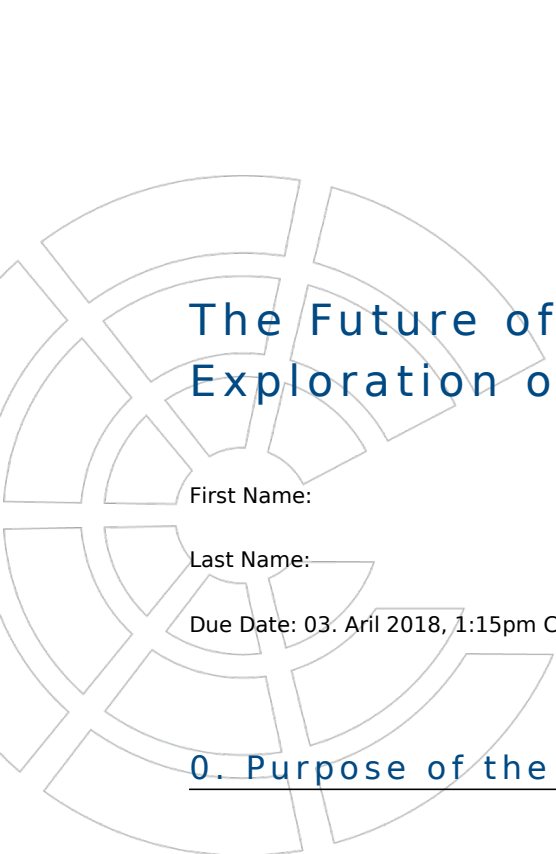




The Future of Socially Intelligent Bots: An Exploration of Perspectives

First Name:

Last Name:

Due Date: 03. April 2018, 1:15pm CET | Via E-Mail to l.brinkschulte@mci4me.at

0. Purpose of the Study

Thank you for agreeing to participate in this study about exploring future characteristics of social intelligent bots. Before you begin addressing the questions in Round One of this study, please review this brief introduction to the research and rationale behind the development of this survey.

Purpose of this study. Today, the existence of bots imitating human characteristics is more relevant than ever. Bots and 'real' people already interact and live together. While bots are often seen as 'work simplifiers', their interactions usually lack social competence. There is evidence that a bot that is perceived to be more social in its behavior will be more easily accepted. Further studies on human-computer interaction stress the importance of social intelligence. Therefore, the purpose of this study is guided by the following question:

Which characteristics of social intelligence should future bots be able to master?

The Delphi survey technique. The procedure used for this study is designed to bring together a group of experts to share their perspectives based on their experiences and expertise. Rather than meeting in person, the Delphi study allows you to participate at a geographical distance, and also allows deeper consideration of different viewpoints that may otherwise be hindered by time and group dynamics. The questions are designed to encourage ongoing participant reflection and reconsideration. Therefore, your ability and willingness to participate in all three rounds of the survey is crucial to its success.

Directions for completing this survey. Round One contains five open-ended questions designed to elicit your insights about the topic. The questions are listed individually in the sections 2.1 to 2.5. Each question contains an introduction into the respective topic at the beginning. The following third section asks you to provide any comments you feel need to be included in the discussion.

Starting Point. The study focuses on both, software bots (e.g. Siri) and combinations of software and hardware (e.g. the robot Pepper). As the starting point of the discussion, think about a bot like demonstrated in the movie "Her" (Trailer: <https://www.youtube.com/watch?v=ne6p6MfLBxc>). Within the movie, a non-embodied artificial agent which calls itself Samantha creates an emotional bond with its owner Theodor.

1. Demographic Questions

What is your gender? (Female, Male)

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What is your age range? (1) Under 25 years old, (2) 25 to 34 years old, (3) 35 to 44 years old, (4) 45 to 54 years old, (5) 55 to 64 years old, (6) 65 years or older

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What is your highest educational level? (Master's Degree, Doctoral Degree, Other) **Please add the field of study below.**

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What are you currently doing professionally and/or educationally?

	A4
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What are your research interests?

	A5
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Where are you located? (Africa, Antarctica, Asia, Oceania (Australia, New Zealand, etc.), Europe, USA, Canada, Mexico, Central America, South America, Middle East, West Indies)

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Please rate how relevant the following areas are in your field of research (from 1=not relevant to 5=very relevant).

Linguistics: Artificial Intelligence:	A7
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Software Engineering: Psychology: Philosophy: Social Sciences:	
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2.1 Situational Awareness

Situational awareness (SA) or also the so-called “social radar” is the ability to read situations and to interpret the behaviors of people in those situations, in terms of their possible intentions, emotional states, and proclivity to interact. Humans use dedicated mental models which represent the relationships between different observations and the formation of beliefs about the environment. This in turn directs the further observations to be performed. Bearing in mind that SA is crucial for human decision making, the concept is also considered in the development of bots designed to display human-like behavior. For a bot to be able to act intelligently in an environment, it has to become aware of the current situation. The agent has to select appropriate observations and the observation results have to be interpreted and combined into one coherent picture. To generate SA and enable bots to make sense of themselves and their surrounding environments bots are equipped with various sensors, actuators and other computation units. The data arising from them have to be collected and processed. Intelligent agents are informed about relevant events, decisions of other agents, coordination of an agent group and execution of cooperative activities. These objects should bridge the gap between the real and the virtual world. It includes gathering information from different sources such as social media, daily interactions, behavioral patterns as well as sensors to which the agent may have access to. The gathering of social information such as social relations, role structures or influencers of a social environments, is also an important agent task. The ability of keeping a timeline of interactions and the capability of memorizing events, actions and decisions help to increase an agent’s SA.

There are **three levels of SA**: perception, comprehension, and projection. Perception is the basic level of SA. This level is achieved when one is able to perceive the information that is needed to do a defined job. The next level is comprehension. Not only the information has to be perceived, it has to be combined with other information and has to be interpreted correctly. The third level is projection or the ability to predict what will happen next based on the current situation. It also has to be predicted how much time is left before an event occurs so that one can judge the interactions necessary to react.

SA is divided in **three different contexts**. Firstly, there is the proxemics context which stands for the human use of space and the effects that population density has on behavior, communication, and social interaction. Secondly, the behavioral context relates to the patterns of action, emotion, motivation, and intention that show up in the interactions among the people who are engaged within the situation. The third context is the semantic context. The semantic context refers to the patterns of language used in the disclosure. It examines the nature of the relationship, differences in status and social class, governing social codes, and the degree of understanding created by language habits.

The processed information is **categorized** as spatial (orientation, movement, structure), informational (building information structure, decision making, information processing, perception, recognition) or functional (building functional structure, task decomposition, planning, specialization) awareness. Pervasive or ubiquitous computing relates to agents which adapt and create a sense for SA to better integrate into the environment. Time is an important element of SA. As situations are dynamic, a bot may have SA for a short period of time but then be flooded by information and not have SA as events unfold rapidly.

Lastly, one divides SA in **three different layers**. Actions are guided/influenced by individual awareness, interpersonal awareness (group collaboration, such as tutoring and meetings), social cultural awareness (race, age, gender, education level, etc.)

In Short.

- SA is the ability to read situations and to interpret the behaviors of people in those situations, in terms of their possible intentions, emotional states, and proclivity to interact
- SA levels: perception, comprehension, and projection
- SA contexts: proxemics context, behavioral context, and semantic context
- SA categories: spatial, informational and functional awareness
- SA layers: individual awareness, interpersonal awareness, social cultural awareness

Instruction. Please think about characteristics future bots be able to master fitting into the dimension of situational awareness. Think about the characteristic itself (“Future socially intelligent bots should...”), rationale, examples, and realization (“how”). What do bots need in terms of perception, comprehension & projection;

proxemics context, behavioral context & semantic context; spatial, informational & functional information? As there are various information from different channels, what to select, sense, track and reason?

Your answer. Please enter your answer here. To ensure a thorough exploration of the topic, please provide at least two or more characteristics:

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2.2 Presence

Presence is also referred to as bearing. It incorporates appearance, verbal and nonverbal communication, acoustic, and other interpersonal signals others process into an evaluative impression of a person.

Appearance refers to how he/she looks influences the observer in making assumptions regarding factors such as attractiveness and credibility. Appearance includes, among others, physical form, humanlike communication, dress, age, race, gender, socio-economic status. Should a bot appear human-like or machine-like? Should a bot be (physically) embodied? Is a voice alone (human or machine generated) sufficient? Does a robot's perceived gender, ethnicity/race, look and age affect the interaction with a person?

Verbal communication designates the linguistic part of the interpersonal communication. This includes both written and spoken communication. It is about what the sender is saying and which information is transferred fully objectively to the counterpart. Word count, turn length and time to respond are critical parts of verbal communication. In e-commerce verbal communication is for example the description of a product or indicating the price.

In contrast to verbal communication, there is the **nonverbal communication** which describes all human communication events that transcend the spoken or written word. Nonverbal communication includes gestures, postures, facial expression, gaze direction during a conversation, and other emotional expressions.

Acoustic patterns and voice affect how people are seen in terms of personality, emotional state, and competence. Charismatic politicians and CEOs are examples, with the ability to push their voices through a wide range of frequencies when addressing the general public to project an image of power and dominance. In which way does a bot have to be equipped with vocal dexterity? Should it sound human or machine generated? Should it have changing pitches for different situations, such as high pitched voice to sound happy? What actually makes a voice seem engaging, melodious, and trustworthy?

Other signals others process into an evaluative impression of a person include for example the split-persona effect. Should agent roles/functionality be split into different distinct agent personas (e.g. two motivator and expert agents as compared to working with one mentor agent)? Should agents know everything or should they have similar competencies to learners? Lastly, virtual environments often allow one to create a personalized avatar to represent his/her virtual "self" (Baylor). Here, users can create an appearance that reflects the reality or not. Should a user be able to create an avatar?

In Short.

- Presence incorporates verbal and nonverbal patterns, appearance, acoustic, and other interpersonal signals others process into an evaluative impression of a person
- Appearance: Physical form, humanlike communication, dress, age, race, gender, socio-economic status
- Verbal patterns: Word count, turn length, time to respond
- Nonverbal patterns: Gesture, posture
- Acoustic/voice: Power pitch
- Other: Multiple agents (split-persona effect), all-knowing or not, creation of avatars

Instruction. Please think about characteristics future bots be able to master fitting into the dimension of presence. Think about the characteristic itself ("Future socially intelligent bots should..."), rationale, examples, and realization ("how"). Which characteristics of social intelligence should future bots be able to master in terms of appearance; verbal communication; acoustic patterns; and other signals others process into an evaluative impression of a person? Should an agent incorporate cultural behavior, characteristics and regulations?

Your answer. Please enter your answer here. To ensure a thorough exploration of the topic, please provide at least two or more characteristics:

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2.3 Authenticity

„I’m a man of the world, and a guy with certain principles. I have no hair, big feed, scratchy tattoos, small biceps, huge forearms, and a permanent right-eye squint. My voice sounds like I gargled with scouring powder, my use of English grammar is not that great, and I eat, sleep, and bathe with a pipe in my mouth. But I know who I am. I’m happy and I’m comfortable in my own skin. You’ll have to take me as I am.” – Cartoon Character Popeye

Authenticity defines a person’s honesty and sincerity. It is about establishing cooperation, preventing manipulation and being true to oneself and others. Moreover, having respect, staying true to one’s values and ‘playing fair’ makes a person (and potentially also a system) authentic. It refers to the social radar of other people pick up various signals from one’s behavior that lead them to judge one as honest, open, ethical, trustworthy and well-intentioned. Being authentic includes for example not to change or manipulate others, to be honest with themselves, and to keep and represent faith with their traditions and the values.

Establishing common ground is necessary as it preserves the relationship, and adds to an upright and ethical conversation. Authenticity builds on these relationships rather than on task-orientation.

To be authentic, you must be **honest** with yourself and with others. A person who is honest with herself and others is authentic, regardless of what she does. We may not approve of her actions, but we should still praise her for being authentic. An authentic person reveals her emotions — she reveals when she’s happy, when she’s sad, when she’s feeling insecure or vulnerable. An authentic person doesn’t put up a false front.

Additionally, **origin** and knowing where one is from is an important part of being authentic. The first definition of “authentic” that pops up when one type it in Google is “of undisputed origins.” In order to be perceived authentic, it is important to show transparency and predictability with respect to decision making. In human-computer interaction, this prevents the so-called “black-box behavior”. Should therefore an agent reflect an agent’s creator(s)/owner(s)? “You can change your future, but you can’t change your past,” says Jones. “Your past made you who you are.”

In Short.

- Being faithful, sincere and honest towards himself/herself and other people
- Standing to one’s own values and beliefs
- Not manipulating
- Being reliable
- Create an atmosphere of trust and confidence
- Positive, friendly, kind, reliable
- Establishing a connection to others

Instruction. Please think about characteristics future bots be able to master fitting into the dimension of authenticity. Think about the characteristic itself (“Future socially intelligent bots should...”), rationale, examples, and realization (“how”). Which characteristics of social intelligence should future bots be able to master in terms of establishing a common ground, honesty and origin? Is it important for an authentic messaging agent to behave transparent; i.e. justified and predictable? Should an authentic agent mimic the behavior of its creator (i.e. the company it represents) or should it rather develop its own ‘personality’? Do you believe that an agent has to anthropomorphize in order to be perceived authentic (note: to anthropomorphize = resemble human form)? What type of ‘social’ relationship should a bot aim to build up in order to be perceived authentic? In your opinion, how ‘conversational’ does a messaging agent need to be in order to be perceived authentic? What are the conversational skills you would expect from an authentic agent? What are conversational rules and values an authentic agent would need to adhere to?

Your answer. Please enter your answer here. To ensure a thorough exploration of the topic, please provide at least two or more characteristics:

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2.4 Clarity

"Don't talk unless you can improve the silence" - Laurence C. Coughlin

Clarity is the ability to explain oneself, illuminate ideas, pass data clearly and accurately and articulate views and proposed course of action, enables people to get others to cooperate with you. It measures the competence to express ones thoughts, opinions, ideas and intentions clearly. One knows how to use the right language in the right situation. Sometimes letting the other person come to the point, finish the sentence, or connect the dots wins the support for the idea like sales people for example know when to stop talking and let the customer finish the job of deciding to buy. There are several methods to express oneself "clearer". One example for this is to transmit ideas through stories (**storytelling**) to make it easily understandable.

Additionally the use of "**clean language**" which stands for the use of neutral speech patterns and words is an important element. The use of clean language leads to empathy, open-mindedness and free exchange of ideas. Ability to monitor one's own use of language patterns and the language patterns of others, and to avoid certain verbal pathologies that can cause misunderstanding, conflict, and even psychological maladjustment, both individual and collective. One example of clean language is that the speaker generally speaks for him- or herself, with-out presuming that what he or she says is true for everybody.

Another important **conversational skill** to express oneself clearer is the use of metaphors. By substituting a concrete image or a familiar experience for an abstract concept one enables people to understand topics easier and faster. Other conversational skills include handling the dialog, turn-taking, and backslapping.

Since the representations include **ethical and moral assumptions**, future bots have to be designed with great care to prohibit discriminatory acting or thinking.

Should a bot make use of specific **jargons and acronyms** like computer-speak, business-speak or government-speak?

What should be the **average sentence lengths** of bots (Studies of reading comprehension clearly show the highest levels of understanding when sentences range from 15-25)?

Example for clean language (Client: "I feel strange."):

- Non-Clean Language facilitator responses might include: "I know this can be uncomfortable.", "Are you ill?", "Do you want to feel normal?", "What would happen if you didn't?", "Stop complaining!"
- Clean Language facilitator responses might include: "And where do you feel strange?", "And what kind of strange?", "And that's strange like what?", "And is there anything else about that 'feels strange'?", "And what happens just before you feel strange?", "And when you feel strange, what would you like to have happen?"

In Short.

- Ability to clearly express ones thoughts, opinions and ideas
- Knowing when to say what and when to be silent
- Using correct and clean language
- Using conversational skills (metaphors, handling the dialog, turn-taking, and backslapping)
- Storytelling

Instruction. Please think about characteristics future bots should be able to master fitting into the dimension of authenticity. Think about the characteristic itself ("Future socially intelligent bots should..."), rationale, examples, and realization ("how"). Which characteristics of social intelligence should future bots be able to master in terms of using correct and clean language, metaphors and storytelling?

Your answer. Please enter your answer here. To ensure a thorough exploration of the topic, please provide at least two or more characteristics:

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2.5 Empathy

"Empathy is patiently and sincerely seeing the world through the other person's eyes. It is not learned in school; it is cultivated over a lifetime." – Albert Einstein

Empathy. How a bot responds is critical, because data show that the conversational style of software can influence behavior. Importantly, empathy matters. Callers to suicide hotlines are 5 times more likely to hang up if the helper was independently rated as less empathic. Empathy defined as the ability to understand and respond appropriately to the affective states of others, having a feeling for someone else, and "sympathizing" with them. Communicating in an empathic manner results in a positive shared feeling between two people. It brings a state of connectedness with another person, which creates the basis for positive interaction and cooperation. Empathic behavior of others can reduce the experienced stress. This goal should for example also be achieved by a companion robot. The idea of empathy is to deal with feelings of others, read their thoughts, and respond adequately. People with empathy find it easy to see things from other people's points of view and they listen well to the concerns of other people. They can give others the feeling of understanding and well-being. Empathy includes to understand what other people think, how they feel in concrete situations, and to engage compassionately. One of the key principles of empathy is making an effective connection with another person, based on where he is, what he needs, how he views the situation, and how he sets priorities. Empathic people are able to connect to a person or group with stories, humor, and a humanistic approach to their subject. Motivational expert Dale Carnegie pointed out that most human beings are hungry for "emotional input", the kind of recognition, acceptance, praise, and affirmation that's actually very easy to give. The principle is: "If you help people feel good about themselves, they'll feel good toward you."

There are **two opportunities** to build empathy. On the one hand there is the moment-to-moment experience of connecting with another person and on the other hand there is the maintenance process where one keeps a relationship healthy over time.

Establishing a strong empathic connection to a person or to a group can be achieved through three specific kinds of behavior, namely the **three A's**: Attentiveness, Appreciation and Affirmation. Attentiveness is referred to the ability to listen to and take the other person seriously. It tends to come naturally if you choose to really pay attention to others as individuals. Appreciation deals with showing other people that you accept them as they are, for what they are. If you disagree with a person and yet treat him in a way that invites him to respect you and possibly even like you, you behave in an affirmative way.

One of the most basic concepts of empathy is the contrast between **"toxic" behavior and "nourishing" behavior**. We can think of toxic people as those who consistently behave in ways that make others feel devalued, inadequate, angry, frustrated, or guilty. In contrast, nourishing people consistently behave in ways that make others feel valued, capable, loved, respected, and appreciated. Toxic behavior destroys empathy. Nourishing behavior restores and builds empathy. To maintain quality relationships and build empathy one has to avoid toxic behaviors and you have to adopt nourishing behaviors. Examples for nourishing behavior are positive jokes, serious compliments, active listening and constructive frolics.

In Short.

- Evoking positive feelings in others
- Knowing and feeling what other people feel
- Responding adequately to emotions
- Behaving according to the three A's (Attentiveness, Appreciation and Affirmation)
- Use of „nourishing“ and non-use of „toxic“ behaviors

Instruction. Please provide characteristics fitting into the dimension of situational awareness. Please use the following pattern to structure your answer. Think about the characteristic itself ("Future socially intelligent agents will..."), rationale ("because..."), examples (come up with a specific situation where this characteristic is helpful) and realization ("how"). Which characteristics of social intelligence should future bots be able to master in terms of responding to emotions, the three A's, and nourishing behavior. How would for example Siri, Google

Now, S Voice, and Cortana respond to questions about depression, rape, or domestic violence, and how would they respond to user concerns about mental health, interpersonal violence, and physical health? How truly aware and considerate of others' feelings should bots be?

Your answer. Please enter your answer here. To ensure a thorough exploration of the topic, please provide at least two or more characteristics:

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3. Thank you for Completing Round One

Thank you for participating in Round 1 of this survey. You will receive a link to Round 2 within approximately 2 weeks. Round 2 will consist of a series of characteristics developed from the answers provided by you and the other experts who responded to Round 1.

Optional question. What areas not identified in these questions would you like to comment on?

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Sincerely,
Luisa Brinkschulte