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# From Eliza to Xiaolce: challenges and opportunities with social chatbots

**Key words:** Conversational system; Social Chatbot; Intelligent personal assistant; Artificial intelligence; Xiaolce

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## **Motivation**

- One of the fundamental challenges in artificial intelligence (AI) is endowing the machine with the ability to converse with humans using natural language.
- 2. Social chatbots' appeal lies in not only their ability to respond to users' diverse requests, but also in being able to establish an emotional connection with users.

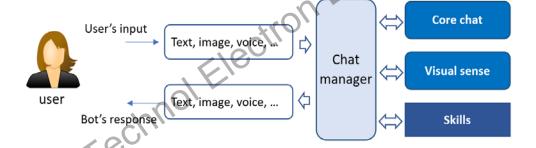
## Main idea

- 1. The primary goal of social chatbots is to be AI companions to humans with an emotional connection.
- 2. Social chatbots are created to serve users' needs for communication, affection, and social belonging.
- The design of social chatbots must focus on user engagement and take both intellectual quotient (IQ) and emotional quotient (EQ) into account.
- 4. Users should want to engage with the social chatbot; as such, we define the success metric for social chatbots as conversation-turns per session (CPS).

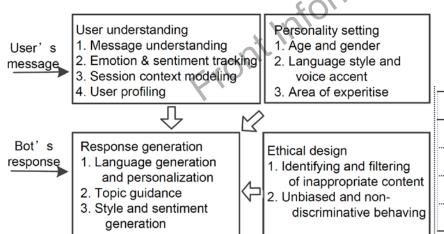
## Method

Social chatbot needs to develop the following capabilities: empathy, social skills, personality and integration of EQ and IQ.

Architecture of a social chatbot



#### Architecture of the core-chat module



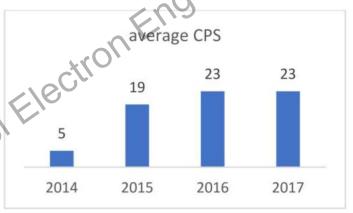
## Expected conversation-turns per session (CPS) for different types of conversational systems

System₽	Expected CPS
Web search.	1₽
Personal assistant <i>₀</i>	1–3₽
Task-completion₽	3–7₽
Social <u>chatbot</u>	10+₽

## **Major Results**

Since 2016, on average each session lasts 23 conversation turns between Xiaolce and a human user

Average CPS improvement over year of Xiaolce in China



- Social chatbots become more popular in Japan, US, India, and Indonesia.
- Since its release in 2014 in China, Xiaolce has become the first widely deployed social chatbot with millions of users.
- Xiaolce has more than 100 million unique users worldwide and has chatted with human users for more 30 billion conversation turns.
- (Xiaolce) has also become an Internet celebrity, appearing as a weather and news anchor, hosting TV programs, and working as a newspaper reporter.

## Conclusions

- 1. We discuss the tremendous opportunities social chatbots will make possible, and their potential impact on society as Al becomes an integral part of our lives.
- 2. As Al companions, social chatbots such as Xiaolce also enable new scenarios that are of significant commercial value.
- 3. Despite recent progress of social chatbots such as Xiaolce, the fundamental mechanism of human-level intelligence is still to be fully understood.
- 4. As AI becomes more pervasive in our lives, it is imperative to establish ethical guidelines for designing and implementing such AI systems.