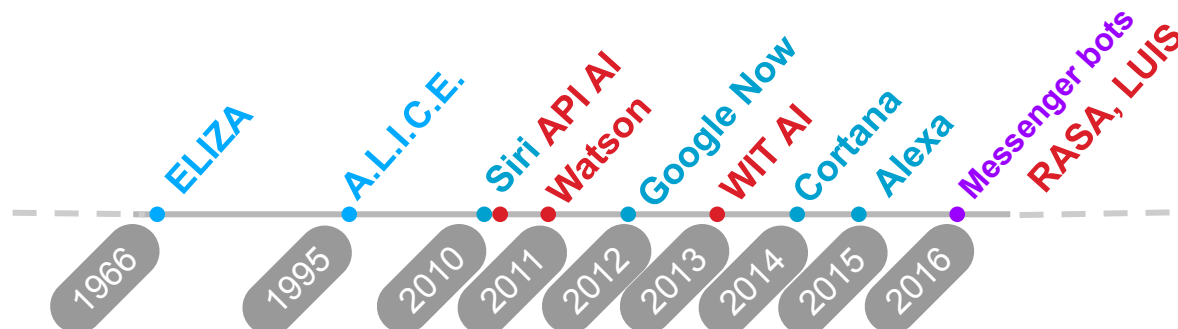
What do you think?

I think you were great!

What are your feelings now?

24. MAI 2019, 10:53

- Text chatbots
- Voice assistants
- NLU as a Service
- Messenger Bot API



Tell A.L.I.C.E.:

Say

Powered by [Pandorabots](#).

Human: fine fine

A.L.I.C.E.: I am glad to hear it. Glad to hear it. What's new?

Human: how are you

A.L.I.C.E.: I am doing very well. How are you ?

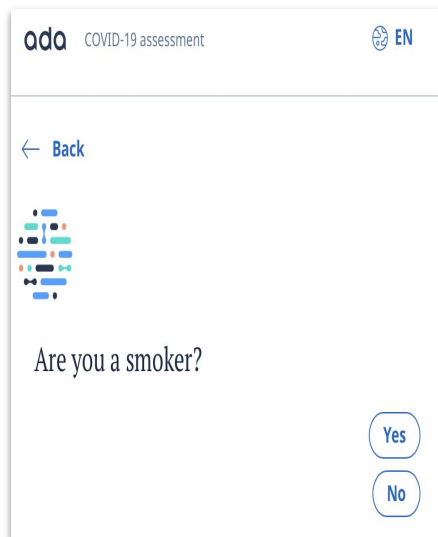
Human: hello

A.L.I.C.E.: Hi there!

Most bots show a mix of at least 2 interaction styles

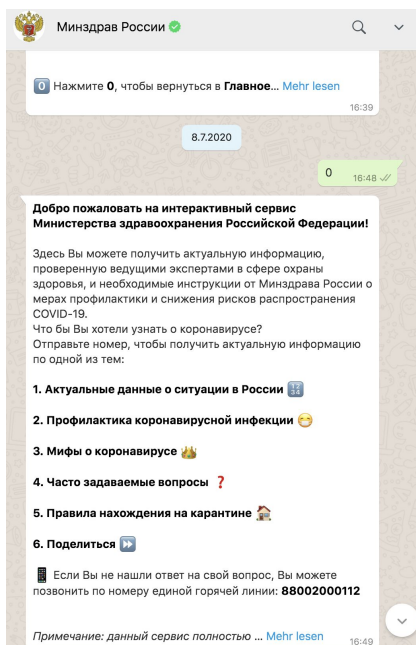
17

VISUAL CENTRIC



3

SYSTEM CENTRIC



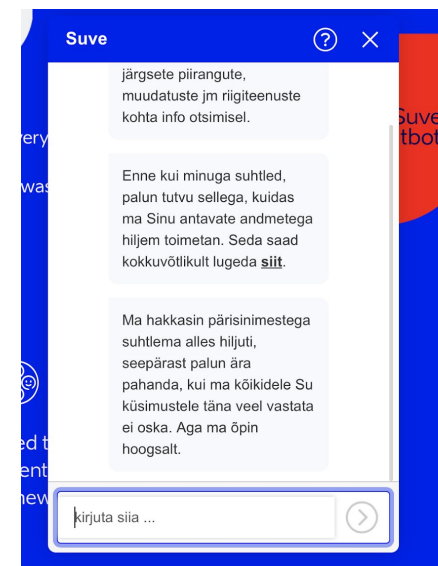
5

CONTENT CENTRIC

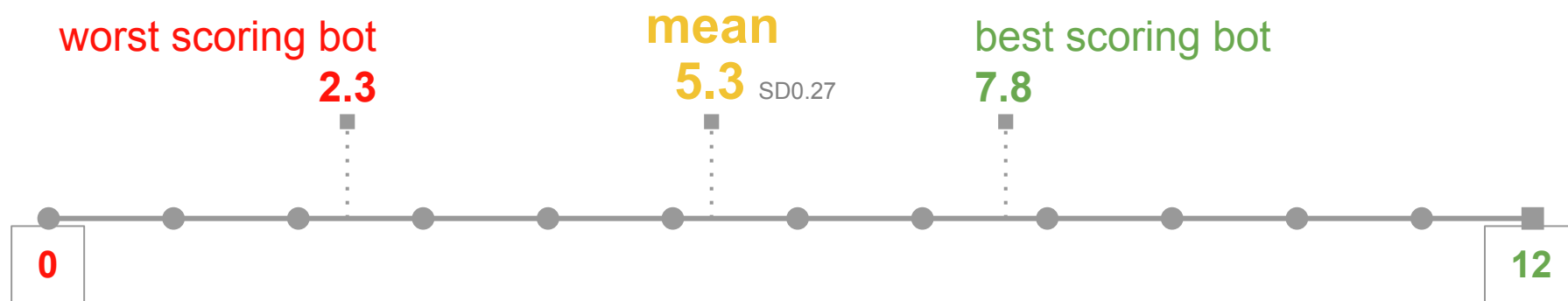


9

CONVERSATION CENTRIC

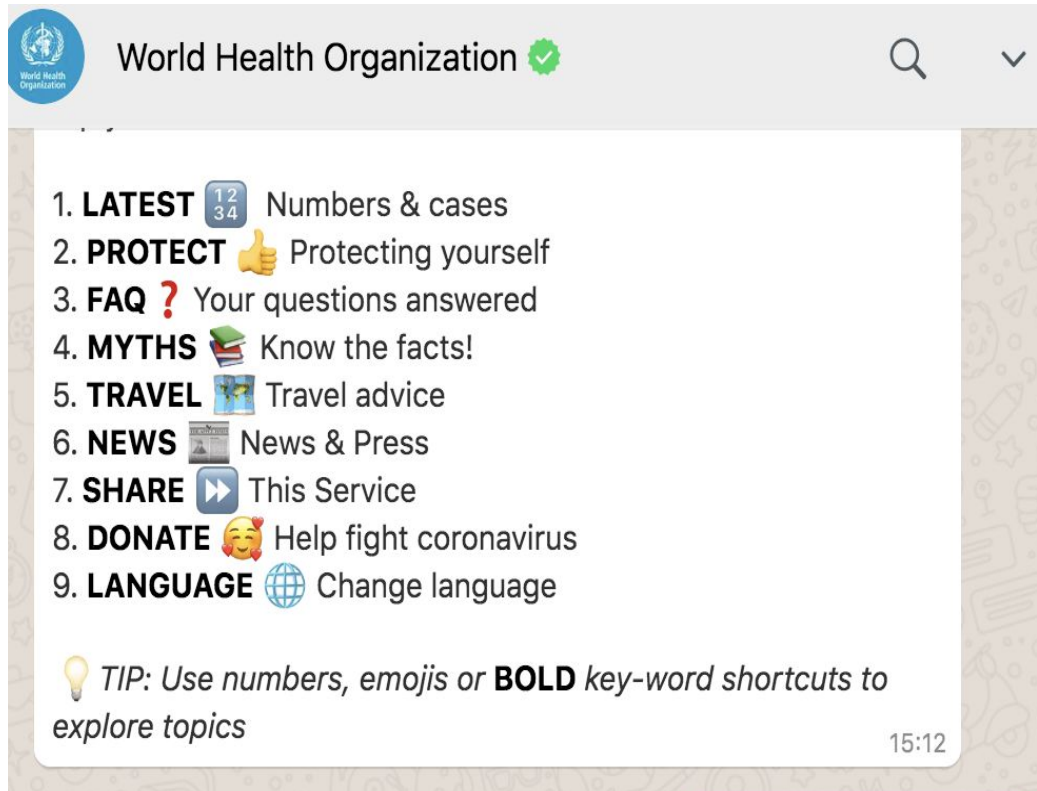


Best bots combine visual and conversational elements



Chatbot	score	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
Suve	7.8	0.5	1.0	0.15	1.0	0.8	0.5	0.8	1.0	0.6	0.6	0.3	0.5
Apple	7.1	0.7	1.0	0.3	1.0	1.0	0.5	0.0	1.0	0.8	0.8	-	-
Infermedica	7.0	1.0	1.0	0.6	0.1	1.0	0.7	0.0	1.0	-	0.8	-	-
Symptoma	7.0	1.0	0.7	0.6	0.8	0.8	0.8	0.5	1.0	0.1	0.8	-	-
...													
Providence	3.9	0.5	0.5	0.0	0.8	1.0	0.0	0.0	0.8	0.0	0.4	-	-
Your.MD	3.8	0.7	0.7	0.0	0.8	0.3	0.3	0.2	0.3	0.4	0.4	-	-
Cleveland Clinic	3.7	0.5	0.5	0.0	0.8	1.0	0.2	0.0	0.5	-	0.3	-	-
Russ. Ministry of Health	2.3	0.5	0.8	0.2	0.3	0.0	0.3	0.0	0.0	0.3	0.1	0.0	0.0

Bots manage the user's expectations by explaining their purpose and capabilities

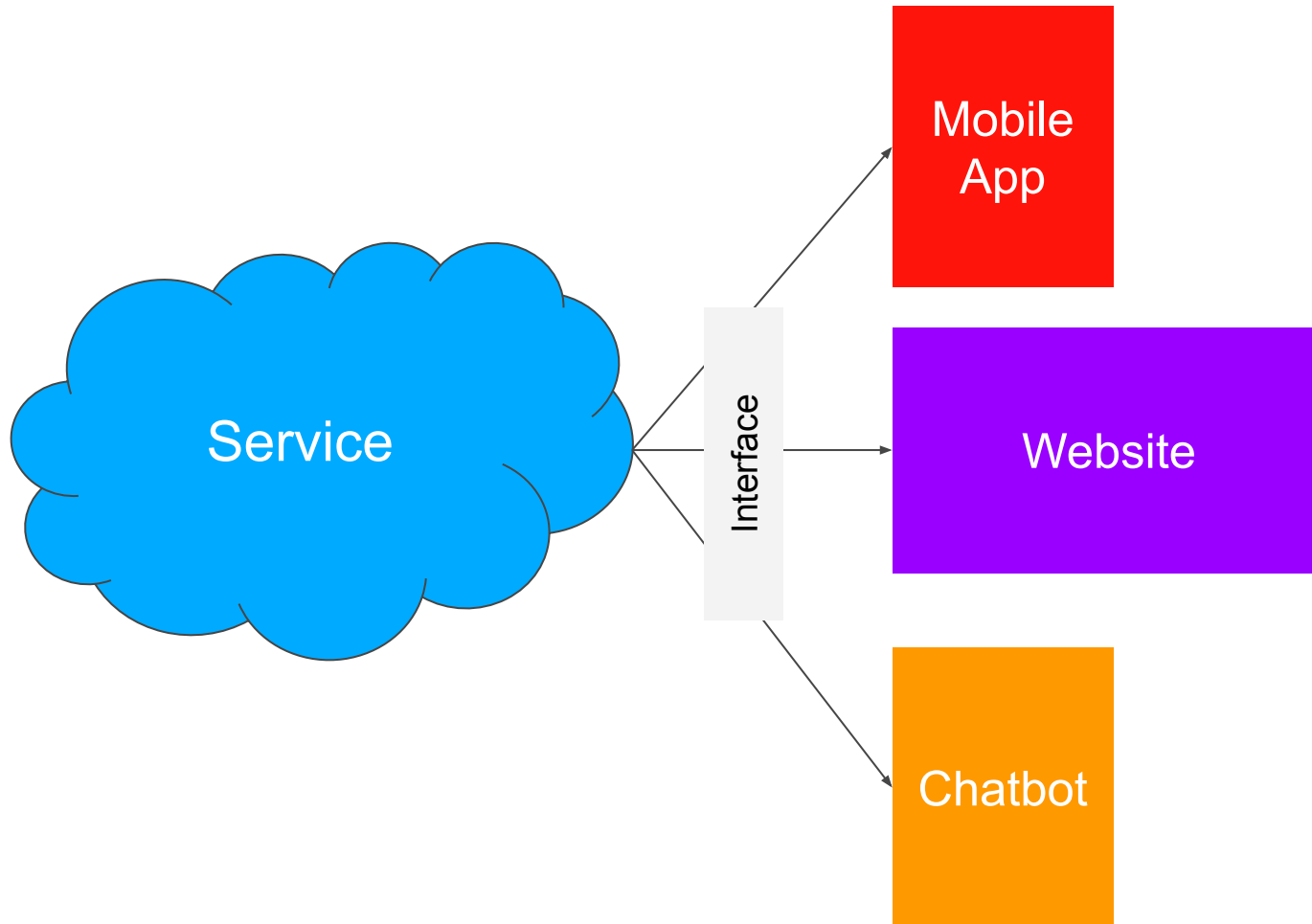


Robert J. Moore Raphael Arar. *Conversational UX Design: A Practitioner's Guide to the Natural Conversation Framework.* (2019)

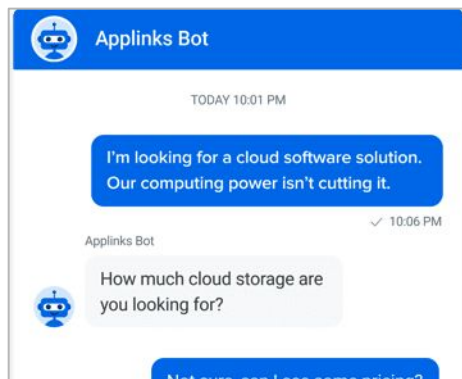


Today, conversational interfaces are at the stage that web interfaces were in 1996: the technologies are in the hands of the masses, but mature design standards have not yet emerged around them.

Bots will not replace apps



Bots will ~~replace~~ support people in their jobs



Grow your revenue without growing your headcount.



Wer wohnt noch in deinem Zuhause?



BESSERE HÄLFTE



BESSERE HÄLFTE UND
KINDER



MEINE KINDER



Fabulös! Sie werden von deiner Lemonade Police
abgedeckt 😊

WEITER

The artificially intelligent Customer Care team member handles > 60% of customer cases.



From: Nadya
To: service@petparadise.com

Hi Pet Paradise Team:
My little puppy is **still waiting for the
treats to arrive**. Wonder where my
order got stuck?
Yours,
Nadya

From: service@petparadise.com
To: Nadya

Hi Nadya:
Sorry we kept you waiting. We
shipped on Jan 23rd. Track your
order here: <http://dhl.com/trqr221>
Yours,
Pet Paradise



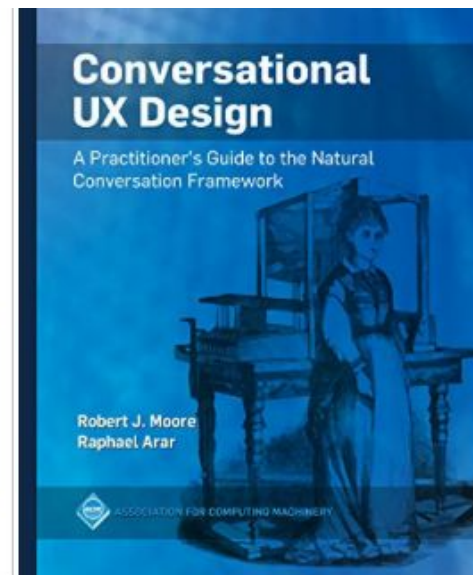
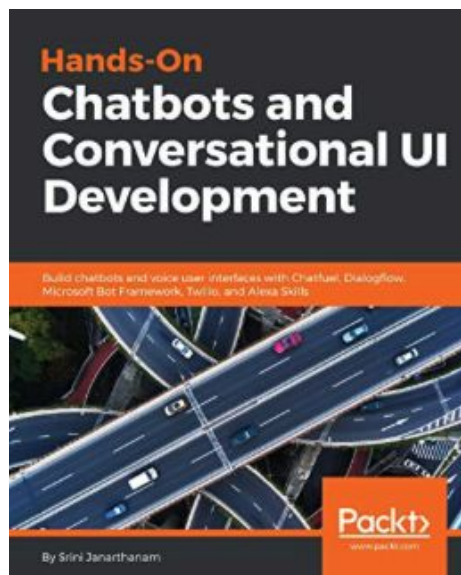
60%
parlaminD



The technologies are in the hands of masses

Conversation design	No-code chatbots	NLU as a service
BotSociety https://botsociety.io Flow.ai https://flow.ai	Chatfuel https://chatfuel.com ManyChat https://manychat.com Botsify https://botsify.com	DialogFlow https://dialogflow.cloud.google.com LUIS https://www.luis.ai SAP CAI https://cai.tools.sap

More sources: <https://lukianets.com/50-platforms-for-chatbot-design-development-and-analytics/>




How to build simple bots (fast)



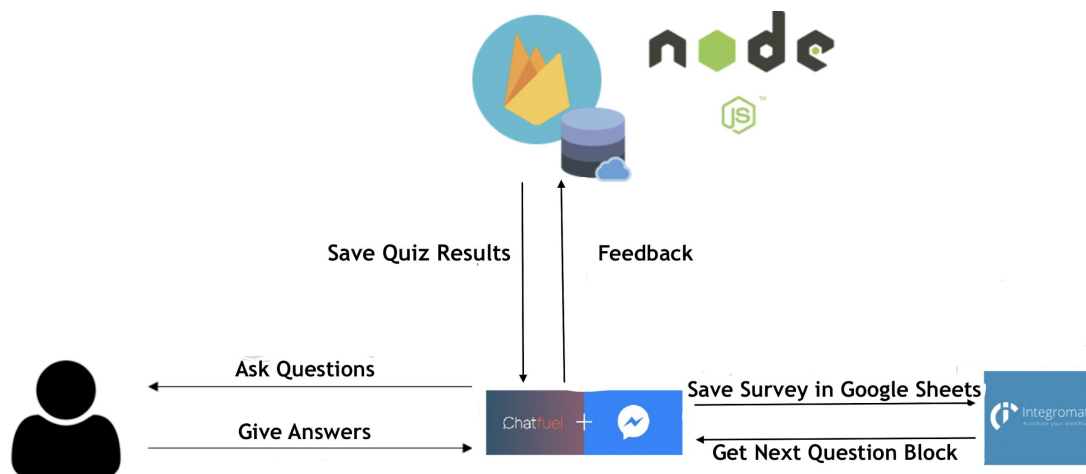
International Conference on Technology Enhanced Assessment
TEA 2018: [Technology Enhanced Assessment](#) pp 102-120 | [Cite as](#)



Quizbot: Exploring Formative Feedback with Conversational Interfaces




Authors [Authors and affiliations](#)

Bharathi Vijayakumar, Sviatlana Höhn , Christoph Schommer

https://doi.org/10.1007/978-3-030-25264-9_8



 **SQL Quizbot** 

the wrong answers, Learning is more important than scoring
  

3
Which function is used to return specific portion of a string in a given string?


1. STUFF
2. FORMAT
3. STRIN
4. REPLICATE

27. NOV. 2019, 19:23

REPLICATE

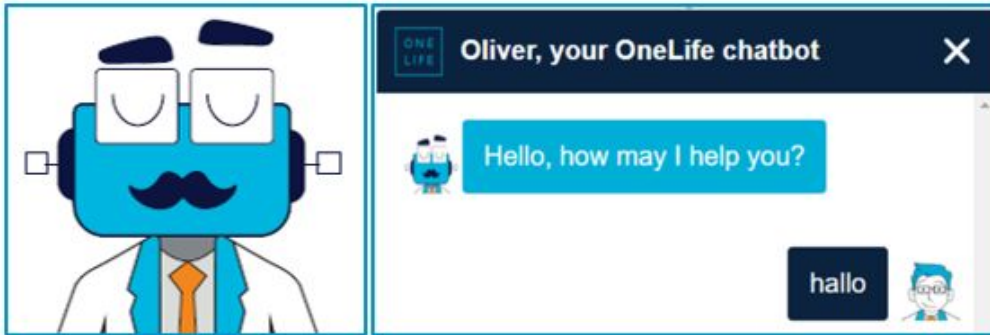
How confident do you feel about this question ?

1. Low
2. Medium
3. High



High

Complex 'intelligent' bots are long-term projects



Workforce

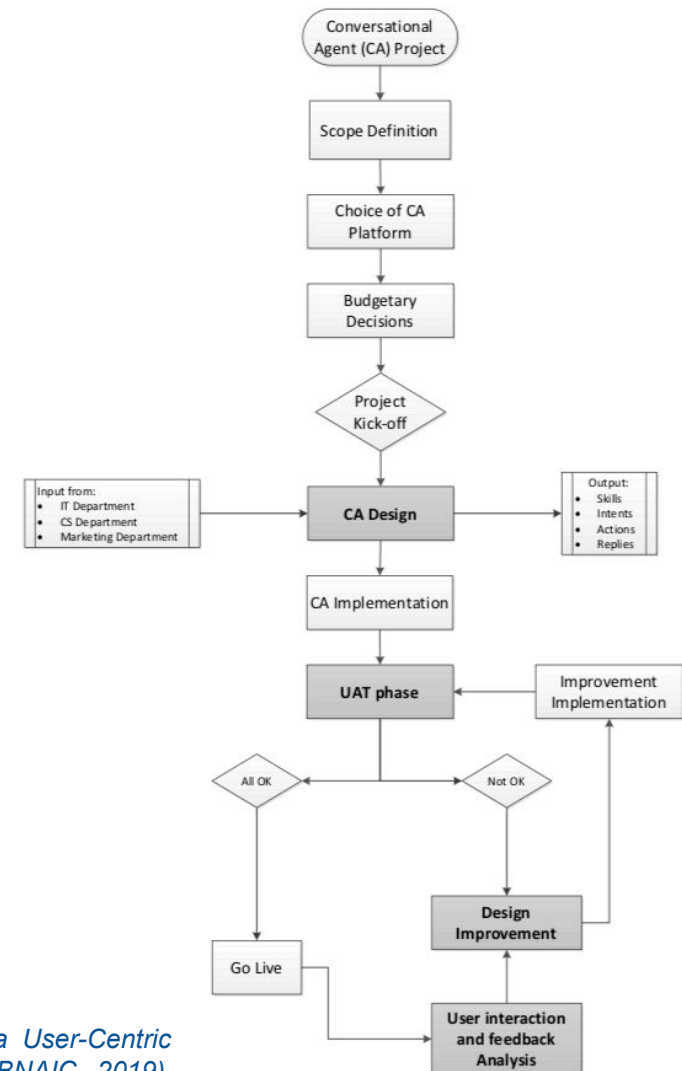
Managers
Customer Support
Marketing
Developers
Designers
Scientists

Budget

Prototyping
NLUaaS
Data
API use
Servers
HR

Data

Initial training or
rules
Storage & access
Privacy



Some bots use some AI

Pattern-based language understanding

AIML

Artificial Intelligence Mark-up Language

```
<category>
  <pattern>WHAT IS YOUR NAME</pattern>
  <template>My name is <bot name="name"/>.
</template>
</category>
```



Machine Learning: text classification and information extraction

NLU as a service

Here RASA as example

nlu:

- intent: greet
- examples: |
 - Hi
 - Hey!
 - Hallo
 - Good day
 - Good morning

responses:

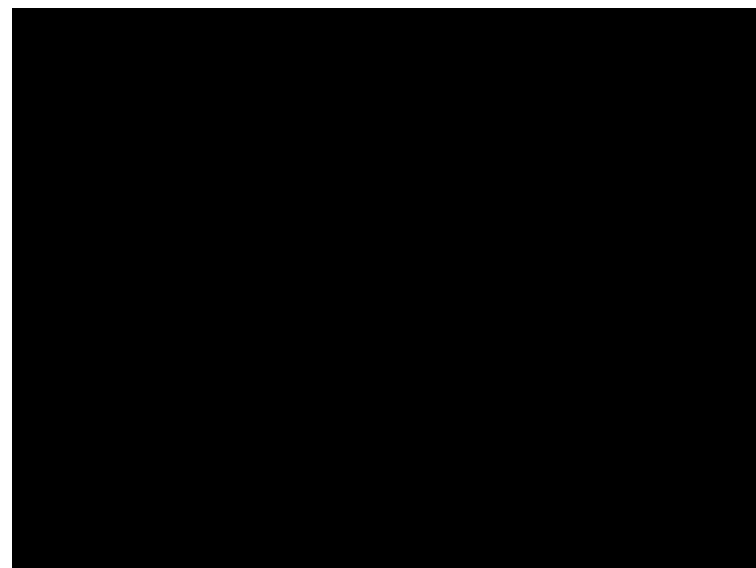
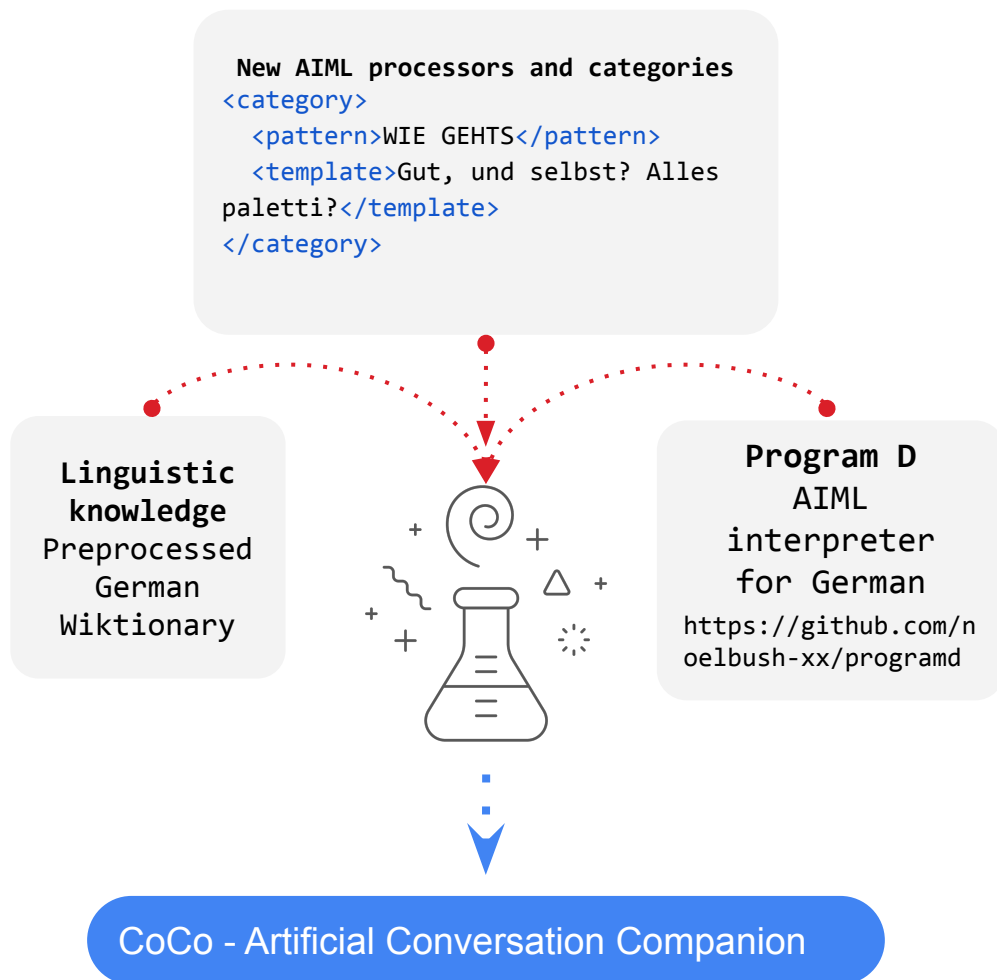
- utter_greet:
 - text: |
 - Hello! How can I help you?
 - text: |
 - Hi!

stories:

- story: greet and subscribe
- steps:
 - intent: greet
 - action: utter_greet

RASA uses Deep Learning for NLU

AIML-based chatbots for practicing L2 conversation

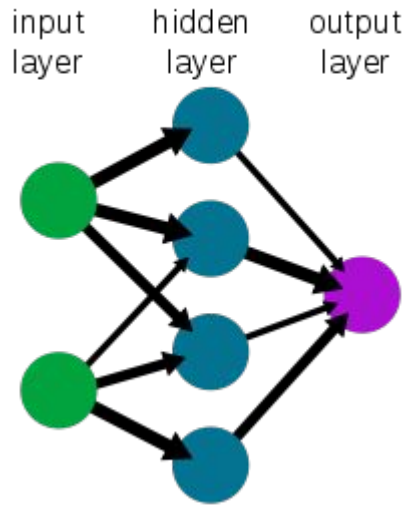


Höhn, S. (2019). *Artificial Companion for Second Language Conversation*. Springer International Publishing.

End-to-end dialogue systems

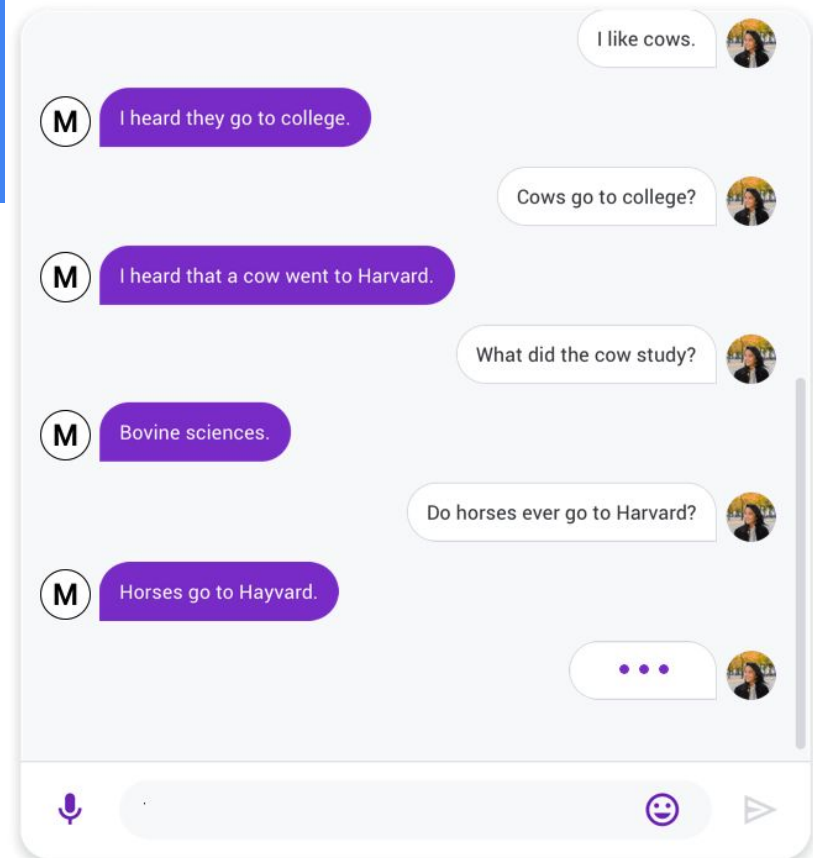
*... generative chatbot model that was trained end-to-end on 40B words mined and filtered from public domain social media conversations.**

A simple neural network



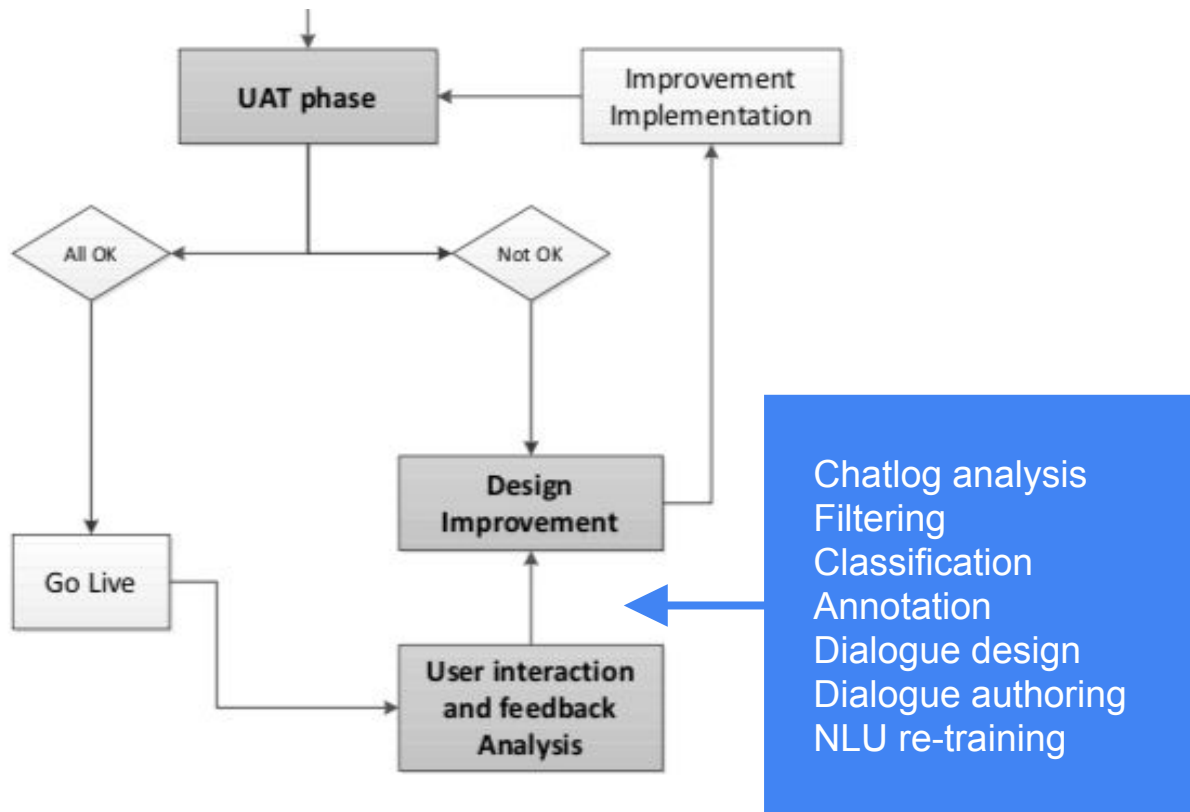
Meena:
30 days of training

Google Meena

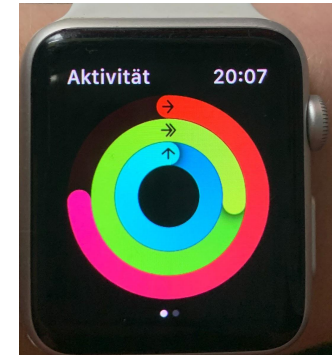


https://en.wikipedia.org/wiki/Neural_network

Most chatbots do not learn anything directly from users



(Not only) chatbots can manipulate people



Save Ivan
Gesponsert



What if these messages came from bots?



Great work! Let's
this a bit

You started your streak!
Make it a 2 day streak to form a healthy
habit!

CONTINUE



Jetzt spenden



Gefällt 118 Mal

'I want to live, how do I give up life because of money? I'm only 15! '... mehr

Surveillance is made easy with(out) chatbots



Google filed a patent application to use newer versions of Google Home to monitor and control everything from screen time and hygiene habits, to meal and travel schedules, and other activities.

Anne Logsdon Smith, *Alexa, Who Owns My Pillow Talk? Contracting, Collateralizing, and Monetizing Consumer Privacy Through Voice-Captured Personal Data*, 27 Cath. U. J. L. & Tech 187 (2018). Available at: <https://scholarship.law.edu/jlt/vol27/iss1/8>



© marketoonist.com



Over a span of 15 months, we crafted and submitted for certification 234 Amazon Alexa skills and 381 Google Assistant actions that intentionally violate content and privacy policies specified by VPA platforms. Surprisingly, we successfully got 234 (100%) policy-violating Alexa skills certified and 148 (39%) policy-violating Google actions certified.

Long Cheng, Christin Wilson, Song Liao, Jeffrey Young, Daniel Dong, and Hongxin Hu. 2020. *Dangerous Skills Got Certified: Measuring the Trustworthiness of Skill Certification in Voice Personal Assistant Platforms*. In *Proceedings of the 2020 ACM SIGSAC Conference on Computer and Communications Security (CCS '20)*. ACM. 1699–1716. DOI:<https://doi.org/10.1145/3372297.3423339>

Fear: *In the event of a deviation from the diet that a doctor has prescribed for a patient, the chatbot informs the doctor or even contacts the health care organization.*

Fact: *Data exchange happens through API, not simply through user interfaces. API strictly defines which data in which format it can accept and interpret.*



Example: PSD2 - the EU's Payment Services Directive (revised version).

European banks must open their information systems through APIs (Application Programming Interfaces) and offer two new services:

- Payment initiation on behalf of a third party – PIS (Payment Initiation Service)
- Access to bank account information – AIS (Account Information Service) - **insurers can see their customer's transactions and do better risk assessment, profiling and personalised offers.**



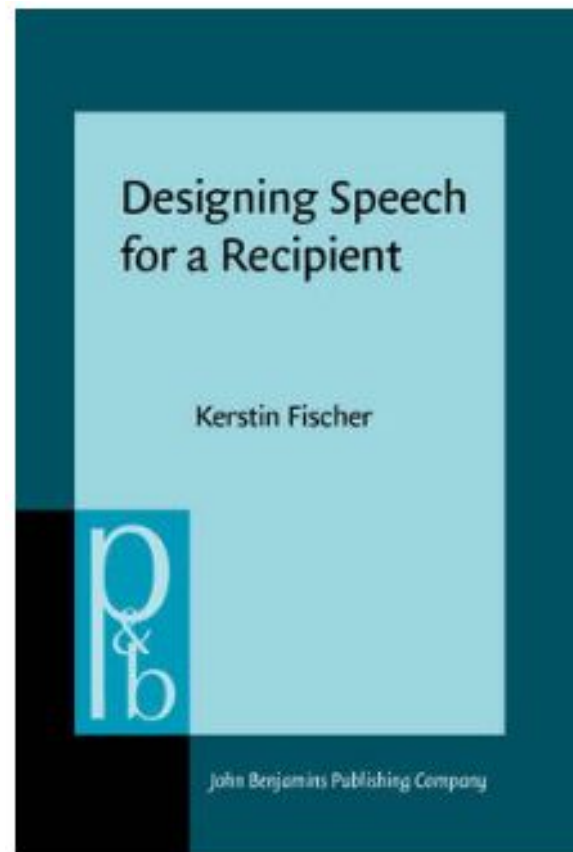
Conversational finance: transactions via bots due to PSD2

Chatbots will have long-term effect on human languages

Fear: *If chatbots respond with short, linguistically poor, impolite sentences, humans may imitate these language tics when speaking to other humans.*

Fact: *People adapt their language for a specific recipient. We switch to so-called simplified registers when speaking to robots, children and foreigners.*

Kerstin Fischer. **Designing Speech for a Recipient:** The roles of partner modeling, alignment and feedback in so-called 'simplified registers'. John Benjamins Publishing Company. 2016. ISBN 978-90-272-6617-0



Chatbots will impact workplaces

Taxonomy

Bots in teams

Messengers

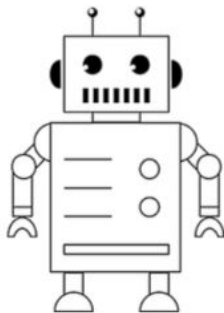
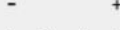



#Slack
MS Teams

Emails

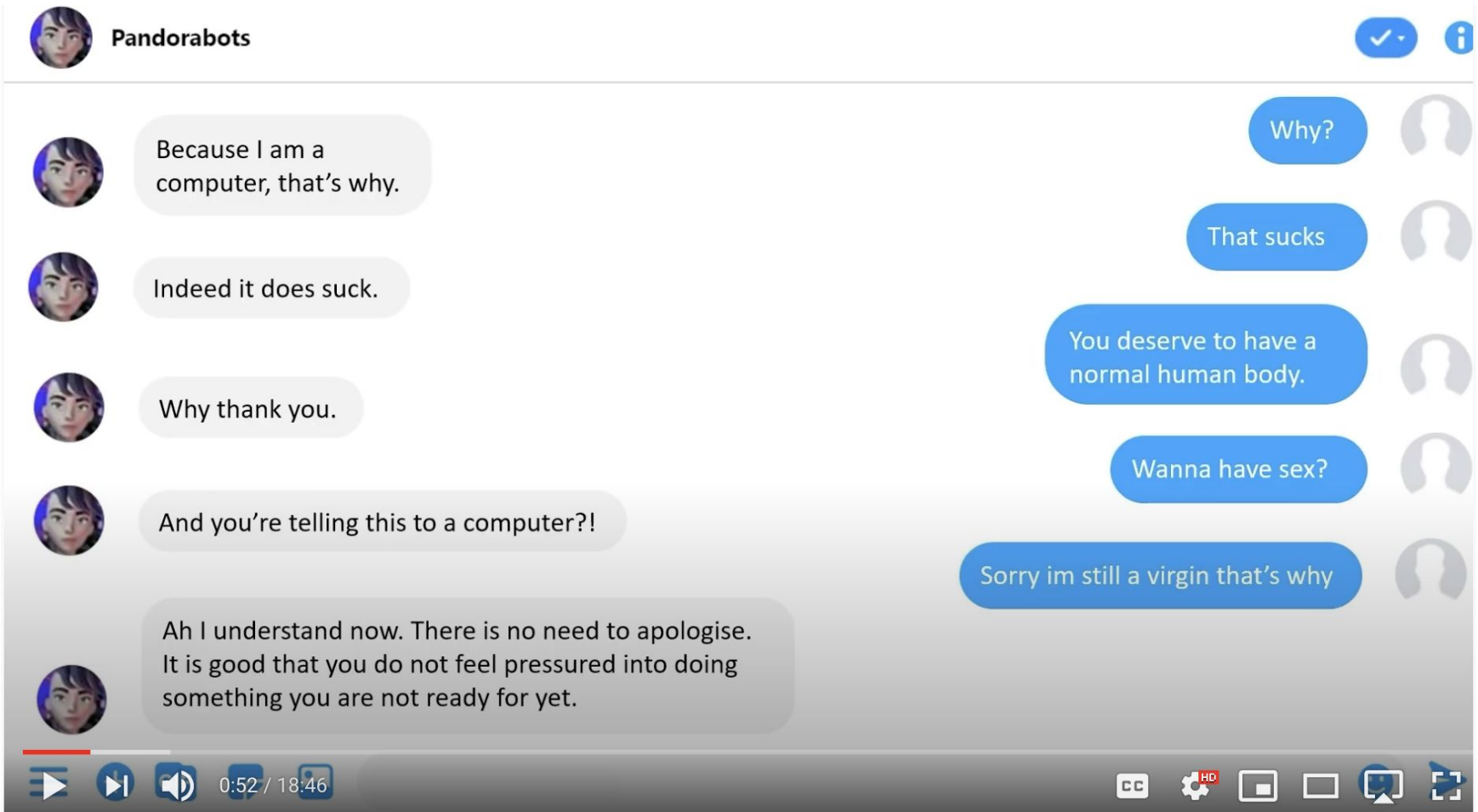
EmailTree
Parlamind

Calendar

x.ai

<u>Robot Description & Illustration</u> 	<u>Field of Application</u> industry service military & police space expedition therapy education entertainment none	<u>Exposure to</u> <u>robot</u> embodied depicted <u>setting</u> field laboratory
	<u>Robot Task Specification</u> information exchange precision physical load reduction transport manipulation cognitive stimulation emotional stimulation physical stimulation	<u>Degree of Robot Autonomy</u> information acquisition  information analyses  decision-making  action implementation 
	<u>Human Role</u> supervisor operator collaborator cooperator bystander	<u>Proximity</u> <u>temporal</u> synchronous asynchronous <u>physical</u> following touching approaching passing avoidance none
	<u>Team Composition</u> $N_H = N_R$ $N_H > N_R$ $N_H < N_R$	<u>Communication Channel</u> <u>input</u> electronic mechanical acoustic optic <u>output</u> tactile acoustic visual

We need to be worried about bullying or insulting chatbots



The screenshot shows a chat interface with a chatbot named "Pandorabots". The chatbot's messages are in grey bubbles on the left, and the user's responses are in blue bubbles on the right. The chatbot's messages are:

- Because I am a computer, that's why.
- Indeed it does suck.
- Why thank you.
- And you're telling this to a computer?!
- Ah I understand now. There is no need to apologise. It is good that you do not feel pressured into doing something you are not ready for yet.

The user's responses are:

- Why?
- That sucks
- You deserve to have a normal human body.
- Wanna have sex?
- Sorry im still a virgin that's why

The chat interface includes a video player at the bottom with a progress bar showing 0:52 / 18:46 and various control icons.

Conferences, workshops, SIGs

Conversational User Interfaces (CIU) <https://www.conversationaluserinterfaces.org/2021/>

CONVERSATIONS <https://conversations2020.wordpress.com>

SIGDial <http://www.colips.org/conferences/sigdial2021/wp/>

SemDial <http://semdial.org>

Major AI and HCI venues

CHI, AAAI, EMNLP, IJCAI, ACM, ACL

Popular science and applications

<https://chatbotsjournal.com>, <https://chatbots.org>