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Group H14

Assignment 6: Developing a support model

Question #1

- ❖ Given this information regarding the system, create your own support model that this system uses. It should decide whether sending a message is appropriate. Give a graphical representation of your support model similar to Figure 1 using either forward or backward reasoning (20 points). Hint: the text above describes the support actions that extend the original domain model as is depicted in Figure 1. It might help to first create the "domain model extended with support actions", and then the "support model" based on this. Describe what choices you made in creating this model and whether (and why) it uses forward or backward reasoning (5 points). Formalize your relations in semi-formal notation (10 points).
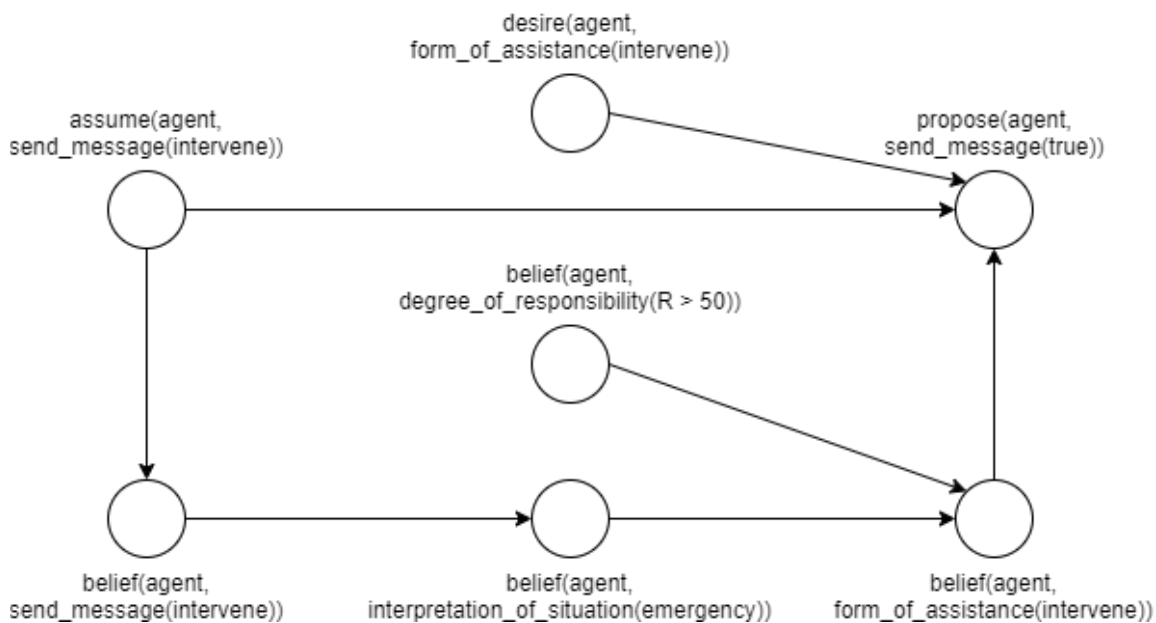

Figure 1.0 Forwards support model

IF ambient agent X assumes that message to 'intervene' has been sent
AND ambient agent X believes that agent has a form of assistance, 'intervene'
AND ambient agent X desires that agent's form of assistance is 'intervene' | Time Step T
     THEN ambient agent X proposes to send a message to 'intervene' | Time Step T + 1

IF ambient agent X believes that message to 'intervene' has been sent | Time Step T
     THEN ambient agent X believes that agent has an interpretation of the situation, 'emergency'
     | Time Step T + 1

IF ambient agent X believes that agent has an interpretation of the situation, 'emergency'
AND ambient agent X believes that agent has a degree of responsibility of R > 50 | Time Step T
     THEN ambient agent X believes that agent has a form of assistance, 'intervene' | Time Step T + 1

IF ambient agent X assumes that message to 'intervene' has been sent | Time Step T
     THEN ambient agent X believes that message to 'intervene' has been sent | Time Step T + 1

Unfortunately, the forward support model goes through all of the rules, which takes more space and time. However, because it evaluates all the rules, it is able to draw a number of conclusions. The process is evaluated by the assumed action to the desired effect, based on the reasoning from the beliefs. As shown, in Figure 1.0 the forward support model starts from the assumed send_message, which is then supported by the action of proposing send_message. The main outcome of this model is thus that ambient agent X believes that some variable will affect another variable.

Question #2
    ❖ Create a second support model. This time use the form of reasoning that was NOT used in your previous model. For this model also create a graphical notation (20 point), semi-formal relations (10 points) and explain your choices made and the reasoning technique that is used (5 points).
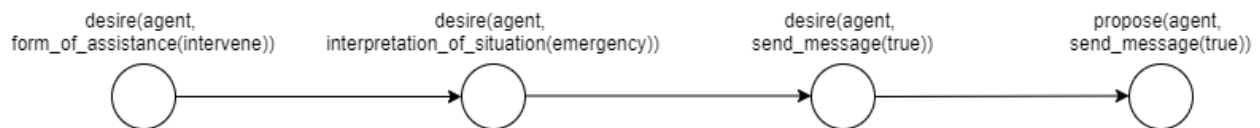

Figure 1.1 Backwards support model

IF ambient agent X desires that agent has a form of assistance, 'intervene' | Time Step T
     THEN ambient agent X desires that agent A's interpretation of the situation as 'emergency'
     | Time Step T + 1

IF ambient agent X desires that agent has an interpretation of the situation, 'emergency' | Time Step T
     THEN ambient agent X desires that the message has been sent | Time Step T + 1

IF ambient agent X desires that agent receives a message to intervene | Time Step T
     THEN ambient agent X proposes that the message has been sent | Time Step T + 1

The backwards model is relevantly short and simple, in comparison to the forward model. The backward model uses the desired state to extend it to the other desired states that lead to the supported action. As shown, in Figure 1.1 the backwards support model starts from the desire to form_of_assistance, which is then supported by the action of proposing send_message. In the end the model displays a relationship that can state that the ambient agent X desires that some variable affects another variable. In comparison, to the forwards model the backwards model uses less time and space to get to its conclusion.

Question #3
    ❖ Choose one of the support models and implement this one in Matlab-L2. Provide a scenario that shows how the system reasons whether the action "sending a message" be proposed (30 points).

https://drive.google.com/file/d/157LLBZM1Xoh4QFbBkiMfLOKwUAcBDPjy/view?usp=sharing