

Implementing Argument and Explanation Schemes in Dialogue

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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 for blood pressure measurements

AS for BP
<i>premise</i> - If mean blood pressure M is higher than 140, High Blood Pressure can be inferred
<i>premise</i> - M is higher than 140
<i>therefore</i> : 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 $e_1 = \langle ASBP, \text{“The systolic measurement of the patient } \{P\} \text{ is } \{S\}, \text{ this value is less than 150 and more than 134 and therefore an Amber flag is raised.”} \rangle$. 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.

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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).

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