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Artificial Intelligence is a Character? Exploring design scenarios to build interface behaviours.

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Abstract | The paper aims to illustrate the qualitative results of the first phase of the scenario research about voice interfaces, examining whether it is possible to design them as if they were a theatrical or cinematographic character. The research field intersects interaction design with character design, intended as the narrative construction of a character, and theatrical performances. The experimentation takes advantage of theatre workshops that aims to show, and understand, which are the main characteristics of a vocal interface and how to design them according to a performance approach. The paper ends illustrating how design can address actual opportunities and criticalities about emerging technologies, following a relations-based approach.

KEYWORDS | INTERACTION DESIGN, VOICE USER INTERFACES, CHARACTER DESIGN, SCENARIO, THEATRE WORKSHOP

1. Introduction, from voice to personality

In recent years, there has been a widespread diffusion of devices that integrate vocal interfaces closely connected to artificial intelligence. Although these issues were already debated in the scientific community during the early 1990s, only in the last decade this topic experienced greater insight from many disciplines, including interaction design. The renewed attention is linked to the massive diffusion in the daily life of two products-functions: voice assistants (SIRI, Google Assistant, Alexa, Cortana); smart speakers (Amazon Echo, Google Home) that had a surge in sales. The scenario also includes extremely complex products, such as robots, voice assistants on board of cars with different degrees of automation and web pages applications. Therefore, the research field appears to be very broad and even in the scientific literature names of the vocal interfaces are connoted with different nuances. They are defined as Vocal Agent (VA), more often as Vocal Assistant, Conversational Agent (CA), Intelligent Assistant (IA), Virtual Assistant (VA). Robotic scientists, for example, imagined them to help fill the gaps in human social relations to generate friends and companions (Richardson, 2015). If the set that contains all the definitions is called Natural User Interfaces (Dasgupta, 2018), much is being discussed not only on the functions of the interfaces but, above all, on aspects such as: the emotions they should communicate, the characteristic traits of the personality, the ability to stimulate virtuous behaviours. The concept of naturalness is still debated in the scientific community, but the dialogue makes interaction easier because voice interfaces currently allow a great tolerance in the understanding of the input messages, without forcing the user to be strict encode and learn standard messages to be given in a dialogic fashion (Dale, 2016). Moreover, the voice is not only perceived as human-like, but human traits are also associated with the behaviours of the system (Nass, Steuer & Tauber 1994). People tend to infer more a human creator behind the computer, hearing a voice than reading the same text (Schroeder & Epley, 2016). Even if users are perfectly aware of the presence of an artificial intelligence, they believe that voice-human has real needs and desires (Short, 2017), human emotions or traits (Brave & Nass, 2007), feeling even more comfortable when VA asked invasive questions (Yu, Nguyen, Prakkamakul & Salehi, 2019). People create a mental image of the voice, including personal traits, attitudes, background information and even physical characteristics (Cohen, Giangola & Balogh, 2004). Starting from this statement, VAs are usually designed to include emotion appraisal (Castellano et al., 2013), generation and expression capabilities (Tsiuorti et al., 2016), to produce empathy (Lunardo & Bressolles, 2016). Other attributes usually associated with VA are: empathetic (Fung et al., 2016), affective (Oker et al., 2015), emotive (Maldonado & Nass, 2007). All these efforts are made to foster communicative and emotional aspects, but the core concept follows the design of a human-like interface, defining it as emotional intelligence, that is grounded in parameters like: believability (Ranjbartabar & Richards, 2016), the illusion of life (Bates, 1994), collaboration (Cassell, Sullivan, Churchill & Prevost, 2000), trust (Cheepen, 1988), sensitivity (Dibitonto, Leszczynska, Tazzi & Medaglia, 2018), capable of conversing (Clark et al., 2019). However, one of the most debated topics is how to give to VA a recognisable personality to simulate a

real human-like dialogue; many scholars apply the same personality model both to the human and the machine side, because the base construct is to create a match between human personality and the machine one. But, at present, the VA wide spreading generated an unusual loop in which scholars are still analysing commercial VUI to find if there is a clearly designed personality, which categories of user can easily accept, adopt and engage a stable relation with that kind of VUI. While personality is well described by Corr and Matthews (2009) as "the set of habitual behaviours, cognitive and emotional patterns that evolve from biological and environmental factors", then the first split concerns the subdivision between the personality traits theory and the personality types one. Personality trait theory considers characteristics of people as part of a larger continuum and its approach is described into the Big Five theory; personality types theory, instead, describes characteristics of people as discrete categories. Big Five theory (McCrae & John, 1992) specifies the general affective behaviour by the five following traits: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism. Type theory has its roots in personality scales, such as the Myers-Briggs Type Indicator (1962), which posits 16 personality types deriving from a set of four fundamental dichotomies, for example, extroversion vs introversion. It is worth noting that in the analysed studies, scholars do not use the two approaches as separate, but often mix them by adding other parameters, see for example Heudin (2017), such as mood (Morris, 2012) and emotion (Campos et al., 1994).

2. Analysing and designing personalities of VA

The literature review presented in these first two sections aims to show how interaction design considered the aspects of voice interfaces design, especially the humanization aspects, including users' inferences. The analysis includes design and psychology references as the research field is multidisciplinary, but broadens the field also considering character design. Garcia, Lopez, and Donis (2018) analysed 3661 online surveys to assess the VA personality; their goal was to evaluate VA and identify people desired VA personality. They found that: attributes most frequently associated with VAs were practical, informed, up-to-date, well-mannered, logical and helpful; the least associated were cheerful, sweet, sentimental and masculine. On the other hand, Ehrenbrink, Osman, and Möller (2017) found the personality profile of testers and their preference for Siri, Google's Now and Cortana, based on attractiveness and psychological state reactance. The results show how the group of testers who preferred Siri was the largest and matched the average personality profile. The Google Now group was preferred by extravert, the group that preferred Cortana was more neurotic, less agreeable and less extroverted. Doyle, Edwards, Dumbleton, Clark, and Cowan (2019) present a study in which two VAs are compared with human interaction. They found eight key dimensions to categorise participants' perceptions, for this study is essential to quote at least three of them: conversational interactivity, partner identity & role, vocal qualities. MA, Yang and Fung (2019) used the Big Five model to understand whether VAs personality affects how people perceive intelligence of Vas; their testers observed VAs

endowed with personalities more intelligent than the robotic one. There are still a few examples of how to design the personality of a VA. Spencer, Poggi and Gheerawo (2018) designed, through participatory design workshops, four personalities based on Jung (1954), Person and Mark (2001) archetypes. They define four main features: purpose and story, person, tone of voice, language. Lee, Lee and Lee (2017) show the results of workshops with groups of two users that play the human role and the VA role, using the Wizard of Oz approach. They found that if the VA role was acted in a cheerful and friend like users were funnier and more satisfied, even if the time to complete the tasks were longer. On the other hand, groups with introvert played VA had the best performance with a minimum level of communication. Ghosh and Pherwani (2015) observed the behaviour of assistants in real life. They collected data about communication styles, attitudes, language and nonverbal cues, strategies to face the boss mood. Then they selected nine personality attributes to generate three hypothetical personalities. This work is significant, but, according to the authors, is focused on the assumption that a VA could be only an assistant and must act mimicking those behaviours. Heudin (2015) designed an emotional metabolism that can manage personalities, moods and emotions into a multi-personality conversational agent. He experimented 12 personalities, some of them referring to characters of cinema. He claims and demonstrates that multi-personality agents work better than mono-dimensional ones preserving coherence. Finally, Braun, Mainz, Chadowitz, Pfleging and Alt (2019) propose to match the personalities of users and VA using Big Five models and experiment them into a real-world driving study. They designed four assistant personalities (friend, admirer, aunt, and butler) and their results show "higher likability and trust for assistants that correctly match the user's personality while we observed lower likability, trust, satisfaction, and usefulness for incorrectly matched personalities". The interesting part of this work is the use of a voice pre-recorded by an actress. In the literature review, the authors found some work about the characterization of the interfaces, starting, for example, from the work of gender analysis by Schnobelen (2016); Luria (2018) suggests three guidelines to design personal robots: reciprocity, affirmation and independence. These come from a review of 15 sidekick characters from popular books and movies. Literature analysis shows that there is still a little corpus of studies about the designing of the personality of interfaces in general. The authors also found that is not clear how to design the behaviours of a voice according to the users and the context, finally even if it is true that people consider VA as human-like there is still a design space to project an AI character giving to machines their characterization. According to these brand-new studies and previous experimentations, the authors want to explore the characterization of the interface and the concept of performing interfaces which is recently be claimed by Aylett, Cowan and Clark (2019), underling the differences between personality and characters. Therefore, considering personality aspects is now part of the design process but as Vas are considered human-like can they be considered as characters? Which elements besides personality are needed to design VA in this way?

3. Methodology and Workshop structure

The experimentation makes use of designed theatre workshops that aimed of showing and understanding the main features of a vocal interface and creating a grounded common language background between performers and designers. The workshops involved three professional actors, they currently work for theatre shows and film productions, they also recorded voice over for films. The elements of discrimination to choose them were: their experience in shows where the contact with the audience was much closer, for example in contexts without a stage and barriers between actor and audience; their work as teachers. We assumed that the closeness and direct interaction with the audience, greatly influences the character and generates sudden changes during the performance, then teachers of acting methods have experience in explaining all the facets of the theme. The three workshops with the individual actors lasted about three hours each, they took place at the authors' department, both the authors took written notes during the workshop. We chose not to record audio and video, except for brief moments related to performance examples, in order to avoid that the actors could perceive the workshop as a set. The first phase focused on the voice assistants currently available on the market; the goal was to: verify the actors' knowledge of the interfaces; acquire familiarization with them; investigate their use; test the other devices they were not aware of; collect their perceptions on the voice assistants asking them which were the main perceived parameters and if they found the features of a character designed as such. The second phase concerned a critical analysis, in which the actors were asked to comment on three vocal interfaces chosen among the many present in the cinema (Samantha in Her, HAl9000 in 2001: A Space Odyssey, the episode White Christmas taken from the Black Mirror Series). The aim was a deeper understanding of how a cinematographic interpretation of an AI was designed and realized and to trigger a dialogue on character building. The third phase mixed elements typical of the semi-structured interview and the performance. The actors were asked to explain not only the main factors that allow to characterize a character during the performance, but also the developing method itself across different steps. This framework could also be useful not only in the preliminary phase, as in this paper, but it could be also used for concept generation and validation. In fact, the general goal is to better understand how performing a character is different from considering personality as seen in literature, in order to obtain other parameters to integrate into the design process.

4. Results

During the first phase all the actors confirmed that they know at least one of the vocal assistants, but they do not own them as speakers. One uses Siri on iPhone weekly, one Google Assistant daily, one Google Assistant only in particular situations (i.e. driving). The actor using Siri started to do it after a random event. During the rehearsals, Siri started talking without anyone wanting to do it. From that moment, Siri was used as a character on

stage as a disturbing and surreal element. All actors previously seen Alexa at work, none of them ever interacted or listened to Cortana's voice. In order to demonstrate how the four VAs work, the actors could freely talk to the assistants for few minutes. Then actors asked to the VAs to tell a fairy tale and sing a song. This choice allowed the actors to listen to two possible uses of the voice closer to their context. For all four cases the actors were asked to evaluate the vocal assistants according to the criteria of verisimilitude, and the parameters associated with the voice that were more evident to them. The comparison with the parameters is based on the literature and includes tone, timbre, pitch, rhythm, intonation, accent, prosodic elements. The three actors recognized as plausible Siri and Alexa, praising the quality of Alexa's voice, while judging the sound quality of Google Assistant and Cortana as still “too raw” and “robotic old school”. Judgements about the characteristics of the voice were: "always UP", "always ready and enthusiastic", "ringing". It should also be pointed out that one actor emphasized that all these characteristics reinforced negative stereotypes related to female gender. The three female voices were also defined as the mirror of current technology. According to the actors, it seems that the voice that represents the intelligence of the machines has that particular timbre. The reaction in front of the fairy tales and songs of all three actors was of "amazement", "makes you smile", "could be used as a pastime". Vocal assistants told: a text about punctuation (Google Assistant); the little mermaid (Alexa, NB with sounds and accompanying effects); the fox and the grape (Cortana); Siri avoided answering. By repeating the experiment, some of the VA can change behaviours, Cortana sometimes answers similarly to Siri and Google Assistant, telling their own story. The actors highlighted that this might contribute to the construction of VA back-story. The songs, instead, have been an element of debate, especially about Cortana (Italian anthem) and Alexa (Il canto dell'addio). The actors expected that VA would use a tone modulation effect, called vocoder, and that they could not keep up with the rhythm of the song. But voices and rhythm were not distorted, so actors assumed that a speaker recorded the songs ad hoc. Google Assistant's voice, instead, collides with the actors' expectations because it sings nonsense lyrics; while Siri refuse to sing and after some insistence provides a spoken version of the song “Nel blu dipinto di Blu”. The songs provided more elements on the analysis of the parameters of the voices, i.e. the rhythm, the cadence and the tails of the vowels. The rhythm is perceived by the actors as "broken", "not fluid", especially when the period becomes very long. In their opinion this depends on a cadence that is not yet fully characterized, but above all on the vowels cut in the length at the end of the words. If, in fact, the addition of some pauses and hesitations, such as "ehm", recalled probable human behaviour, one actor pointed out that the word can be pronounced more or less quickly, but very rarely is cut off sharply. The question at the end of the first part concerned the perception of a designed character in VAs. In this case all the three disagreed, pointing out the total lack of acting and of typical aspects of the character, defining the interfaces as "generalist", "average", "not at all prone to make the interlocutor emotional", "distant, though always cheerful and available". When asked to compare their comments to the personality classifications found in literature, actors agreed on their utility, but they pointed out that personality is not "rock-hard", it has to be declined in every single line and actions;

so, it is not possible to apply personality just to a question-answer, but it needs more connotation as a whole character. They underlined that a character needs more psychological elements – personality is just one of them –, physiological and sociological features in a complex way. The second phase was dedicated to the analysis of three videos that clearly show the interactions with artificial intelligence. The beginning of this phase was dedicated to watching some part of films in English and Italian language. The first sentence that all the actors uttered was almost identical "this is acting", "we are talking about something else", "it is not comparable". The actors underlined the strong interpretation highlighting the unbridgeable difference between actor and speaker. Although some subjects of actor and speaker courses of study are similar, actors are called to work with their whole body "in a holistic way", while speakers can work only on aspects of voice. Explaining better those concepts, actors focused both on the vocal emission through the body and its movements, and on the psychological aspects. They performed some lines showing how that interpretation could be generated by focusing on the invisible body of the actor, for example "even if you can't see the body of Scarlett Johansson (Samantha's voice in the film Her), you can perceive her posture, her gestures, you can hear her breathing". Two of the actors narrate, in fact, that in order to emit sounds in the theatre it is necessary to involve the whole body, that is used according to postures, movements and gestures to limit, amplify or modify the sounds, even stage costumes are taken as a cue to characterize the vocal emission. In the theatre, the psychology of the character is explored in an extremely detailed way and the indications are often metaphorical, "that sound must be yellow". Sentences that seem to recall Kandinsky's theories and that, however, could generate a common background language starting from design elements. All the actors agreed on another determinant factor of the acting: it can return the change in the psychology of the character. "You can understand what Hal9000 is becoming paying attention to how the interpretation is changing, the rhythm, the sound, how it plays between the mellifluous and reassuring register and the attitude of the one who hold your life in its hands". The voice reacts to the narrative, to the evolution of the characters during the whole time. One actor, commenting on the scene of Black Mirror, dwells on the fact that it is the man who tries to imitate, to impersonate the role of the machine, as if the machine now had a predetermined archetype. The third phase focused on two questions: how an actor builds the character to be performed on stage and how, once on stage, he modulates and manages everything he has studied. The answers were very different, many methods and schools of acting were mentioned and often the answers remained on a high level, the same about the voice parameters. Three phases emerge: study and construction of the character by themselves, adaptation of the character during the rehearsals with the director and the other actors, live performance. During the first one the answers have common traits when quoting the questions towards the character. This is a technique widely used in writing (Seger, 1990), whether it is dedicated to novels, films or theatre performances. It is an approach that can also be found in character design and concerns the exploration and research of the character, starting first with the written text analysis and then adding levels of depth on all possible aspects of the character's life and story. When a detail is not present in the text, the

actors reconstruct it. This serves to build the internal motivation, "the engine", the goal that will become increasingly evident on stage. The reconstructed elements will help the actor in shaping the character. On the basis of the text and the questions to the character, the actors declare to build "a scheme", "a grid" that includes all the elements, from the dominant emotions to the recursive gesture (e.g. of the hands) constructing a recognizable grammar of the body, from the parameters related to the voice to the relationship they will have with the other actors. The second example has been defined "the jazz grid" and is linked to the other two phases of rehearsal and live performance. The actor builds the character on a "reactive grid", with possible responses to other events. As in jazz improvisation, the interpretation becomes relational. The grid then responds to the input provided at that moment by the other actors, by the audience, by the context and by the environment whether real (in the street or in houses), or on stage. A clear distinction emerges between these two environments. Although the actors on stage claim to perceive very well how the audience is reacting, in situations without barriers the actor enters a direct relationship with the nearby audience and modulates the parameters of the grid by virtue of the audience's attitude. In these cases, they say that the range of variation of the parameters is much wider to better adapt, provoke, seek empathy with the audience.

5. Conclusions

The actors' vision was very much concerned with qualitative aspects of performance. Aspects not found in the literature and divergent ones appear in all three phases of the workshop, from the use of the whole body acting to generate the voice, to the need to build the psychological aspects of the character, starting from his relations and his story that evolves during the use. The lack of characterization of VA is highlighted, as a homologation on many aspects. Furthermore, some purely vocal aspects must be implemented, such as the final resonance of the vowels and a design of some distinctive features such as rhythm and cadence. It is difficult from the analysis of these workshops to draw precise variations in order to obtain immediate results applicable to the existing vocal interfaces. According to actors the project is missing, although the vocal instrument is at an advanced state of realization and their producers are exploring innovations such as emotional intelligence, which may not fill the aspects of emotional reaction. The three workshops, on the contrary, allowed the authors to glimpse what could be a road still little explored regarding the question: what is the character of technology, of artificial intelligence? Cinema and visual arts provided many answers designed to stimulate reflection, trigger discussion and provoke, but by now the technological tool is already present in our homes and in our habits. Personality aspects can be considered a starting point but, as actors pointed out, using only personality the risk is to obtain a homogenisation of the interfaces' behaviours. To create real emotional conversational VA, the next step should be the construction of a complex character able to react during the dialogue, according to the situation and the context. The contribution of design in this field can therefore be very methodological, if it integrates not

only actors for performance but also copywriters, psychologists and social science experts in a wider way.

6. Future Works

The presented work is part of a research project that will end with the design of an interface for a self-driven vehicle. The next step will therefore concern the definition of some possible characters that AI will be able to interpret in a well-defined context, the script writing and interpretation of the actors and the subsequent post-production actions that are still open questions.

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