CHAPTER 7 –Affective-Behavioral Cognitive (ABC) Learner Modeling

Genghu Shi

Overview

- Affective-Behavioral Cognitive (ABC) Learner Modeling
- Author information (Abhiraj Tomar and Rodney D. Nielsen)
    - Dr. Nielsen's research is primarily in the areas of Natural Language Processing, Machine Learning, and Cognitive Science, with an emphasis on Educational Technology, Health & Clinical Informatics, and their confluence – Educational Health & Wellbeing Companion Robots. He is currently researching emotive, perceptive, spoken-dialogue companion robots, in the form of stuffed animals, to assist the elderly and isolated in need of special care. Such *Companionbots* might help seniors maintain their independence and continue to live in their homes. Dr. Nielsen is also inventing the future of classroom education with human language technology that facilitates a teacher's real-time understanding of the students' ongoing subject comprehension. He has developed machine learning algorithms to recognize elementary school students' understanding of science concepts when interacting with Intelligent Tutoring Systems, and is developing an end-to-end question answering and data mining system for clinical informatics. He has researched computational models for recognizing textual entailment, labeling semantic roles (predicate argument structure) in text, and estimating class probabilities in machine learning, among other things. He also has an extensive background in software engineering, including research in the areas of software re-engineering environments, operations research, automated software testing, and automatic code generation.

Overview

- ## Section 1 (2.5 min. 5 slides)
  - What has been done by the author(s)?
- ## Section 2 (1.5 min. 3 slides)
  - What is the theoretical foundation of the chapter?
- ## Section 3 (1.5 min. 3 slides)
  - What is (are) the basic assumption(s) of the chapter?
- ## Section 4 (1.5 min. 3 slides)
  - What would happen if one of the assumptions is not supported?
- ## Section 5 (2 min. 4 slides)
  - What would you do to improve the article if you write it today?

Section 1- 1

- What has been done by the author(s)?
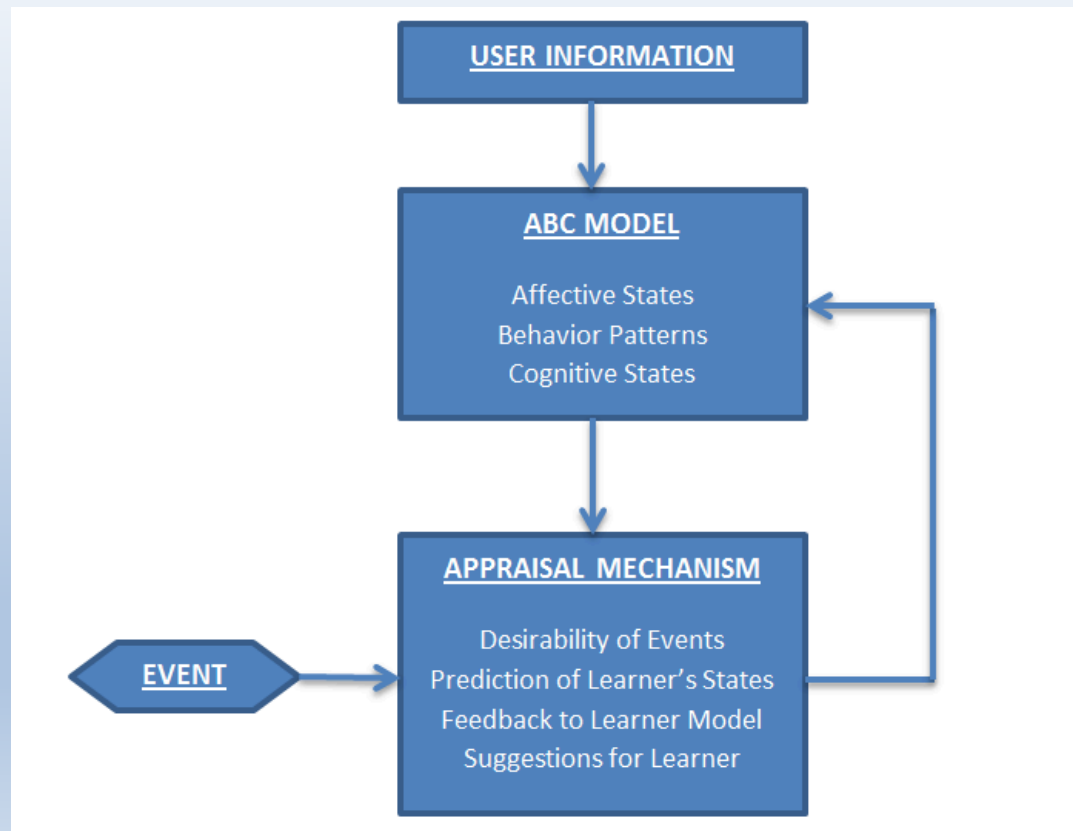
Section 1- 2

- What has been done by the author(s)?
The ABC User Model
  - ✓ Affective States
    - o Emotional Profile
    - o Emotional States
  - ✓ Behavioral Patterns
    - o Personality Traits
    - o Goals
  - ✓ Cognitive States
    - o Cognitive Profile
    - o Cognitive States

Section 1- 3

- What has been done by the author(s)?

User Information

Type of Information
Characteristics
Capabilities
Preferences
Domain Knowledge
Goals

Methods
Survey Forms
Learner's Academic Records
Pretest and Questionnaires
Sensors

Section 1- 4

- What has been done by the author(s)?

❑Event

  ✓ Desirable Events: events that lead to or facilitate the realization of goals and objectives.

  ✓ Undesirable Events: events that prevent or inhibit the achievement of goals and objectives.

❑Relation Between Events and Learner Model

Section 1- 5

- What has been done by the author(s)?

Appraisal Mechanism

❑ Desirability of events → consequence of events emotions

- o satisfaction and distress

❑Appraisal of actions → action of agents emotions

- o admiration and remorse

Section 2- 1

- What is the theoretical foundation of the chapter?

1. OCC Theory

a cognitive appraisal theory that is structured as a three-branch typology, corresponding to three kinds of stimuli: consequences of events, actions of agents, and aspects of objects.

Section 2- 2

- What is the theoretical foundation of the chapter?

2. Personality Traits

Section 2- 2

- What is the theoretical foundation of the chapter?

3. Achievement Goal Theory

Section 3-1

- What is (are) the basic assumption(s) of the chapter?

- Past and current user information can represent the learner's affective, behavioral, and cognitive states.

Section 4-1

- What would happen if one of the assumptions is not supported?

These affective, behavioral, and cognitive states may change over time rapidly in the influence of physical the environment the learners are in. I cannot see the ABC model can adapt to such changes. So I doubt that if these user information can represent the learners ABC states.

Section 3-2

- What is (are) the basic assumption(s) of the chapter?

- Based on user information, the ABC Model predicts how a learner is going to behave on the occurrence of an event.

- Then, the ITSs will adaptively assign learning tasks to specific learners based on these information.

Section 4-2

- What would happen if one of the assumptions is not supported?

As I said in the previous slide, if the ABC states of a learner are dynamically and rapidly influenced by the outside environment, the system cannot response to the ABC states change during a learning task. This will weaken the prediction and make the user model less effective.

Section 3-3

- What is (are) the basic assumption(s) of the chapter?

- The appraisal structure makes use of inductive and abductive reasoning over these perceptions. Induction allows inferring the conclusion from the premise with a high probability.

- For example, if learners have a tendency to behave in a particular way while experiencing some specific states, then the system predicts that behavior under similar circumstances in future.

Section 4-3

- What would happen if one of the assumptions is not supported?

In my mind, the learners are evolving when they are learning. The same behaviors may not happen in the future similar circumstances.

Section 5-1

- What would you do to improve the article if you write it today?

First, I will talk about the influences of the physical environment when the learners are using the ITSs with ABC user model. And to what extent, the environment will reduce or enhance the effectiveness of the ABC model.

Section 5-2

- What would you do to improve the article if you write it today?

Second, I will add the discussion of the ethical concerns about the ABC model, because the model will try to obtain learners' information that they do not want to disclose, such as emotional status, personality traits. And how the ITS owners protect the disclosure of the users' information

Section 5-3

- What would you do to improve the article if you write it today?

Third, based on this chapter, the ABC model is actually a very complex model. How will the model be implement to make sure that the ITSs make the best use of the ABC model should be talked to improve the article.

Section 5-4

- What would you do to improve the article if you write it today?

The last thing to improve the article, I think, is that the article should talk about the the way of mapping the user information to ABC states, for example, machine learning, or deep learning methods. The article only mentioned that in the discussion section, not in detail.

The End