Computational Models of Argument H. Prakken et al. (Eds.) © 2020 The authors and IOS Press. This article is published online with Open Access by IOS Press and distributed under the terms of the Creative Commons Attribution Non-Commercial License 4.0 (CC BY-NC 4.0). doi:10.3233/FAIA200539

Implementing Argument and Explanation Schemes in Dialogue

Isabel SASSOON^{a,1}, Nadin KOKCIYAN^b, Martin CHAPMAN^c, Elizabeth SKLAR^e, Vasa CURCIN^c, Sanjay MODGIL^c, and Simon PARSONS^d

^aDepartment of Computer Science, Brunel University London
^bSchool of Informatics, University of Edinburgh
^cDepartment of Informatics, King's College London
^dSchool of Computer Science, University of Lincoln
^eLincoln Institute for Agri-Food Technology, University of Lincoln

Keywords. Argumentation Schemes, Explanation, Dialogue

In this demo paper we outline the implementation of argumentation schemes within the CONSULT mobile application [1]. We illustrate it through a specialised argumentation scheme that supports the generation of Blood Pressure (BP) alerts within the CONSULT self management process. The scheme not only creates alerts when required but also supports the explanation of the alert to the user. The thresholds that dictate whether a user should be alerted about their BP reading are outlined in NICE guidelines CG127 [3]. The approach to structuring the explanation templates is based on our previous work [2,5]. This was part of the CONSULT mobile application version that was piloted in January 2020 in a 7 day pilot study involving 6 healthy volunteers.

Table 1. Argument scheme fo	blood pressure measurements
-----------------------------	-----------------------------

AS for BP	
premise - If mean blood pressure M is higher than 140, High Blood Pressure can be inferred	
premise - M is higher than 140	
therefore : High blood pressure (hbp) is inferred	

The argument scheme and dialogue implementation. This demo shows how a new BP measurement taken by the user is processed, and an alert is triggered depending on the value. This processing involves the instantiation of an argumentation scheme, ASBP [4], as outlined in Table 1. Depending on the instantiation, an alert may or may not be generated. For example, an explanation for an amber alert is constructed according to the explanation template e_1 , represented as $e_1 = \langle ASBP, "The systolic measurement of the patient {P} is {S}, this value is less than 150 and more than 134 and therefore an Amber flag is raised." The textual explanation includes variables (P and S) shown in brackets, which are the patient id and the systolic BP respectively. These variables will be replaced by actual values as a result of the instantiation of the ASBP scheme.$

¹Corresponding Author: Department of Computer Science, Brunel University London, United Kingdom.; E-mail: isabel.sassoon@brunel.ac.uk

	Connie BOT 4:19 PM
	Hi, it looks like your latest blood pressure reading is a bit higher than expected. Do you think this could be because you are under pressure or stressed?
CONSU ¹ 2→@ VO.1.0	Yes No I am not sure
Slightly high	Connie BOT 4:19 PM
Blood Pressure 142 / 86 mmHG 2016 4:10 2016 4:10 2016 4:00 2016 4:	This could explain the latest reading. If you think that stress is making your blood pressure readings a bit higher than expected have you considered some stress reduction tactics or techniques? (point to NLS Choices for stress reduction http://tress-anweige- depression/understanding-stress/). Would you like to know more about this aler?
ECG A	Yes No Image: connic isor 4.20 PM
149897 samples 2018-07-12 15:06:29.94 2019-08-29 19:37:14 Source: Clinic Source: Home	The systolic measurement of the patient p4b780120_8892_11ea_a12(_077c24a4a750 is 142. This value is less than 150 and more than 134; therefore, an amber flag is raised.
(a) Dashboard Alert	(b) Chatbot interaction

Figure 1. Alert in the CONSULT Dashboard and the Alert Dialogue in the Chatbot

If an argument in support of an alert is generated, this is seen by the user as an 'Amber' or 'Red' shading of the BP box as depicted in Figure 1a. Furthermore, this alert is written out in detail in the BP specific tab of the CONSULT mobile application as a graph. This alert also triggers a new dialogue in the CONSULT chatbot, where a textual explanation about the alerts is provided (see Figure 1b).

Scenario. The screenshots illustrate a scenario in which a user's latest systolic BP measurement is 142. This is considered as an Amber alert for Stage I Hypertension. In this case, the instantiation of ASBP results in an argument inferring high blood pressure. Then the argumentation engine instantiates the corresponding explanation template e_1 and constructs the following explanation: "The systolic measurement of the patient is 142, this value is less than 150 and more than 134 and therefore an Amber flag is raised". This explanation is displayed as part of the dialogue when the user enquires as to why this alert has been raised by interacting with the CONSULT chatbot (Figure 1b).

Acknowledgements. This research was supported by the UK Engineering & Physical Sciences Research Council (EPSRC) under grant #EP/P010105/1.

References

- N. Kökciyan, M. Chapman, P. Balatsoukas, I. Sassoon, K. Essers, M. Ashworth, V. Curcin, S. Modgil, S. Parsons, and E. Sklar. A collaborative decision support tool for managing chronic conditions. In *MEDINFO 2019: Health and Wellbeing e-Networks for All*, volume 264, pages 644–648, 2019.
- [2] N. Kökciyan, S. Parsons, I. Sassoon, E. Sklar, and S. Modgil. An argumentation-based approach to generate domain-specific explanations. In *European Conference on Multiagent Systems*, 2020. in press.
- [3] National Institute for Health and Care Excellence (NICE). Hypertension in adults: diagnosis and management cg127, 2011. https://www.nice.org.uk/guidance/cg127.
- [4] I. Sassoon, N. Kokciyan, S. Parsons, and E. Sklar. Towards the use of commitments in multi-agent decision support systems. In *The International Workshop on Dialogue, Explanation and Argumentation* in Human-Agent Interaction (DEXAHAI), 12 2018.
- [5] I. Sassoon, N. Kökciyan, E. Sklar, and S. Parsons. Explainable argumentation for wellness consultation. In *International Workshop on Explainable, Transparent Autonomous Agents and Multi-Agent Systems*, pages 186–202. Springer, 2019.