Week 3 Video 1

Behavior Detection
Welcome to Week 3

- Over the last two weeks, we’ve discussed prediction models

- This week, we focus on a type of prediction model called behavior detectors
Behavior Detectors

- Automated models that can infer from interaction/logs whether a student is behaving in a certain way.

- We discussed examples of this:
  - off-task behavior and gaming detectors

- In the San Pedro et al. case study in week 1.
The Goal

- Infer meaningful (and complex) behaviors from logs or in real-time
- So we can study those behaviors more deeply
  - How do they correlate with learning?
  - What are their antecedents?
- And so we can identify when they occur
  - In order to intervene
Behaviors people have detected
Disengaged Behaviors

- Gaming the System (Baker et al., 2004; dozens of other examples)
- Off-Task Behavior (Baker, 2007; Cetintas et al., 2010)
- Carelessness (San Pedro et al., 2011; Hershkovitz et al., 2011)
- WTF Behavior (Rowe et al., 2009; Wixon et al., UMAP2012)
Meta-Cognitive Behaviors

- Help Avoidance (Aleven et al., 2004, 2006)
- Unscaffolding Self-Explanation (Shih et al., 2008)
- Exploration Behaviors (Amershi & Conati, 2009)
Teacher Strategic Behaviors

- Curriculum Planning Behaviors (Maull et al., 2010)
- Teacher Interventions for Students (Miller et al., 2015)
Related problem: Sensor-free affect detection

- Not quite the same conceptually

- But the methods turn out to be quite similar

- Detecting
  - Boredom
  - Frustration
  - Engaged Concentration
  - Delight

(D’Mello et al., 2008; Sabourin et al., 2011; Baker et al., 2012, 2013, 2014; Pardos et al., 2014; Kai et al., 2015; Paquette et al., 2014, 2015)
Related problem: LMS and MOOC Usage Analysis

- Studying online learning behaviors

- But typically not the same methods/process I’ll be discussing in the next lectures

- More often, researchers in this area have looked to predict outcomes from relatively straightforward behaviors

- Due to what’s visible in the log files (access to resources rather than thinking processes made visible through complex activities)
Related problem: LMS and MOOC Usage Analysis

- That said, lots of great prediction modeling research in this area

- Predicting and analyzing outcomes based on when and how much learners use videos, quizzes, labs, forums, and other resources

(Arnold, 2010; Breslow et al., 2013; Sharkey & Sanders, 2014; dozens of other examples)
In the remainder of this week we’ll discuss

- Ground truth
- Feature engineering for behavior detection
- Knowledge engineering versus data mining
Next Lecture

- Ground Truth