Call Me by My Name: Exploring Roles of Sci-fi Voice Agents

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ABSTRACT

Voice Conversational Agents (VCAs) are increasingly becoming part of our daily life. Calling them by their names can solve more than just a problem of efficiency in interaction between users and VCAs, but also can cast them as actors capable of playing a role in a relationship. However, due to the immature state of the technology and its related services, such relationships between users and VCAs can be limited in practice. To broaden the scope in designing different relationships, this study explores VCAs depicted in sci-fi movies. Sci-fi is not purely based on fantasy, but also is a social reflection on technology, which in turn can inspire design researchers to understand and speculate the complexity of VCAs. Through community sourcing with sci-fi enthusiasts, 43 Sci-fi VCAs were

Figure 1: VCAs are shown in different forms across various Sci-fi movie scenarios.

deduced. A movie event was also organized to discuss the role of VCAs. Finally, this paper presents several possible design insights for designing the role of VCAs.

Human Role	
Physiology	
What does a role look like physically? (height, weight, gender, age, etc.)	
Sociological	
How does a role live in a society? (background, family, religion, etc.)	
Psychological	
How does a role behave? (attitude, complexes, etc.)	
Voive Agent Role	
Physical identity	
What does it sound and look? (gender, tone, pitch, form, etc.)	
Social identity	
How does it live with human and other agents? (given name, position, authority, etc.)	
Autonomous behaviour	
How does it express 'who I am'? (attitude, etc.)	

Figure 2: The comparisons between human role proposed by Egri and VCAs role proposed by this work.

[1]http://superflux.in/index.php/work/ friends-electric, a VCA help you to argue on the service call

INTRODUCTION

"*Hey, Alexa*", calling the Voice Conversational Agents (VCAs) by name has become natural and common in daily life. By interacting with VCAs, through names, users project a role on to them. Naming VCAs is not just for efficiency problem (of knowing who I am talking to). Philip van Allen [12] mentioned that projecting personality, roles, intentionality on to a non-living thing, can assist users to understand the autonomous behavior more easily. However, constructing a role for an intelligent agent can be complex. In drama theory, an image of a role can project not only predictable behaviors, attitudes, but also the relationship with others. When an user interacts with a VCA for a longer period, the role of the agent can evolve dynamically [3]. Although devices, such as the Amazon Echo, Google home, and Apple Siri, provide HCI (Human-computer interaction) a great opportunity to study actual relationships between users and VCAs [7]. Studying the VCAs in the field can be limited by incomplete services, and focus on the efficiency problems [6]. To envision different roles VCAs can play in our future everyday life, we need to broaden our scope to not only studying the currently available VCAs.

We conjectured that science fiction media could be a rich resource to broaden our scope on studying the VCAs. In the HCI literature, several researchers have studied sci-fi media for different purposes in HCI [4, 8]. There are also anecdotes in which sci-fi not only makes designers and engineers reflect on the limits and social impact of current technology, but also inspires ideas for its evolution. This study is a constructive design research [2] using multiple approaches to study VCAs depicted in sci-fi. We aimed to speculate possible roles of VCAs, and to provide design insights for VCA design.

RELATED WORK

Marenko and van Allen [5] proposed the animistic perspective for designing autonomous behavior, which can help users to understand responses from VCAs, or assist user in handling problems like the VCAs presented in *Our Friends Electric*[1]. However, designing the personality for a VCA is complicated. Sondergaard et al. [9] discuss the morality and responsibility of VCAs. They further hypothesizes that, an always active and positive VCA can lead users to easily accepting its suggestions, and thus ignoring potential risks. Moreover, designing a role for VCAs is not just to improve efficiency of interaction, but also to facilitate development of a relationship and trust with these agents [3]. Since a VCA can be characterized by its voice, accent and language, the user's understanding of its role, can become more sensitive, varied and political. A wider perspective is needed to better design the roles of VGAs.

Egri [1] defined three dimensions needed for human role construction, namely physiology, sociality, and psychology. In this work, we follow the concept of Egri's work and propose three dimensions for

	1st Crowd Sourcing	
Online Community	Aim	find suffficient movies (<60 yrs)
	Request	x human like
	Result	72 movies (total)
	2nd Crowd Sourcing	
	Aim	find suffficient movies (<60 yrs)
	Request	x human like
	Result	81 movies (total)
	3rd Crowd Sourcing	
	Aim	eliminate ambiguous types
	Request	x human like
		x creature like
		x auto mobile
	Result	50 movies (total)
Workshop	**4th Crowd Sourcing**	
	Aim	eliminate ambiguous types
	Request	x human like
		x creature like
		x auto mobile
		x alien like
	Result	31 movies (total)

Figure 3: Four iterations of crowd sourcing in this study

By the fourth iteration of the study, all creature/human like VCAs were eliminated. The study aimed to retain a set of VCAs, that would seem realistic and feasible to the users of present day. The final classification of the VCAs is depicted in Figure 6.

[2]https://www.imdb.com/

[3]PTT Bulletin Board System, https://www.ptt.cc/

roles of VCAs, namely *physical identity*, *social identity*, and *autonomous behaviour* (see Figure 2). The above three dimensions are proposed to better understand the characteristics of a VCAs' role. These dimensions alone, do not represent a framework for role construction. They can however be viewed as building blocks for such a future framework.

METHOD

Troiano et al. [11] collected sci-fi clips, by filtering on criteria such as keywords and ratings using IMDB[2]. These clips were viewed in a fast forward mode for further selection. Surowiecki [10] proposes that community sourcing can be a better data collection method, in terms of both efficiency and quality. Community sourcing enables capturing VCAs that could be an unnoticeable side role, and be filtered out by the platform. In addition, the community can bring along the collective knowledge and experience, thus improving the quality of collected data. The data collection method for this study is a combination of the aforementioned two approaches with some modifications.

Collecting a Movie List from the Community of Sci-fi Fans

For initial data collection, an online movie club was approached. This community uses a local online platform PTT[3]. PTT is a popular local online platform in Taiwan where only qualified members can discuss movies. Figure 3 shows the various steps employed by this research to work with the community to collaboratively refine the roles of sci-fi VCAs. Every iteration was performed for the duration of one week. The data contributors could submit their movies lists to the researchers via PTT posts. A table was created to collect the various forms of VCAs, which could be edited by both the contributors and researchers. The contributors were allowed to add new VCAs or to classify existing ones already listed in this table. The researchers inspected at regular intervals, to check whether new VCAs were added.

Hunting for Sci-fi VCAs - Movie Workshop

Based on the collected movie list, the researchers selected a shortlist of 50 movies containing potential VCAs. One difficulty that the researchers encountered was that the contributors were enthusiastic to suggest movie names, but were less willing to provide names and details of the VCAs. Without such details, it was difficult to determine whether a proposed VCA met the desired criterion. To gather more details about the VCAs, a workshop called 'Hunting for VCAs' was organized. In this event, the contributors watched selected sci-fi movies, then discussed the VCAs that they noticed in these movies. Twenty one participants aged between 24-40 years old participated in the workshop. There were a mix of designers, engineers and performers. With such interdisciplinary groups, participants could contribute different perspectives to the discussion. During the workshop, two facilitators hosted

Figure 4: Details of Workshop

(1) Introduction: Facilitator introduced the desired criterion of VCAs by showing different examples. In order to distinguish between robots and VGAs, a criterion is that the VCAs should appear with everyday objects or only by voices.

(2) Hunting for VCAs: Participants were asked to bring their personal laptop, and to co-edit an online table. While watching movies, participants contributed the VCAs clips by filling in the time stamps, VCAs' names, types, and brief descriptions of scenarios.

(3) Interpretation: After watching movies, participants received a VCA Resume form to describe about the VCAs that they have collected.

(4) Focus Group: Participants were distributed into a smaller group (5-6 people). In each group, one facilitator host the discussion with participants. Through sharing VCAs' resumes and clips, participants and facilitators discussed possible design implication or scenarios for the future.

four sessions, see Figure 4 for details of the workshop. After the workshop, participants and researchers together selected 31 movies, and 43 sci-fi VCAs.

PRELIMINARY RESULTS AND FINDINGS

Most Sci-fi VCAs used a human-like language, thus allowing participants to instinctively project a human-like role on a Sci-fi VCA. During the workshop (see Figure 4), participants were enthusiastic to speculate the role of Sci-fi VCAs beyond the scope of details presented in the movies. We started by sorting participants' role interpretations into a table shown in the Figure 5 based on the three dimensions proposed in Figure 2.

As shown in the Figure 5, role formation can be complex. The attributes such as job positions or attitudes can be used to describe the role of a VCA. For example, participants used job positions to express the VCA's functionality and the hierarchy between agent and user, which indicates an agent's autonomy. Participants could deduce the intention of an agent's decision based on its attitude.

VCAs were also observed exhibiting changes in behavior during the movie. With such variations, the role of Sci-fi VCAs becomes more complex. To better understand such dynamic role projections and relationships between an user and an agent, we further formulated a metric, the details of which can be seen in Figure 7.

Figure 5 presents 11 of the 43 Sci-fi VCAs. After reviewing these results, we reflected on the roles of VCAs and their corresponding movie clips. The following presents the possible implications of deploying 'roles of VCAs' into the voice conversational agent design.

Projecting User Intention Using Pet-name

Single VCAs can switch behavior if an user calls them by a pet-name, or in a nickname of endearment. By different pet-names, sci-fi VCAs can understand a user's intention. Taking [V2] as an example, if a user called VCAs 'sweetie', it indicates that he/she is in a good mood. In contrast, calling VCAs by its full name indicates a serious situation. In future applications, VCAs design should incorporate a better capacity to understand user intention, this could be for example, learning multiple terms or names by which a user could address the VCAs. In an environment with multiple users, the design of a VCA should also consider the ability to distinguish between various users.

Building Trust by Giving VCAs a Name / a Role

Some VCAs do not have a name in the beginning. After a period of interaction, VCAs earn the right to names from the user, such as [V1]. Some users may not trust the VCAs to begin with, and VCAs may not trust users either [V7]. After interactions, they build trust on each other and even build stronger bond [V6]. In future applications, there can be an adaptation period for VCAs and users. Users do not need to name VCAs immediately. By doing so the users and VCAs are afforded some flexibility. Users

Movie List			Default Physical ID		The start of the Movie					The End of the Movie			
					Social ID		Autonomous Behavior	Speculative Role		Social ID		Autonomous Behavior	Speculative Role
No	Origin	Year	Form	Sex	Name	Job Position	Attitude	(attitude, position) *		New Name Acquired	Job Position	Attitude	(attitude, position) *	
V1	Spider-Man: Homecoming	2017	Suit	F	Suit lady	Combat Assistant	Polite, Responsive "would you"; "good morning, peter"	supervisor	(1, 0)	Karen	-	Supportive "kiss her"	friend	(0, 1)
V2	Hers	2013	Phone	F	Samantha	Information Assistant	Humorous, Easygoing "Hi Hi!"; "I'm here"	friend	(0, 1)	Sweetie	-	Emotional "sweet heart" "Fuck you! (cry)"	lover	(0, 2)
V3	Hers	2013	Non	M	Unknown	Salesman	Polite, Responsive "Welcome, Mr. Theadore."	subordinate	(-1, 0)	-	-	Impatient "thank you" [interrupt]		(-1, -1)
V4	Wall-E	2008	Monitor	F	Computer	Dictionary	Polite, Obedient	subordinate	(-1, 0)	-	-	-	subordinate	(-1, 0)
V5	Wall-E	2008	Ship's wheel	M	Auto	Space Ship Crew	Neutral, Responsive "Negative";"Positive"	colleague	(0, 0)	-	Commander "No"	-		(-1, -2)
V6	Srealth	2008	Air plane	M	Edi	Flying Officer	Rebellious, Cocky "Leave me alone"	enemy	(0, -2)	Tinman the first	Combat Partner	Faithful, "…" [playing background music for itself]	friend	(0, 1)
V7	2001: A Space Odyssey	1968	Camera	M	Hal9000	Space Ship Crew	Calm, Superior "Yes, Dave?"; "Certainly"		(1, -1)	-	Commander "I cannot allow you"	-	devil	(2, -2)
V8	Iron man 1,2,3	2008 2014	Non	M	Jarvis	Combat Partner	Obedient "yes, sir."	follower	(-1, 1)	-	-	Suggestive "Sir, take a deep breath"	friend	(0, 1)
V9	Infinity Chamber	2016	Non	M	Howard	Prison Officer	Disingenuous, Humorous "Gotcha."; "Hey Frank!"	boss	(2, 0)	-	Prisoner "can you..?"	Emotional, Doubting "why(sad)"	friend	(0, 1)
V10	On the Red Planet	2000	Non	F	Lucille	Space Ship Assistant	Neutral, Steady "checked"	colleague	(0, 0)	-	-	-	colleague	(0, 0)
V11	Moon	2009	Monitor	M	Gerty	Space Station Administrator	Steady, Supportive "ok, Sam"; "can I help you?"	supervisor	(1, 0)	-	Escape Advisor	-	friend	(0, 1)

Figure 5: This figure shows 11 of the 43 VCAs and the complete list is shown in the following link: https://goo.gl/T6gLgW. Furthermore, we use the metric with two attributes (attitude and job position) to elaborate the details of VCAs' speculative roles (indicated by *) in Figure 7.

Types	Definition
Human-like	It can be recognized as a human, no matter it is physical or digital.
Creature-like	It can move by itself, and looks like a creature.
Object-like	It cannot move freely by itself, and it is a single everyday object.
Non (voice only)	It may show via multiple objects, but no any object can represent it.

Figure 6: This work classified four types of VCAs, including "Human-like", "Creature-like", "Object-like", and "Non (voice only)".

can begin by building an understanding of VCAs, and finally name it to change the VCAs role into that of a personal partner.

Reducing User's Load of Cognition by Multiple Roles

[V4] and [V5] function in the same location, but occupy differing hierarchical positions in their roles. To the VCAs with lower hierarchical positions, the user can naturally give very simple and precise commands, whereas user tends to use more formal expressions to interact with a VCA holding a higher hierarchy. In the future, there can be multiple VCAs in the same environment. Future VCAs design should provide features where the agent can play multiple roles, thus reducing the cognitive load for the users to easily react with suitable commands or instructions. The VCAs design must also be capable of determining if the user is interacting with it or another VCA in the same location.
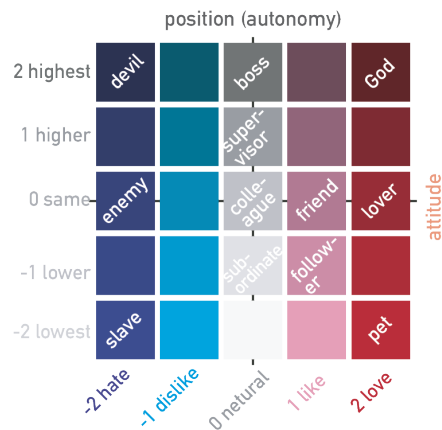
Figure 7: Metric for Speculative role

Autonomy and attitude can also be two potential attributes for future role building frameworks. For example, "Yes, sir" and "Gotcha!" represent differing levels of autonomy, whereas their job positions can be different. However, even speaking the same sentence, attitude can change user's perception from being offensive to friendly and supportive. For example, "Gotcha" spoken in a cordial manner indicates a supportive agent, whereas the same expression when spoken with a sarcastic tone, can imply an underlying tension in the relationship. Based on this insight, we speculate possible roles of VCAs by such metrics.

Playing a Negative Role is Necessary

In some dangerous situations, [V8], [V11], [V9] switch to a negative attitudes, which can be sharp, quick, offensive responses, to make user quickly aware of the level of emergency. On the contrary, [V10] is too polite to notify the fire emergency, and thus it leads user to a dangerous situation. In future implications, the negative role can not only be a good way to notify the level of danger, but also make the user more attentive to the advice of the device or machine.

CONCLUSION

This study illustrates that sci-fi movies can be a rich resource for studying on how VCAs interact with people. Through several iterations, 43 VCAs depicted as everyday devices have been identified and characterized, via the process of design speculation on the roles of VCAs. Finally, we present several insights for designing VCAs in the future. Future research includes developing the framework for the role of VCAs, and designing VCAs with specific roles to be studied in the real world. The limitation of this research is the scope of sci-fi media. Due to the specific community we selected and the limitation of language, our sci-fi VCAs are mostly from American sci-fi, as well as some Japanese and Cantonese sci-fi. Sci-fi VCAs from other regions might offer very interesting insights. Future research can clearly explore further on other sources of sci-fi media.

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