Resit exam Dynamic Modelling for Human-centered Systems

June 8, 2022, 18:45

Instructions

This exam consists of 20 multiple choice questions. There is one correct answer per question. Read the questions below and write the correct answer *on the answer sheet*. Do not write additional text on the answer sheet.

Questions

1. Which task is relevant in the conceptualization phase of creating a model?
   A. Choosing between a numerical and logic representation.
   B. Formulating expectations about the model behavior.
   C. Defining the calculation rules between model concepts.
   D. Evaluating the simulation results.

2. A *limited growth* function can be formalized as
   $Amount(t+\Delta t) = Amount(t) + \alpha * ((C - Amount(t)) / C)$
   What is the maximum value that the concept Amount could reach?
   A. 1
   B. 10
   C. C
   D. Amount(t)

3. Choose the right word to fill in at the blank. 'The model of a Aplysia sea hare is a model at the _____ level?'
   A. cognitive
   B. collective
   C. experimental
   D. physiological

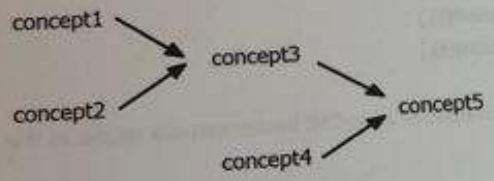
4. What is the role of a "characteristic patterns" in model development?
   A. They are meant to evaluate whether the model behaves as expected.
   B. They help to classify different models.
   C. They determine the relations between concepts.
   D. They provide a summary of the function of the model.

5. Which of the following sentences is <u>not</u> a correct formulation of a *characteristic pattern* for the model of the Aplysia sea hare?
   A. When touching the syphon several times, the synapse strength between the *sensory_neuron_2* and the *motor_neuron* is increasing.
   B. Initially a contraction occurs after a tail shock, but there is no reaction upon a siphon touch.
   C. After a training period of a number of trials (each of a siphon touch followed by a tail shock), contraction will take place after any siphon touch.
   D. During a training period (several siphon touches followed by a tail shock) the strength of the synapse increases and eventually reaches a maximal strength.

6. Which of the following statements does not hold for the model of honey bees?
   A. Over time, bees are less willing to do tasks that they did not do often.
   B. Concepts at behavioral level influence concepts at the collective level.
   C. Every bee is in principle able to do every task.
   D. Bees always choose the task that is most urgent.

7. There are two approaches for modelling social processes, e.g. the spread of a disease in a society. Which sentence is correct?
   A. The names of the two approaches are population-based and individual-based; an advantage of a population-based approach is that it allows to model larger societies.
   B. The names of the two approaches are **population-based** and **individual-based**; a disadvantage of an population-based approach is that it is computationally more intensive.
   C. The names of the two approaches are **collective-level** and **behavioral-level**; an advantage of a collective-level approach is that it is computationally more efficient.
   D. The names of the two approaches are **collective-level** and **behavioral-level**; an advantage of a behavioral-level approach is that it can be used for different types of behavior.

8. This picture provides a schematic illustration of the BDI model. Choose the answer that correctly provides the names for the concepts.



   A. concept1 = belief; concept3 = intention; concept5 = action
   B. concept1 = intention; concept3 = preparation; concept5 = action
   C. concept1 = desire; concept2 = belief; concept4 = intention
   D. concept1 = desire; concept3 = intention; concept4 = belief

9. What is the key characteristic of intelligent behavior?
   A. Intelligent behavior can only be performed by animals that have (some) cognitions.
   B. Intelligent behavior should be modelled with a logical formalism.
   C. Intelligent behavior requires knowledge about the world.
   D. Intelligent behavior requires a complex environment.

10. Which concept is essential to model 'adaptive' behavior, but is not required for modelling 'reactive' behavior?
   A. sensory representation
   B. intention
   C. sensitivity
   D. desire

....continue at next page...

11. A model that describes how the facial expression of a person that is presented to this person is an example of
   A. stimulus-response behavior.
   B. delayed response behavior.
   C. adaptive behavior.
   D. motivation-based behavior.

12. What is a correct statement about the "mis
with Little Thumb)?
   A. Complex mental states are require
the way back.
   B. The model does not include in
   C. The model does not include
replacement for beliefs.
   D. Complex mental state
crossings, adjacent

13. What is a not an e
   A. It is situated
   B. It receive
   C. It is abl
   D. It ha

14. Wh

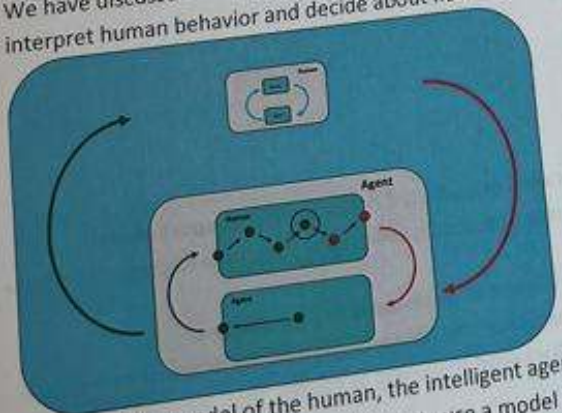
11. A model that describes how the facial expression of a person is determined by a specific picture that is presented to this person is an example of
    A. stimulus-response behavior.
    B. delayed response behavior.
    C. adaptive behavior.
    D. motivation-based behavior.

12. What is a correct statement about the "mind extended in the world" model (i.e. the example with Little Thumb)?
    A. Complex mental states are required to model the process of dropping pebbles and finding the way back.
    B. The model does not include internal mental states because the process is very simple.
    C. The model does not include internal mental states because the pebbles act as a replacement for beliefs.
    D. Complex mental states are needed because the external world is very complex, with crossings, adjacent positions, directions, etc.

13. What is a <u>not</u> an essential characteristic of an intelligent agent?
    A. It is situated in an environment.
    B. It receives incoming communication from humans.
    C. It is able to perform autonomous actions.
    D. It has goals.

14. Which predicate does <u>not</u> belong to the set of standard predicates for agent models?
    A. observed(A:AGENT, I:INFO_ELEMENT)
    B. prepare(A:AGENT, Ac:ACTION)
    C. to_be_communicated(A:AGENT, I:INFO_ELEMENT)
    D. desire(A:AGENT, Ac:ACTION)

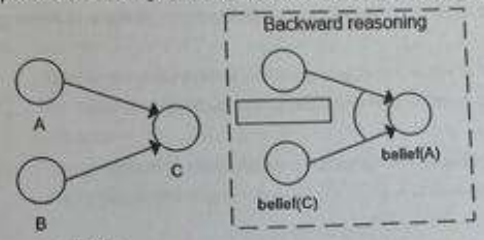
15. We have discussed the picture below multiple times. It describes how (intelligent) agents can interpret human behavior and decide about how to influence it. Which statement is <u>incorrect</u>?



    A. By using a model of the human, the intelligent agent can predict what the effect is of actions.
    B. Both humans and (intelligent) agents use a model inside to reason about their actions.
    C. The (intelligent) agent always applies forward reasoning to interpret the observations.
    D. The concept within the blue circle represents the desire of the agent.

16. What is not a valid way of embedding a domain model within an intelligent system?
    A. As an analysis model
    B. As a conceptual model
    C. As an adaptation model
    D. As a support model

17. Suppose the following model snippet (picture at the left). When we perform backwards reasoning, there are several possible interpretations. What should be filled in on the blank in the picture on the right so that you can indeed derive "belief (A)"?



    A. belief(A)
    B. default(B)
    C. belief(not B)
    D. belief(not C)

18. Choose the answer that lists the right words to put on the blanks. "When you implement a model in the P3-Python environment, you define the ___1___ in the ___2___ and the ___3___ in the ___4___."
    A. 1: scenario's; 2: main file; 3: parameter values; 4: main file
    B. 1: scenario's; 2: scenario file; 3: predicates; 4: main file
    C. 1: start values; 2: main file; 3: predicates; 4: rules file
    D. 1: start values; 2: scenario file; 3: parameter values; 4: rules file

19. Which concepts are all relevant in an *analysis model*?
    A. desire, assessment, belief
    B. propose, assessment, desire
    C. belief, assume, desire
    D. action, belief, assessment

20. How do you decide whether to use forward or backward reasoning in **a support model**?
    A. You determine whether there are more causes (in which case you chose backward) or more effects (chose forward).
    B. You chose the direction that is the easiest to implement in your system.
    C. It follows automatically from the position of the observations and the desire in your model.
    D. You always have to do it both: first backward reasoning to causes, then forward to effects.

Exam Dynamic Modelling for Human-centered Systems

March 30, 2022, 15:30

Instructions

This exam consists of 20 multiple choice questions on 4 pages. There is one correct answer per question. Read the questions below and **write the correct answer on the answer sheet**. Do not write additional text on the answer sheet.

Questions

1. Which task is <u>not</u> relevant in the conceptualization phase of creating a model?
   A. Defining the scope of the model.
   B. Deciding on the representation of the model concepts.
   C. Determining relations between concepts.
   D. Formulating expectations about the model behavior.

2. How do we define a *limited growth* (also called "logistic growth") process (with C = capacity and α = growth factor)?
   A. Amount(t+Δt) = Amount(t) + α * ((C – Amount(t)) / C)
   B. Amount(t+Δt) = C – (α * Amount(t))
   C. Amount(t+Δt) = Amount(t) + α * (1 – Amount(t))
   D. Amount(t+Δt) = α * Amount(t) + (C – Amount(t))

3. Choose the right word to fill in the blank. 'The model of an e-Coli bacterium is a model at the _____ level?'
   A. individual
   B. collective
   C. cognitive
   D. physiological

4. Which statement about "characteristic patterns" <u>is not</u> correct?
   A. They are meant to help developers of intelligent systems to understand the meaning of the model.
   B. They are meant to evaluate whether the model behaves as expected.
   C. They are formulated during the design phase of a model.
   D. They preferably specify effects between concepts that are not directly connected.

5. How could you extend the model of the Aplysia sea hare to include **a realistic** process of "forgetting" the learned behavior?
   A. By setting the value of "synapse strength" to 0 after 5 touches on the siphon.
   B. By removing the connection between the "intermediate neuron" and the "moto-neuron".
   C. By introducing a decay-factor that reduces the value of the concept "synapse strength" every time step with a few percent.
   D. By introducing a concept "forget" that grows over time.

17. When we use a numerical representation in which the values can only be 0 or 1, how can you represent the Boolean statement: **not (A or B)**

A. $0 - (A * B)$
B. $1 - MAX(A, B)$
C. $(A * B) - 1$
D. $1 - MIN(A, B)$

18. Choose the answer that lists the right words to put on the blanks. "When you implement a model in the P3-Python environment, you define the ___1___ in the ___2___ and the ___3___ in the ___4___."

A. 1: start values; 2: scenario file; 3: parameter values; 4: rules file
B. 1: scenario's; 2: main file; 3: predicates; 4: scenario file
C. 1: start values; 2: main file; 3: parameter values; 4: rule file
D. 1: start values; 2: scenario file; 3: predicates; 4: scenario file

19. How do you decide whether to use forward or backward reasoning in an *analysis model*?

A. You determine whether there are more causes (in which case you chose backward) or more effects (chose forward).
B. You chose the direction that is most easy to implement in your system.
C. It follows automatically from the position of the observations and the desire in your model.
D. You always have to do it both: first backward reasoning to causes, then forward to effects.

. Which concepts are all relevant in an *support model*?

A. desire, assessment, belief
B. belief, action, observed
C. proposed, assumed, desire
D. action, belief, assessment