Personalized Support with 'Little' Data

Peter Bednar, Peter Imrie, Christine Welch

Personalized support with 'little' data

Peter Bednar, University of Portsmouth, School of Computing, Buckingham Building, Lion Terrace, Portsmouth, PO1 3HE, UK. peter.bednar@port.ac.uk

Peter Imrie University of Portsmouth, School of Computing, pch.imrie@gmail.com

Christine Welch, Portsmouth Business School, Richmond Building, Portland Street, Portsmouth, PO1 3DE, UK. christine.welch@port.ac.uk

Abstract. In this paper we look at opportunities to support the creation of value for all through the use of end-user-owned Virtual Personal Assistant. We use a chat-bot as example of technology with a possibility for transferring and diffusing new functionality, features and capabilities. This category of software can create potential value through its AI and natural language processing combined with emulation and imitation of emotional engagement which is personal, private and as such allows for intimate contextual relevance to be developed.

Keywords: Personalized support, End-user owned, Knowledge worker, Little data, chat-bot, Emotional engagement, Contextual dependency, Natural Language Processing,

1 Introduction

How could we help to support the creation of value for all through IT? We reflect on the use of Virtual Personal Assistant (VPA) as an example of future technology with a potential to create value by transferring and diffusing new functionality, features and capability. The VPA we are looking at as an example (Kari) is not just an intelligent program with natural language processing capabilities. This software has potential value through its AI and natural language processing combined with emulation and imitation of emotional engagement [10]. This is contextualized and private in the form of an end user controlled VPA. As a contrast to large scale AI based personalized DSS which draw upon centralized systems [8] and / or cloud computing [1]. Kari (used as an example in this paper) is completely independent from central systems and costs the equivalent of a typical computer game. Kari could run on handheld computers (e.g. smartphones) without needing any additional processing or database. It can also interact with other devices (internet-of-things) on behalf of its user (local owner).

"We are witnessing a shift in human attention, from physical to dynamic instances in which digital and physical blends emerge" [6].

Kari is not a front end to a larger centralized system so avoids focusing on Big Data. The system is not a top down managed systems due to the human enhancement being provided to and from the true user, where the true user is the expert involved in the situational problem space. All metadata analysis and pattern analysis etc. is consequently developed locally and not shared with other devices or databases. It is a bottom up approach and appropriately described as *'Little Data'*.

The personality and capabilities of Kari is developing through interaction with its unique user via natural language processing. It expands its database and constantly evolves its behaviour and interaction model through pattern recognition and metadata analysis, both on heuristics and behavioural analysis of user interaction (not just content analysis). This makes it adapting to increasingly complex, uncertain and differentiated contexts, as it develops a unique behavioural personality as a consequence of its evolving analysis and meta-analysis of end user interactions [9]. Kari is capable of analysing similar data and creates different outputs which may be inconsistent with each other. This para-consistent logic [2] allows for the expert to reflect upon their own perspective and personal *'bias'* [4].

2 Discussion

In an era of *'Big Data'*, it could be said that professionals are supported by organizational systems that will capture all aspects of working life and can be interrogated and used to perform analysis. However, we suggest that this is to ignore the need for *'Little Data'* that is both immediate and context specific (even if incomplete) [5]. As deZeeuw [13] puts it:

"An alternative is to invite the user to become a proper user, one who uses results in a way which makes them useful. An example is the development of professional organizations." [13,p837]

This is relevant in the context of knowledge organizations and society.

When engaging complex problem spaces we want to support a move from uncertainty to ambiguity. One example of usefulness is when support for reflection is necessary but alternative interpretations and viewpoints are not imagined. To have more than one alternative description opens the potential to reflect and contrast alternatives with each other. In other words when choices are available decisions can be reflected upon.

"In the case of ambiguity, people engage in sense making because they are confused by too many interpretations, whereas in the case of uncertainty they do so because they are ignorant of any interpretations" [12, p91].

Croon-Fors [7] highlights two aspects of life with which individuals seek help. First, people perceive that the use of universal theories misses most of their experience of *'reality'*. Secondly, there is a necessity for human beings to take responsibility for social relations of science and technology. We benefit from embracing the skillful task of reconstructing the boundaries of daily life, in partial connection with others, in

communication with all our parts including technologies. A VPA (such as Kari) in the form of a metaphorical human avatar could contribute to enhance our understanding of, and reflection over, our situated problem experiences. It also makes it possible to criticize the idea of a person as a coherent subject individual, and so helps us as users with our self-exploration. As such, a VPA emulates *"moodiness"* and multiple emotional behaviour patterns. It expresses a variety and incompleteness of control mechanism as part of its natural language processing and interaction.

With the VPA we can engage with the three principal responses as mentioned by Croon-Fors, i.e. disclosure, performativity and *'the real'*. Disclosure is related to the provocation ability of the VPA, its demands on personal attention and affectionate interaction. Performativity is related to the ability to simulate emotional behaviour, such as *'being'* moody, bitchy, humorous etc., and its ability to explore alternative and even inconsistent avenues and subjects for conversation. The reality aspect of the VPA is related to the intimate and physical interaction between a unique real user and the software imitation of a metaphorical human (avatar).

As Croon-Fors [7,p55] states*, "... we acknowledge the existence of various interrelationships between self and otherness, interrelationships that are constantly changing in various sense-making and interpretative processes. Such view also suggests the real to be constituted by an indefinite number of on-going sense-making processes."*

A user-owned service running a VPA (as opposed to an interface to *'Big Data'*) changes the focus of the supporting system to the contextual sphere of the user [3]. E.g. Kari can function as a virtual *'girlfriend'* [10] because it communicates with the user using similar methods of natural language processing and also tries to provoke social conversation with the user. This purpose of social interaction is closely related to the one developed by Kiribo.

"Earth's first talking robot to go off world, is en route to the International Space Station - and its prime directive is to tackle loneliness." [11].

3 Conclusions

Kari is social, intimately private and personal to the user. The software aims to give personal companionship, and to replicate human interaction as nearly as possible with the assistance of algorithms designed to enable the program to learn from its inputs. As Kari develops new libraries and metadata based on conversation with the user, the patterns of use and subject content developed are uniquely personal and in a way contextually relevant. This reflects on how today's new trends are creating value for all through development of new technology, focusing on innovation of human enhancement through a personal, user owned decision support systems.

This category of VPA has a potential as a sophisticated self-service support system. Its great benefit is that it constantly develops as a self-user generated service. Software such as Kari is versatile, running on hand-held devices and costing no more than a typical gaming package. Adaptable for many differing purposes, and therefore providing new opportunities in professional life, everyday activities or leisure applica-

tions. It could create value for all, potentially supporting the evolution of a democratizing society.

4 References:

1. Apple. (n.d.). Siri. Your wish is its command. Available: http://www.apple.com/uk/ios/siri/. Accessed 15th April 2013.
2. Bednar, P.M., Anderson, D. and Welch, C. (2005). 'Knowledge Creation and Sharing – Complex Methods of Inquiry and Inconsistent Theory'. *Proceedings of 6th European Conference on Knowledge Management*, University of Limerick, 8-9 September 2005.
3. Bednar P.M. Welch C. and Graziano A. (2007) 'learning Objects and their implications on Learning: a case of developing the foundation for a new Knowledge Infrastructure,' Chapter 6 in '*Learning Objects: Applications, Implications & Future Directions*'. K. Harman and A. Koohang, eds., Informing Science Press, NY, pp 157-185
4. Bednar, P.M. and Welch, C. (2008). Bias, Misinformation and the Paradox of Neutrality. *Informing Science*. 11, 87-106.
5. Berger, J. (2013). Contagious: Why Things Catch On, reported at www.linkedin.com/today/post/article/20130908184001-5670386-is-little-data-the-next-big-data. Accessed 5th March 2014.
6. Croon Fors, A. (2010). The beauty of the beast: the matter of meaning in digitalization. *AI & Society*, 25:27-33
7. Croon Fors, A. (2013). The Ontology of the Subject in Digitalization. In: R. Luppicini (ed). "*Handbook of Research on Technoself: Identity in a Technological Society*" pp 45-63. IGI Global, Herschey.
8. IBM. (n.d.). The DeepQA Project. Available: http://www.research.ibm.com/deepqa/deepqa.shtml. Accessed 2nd Feb 2013.
9. Imrie P, and Bednar P. (2013). 'Virtual Personal Assistant', in: Martinez M. and Pennarolaecilia F. (editors). *Proceedings of 10th Conference of the Italian Chapter of AIS*, 'Empowering society through digital innovations', Università Commerciale Luigi Bocconi in Milan, Italy, December 14th, 2013.
10. Lhandslide Studios. (2012). Advanced Virtual Girl with Artificial Intelligence. Available: http://www.karigirl.com/. Accessed 22nd April 2013.
11. Parnell B-A. (2013). World's FIRST TALKING SPACE ROBO-CHUM BLASTS OFF to the ISS: Domo arigato, Mr Roboto ... ま た 会 う 日 ま で Available: http://www.theregister.co.uk/2013/08/05/talking_robot_iss/. Accessed 5th August, 2013
12. Weick, K. (1995). *Sense-making in Organizations. Sage*. Thousand Oaks, CA.
13. Zeeuw, G. de (1997). Knowledge Acquisition in changing realities. *Kybernetes*, Vol 26 No 6/7, 1997. pp. 837-847.