

# 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

6

- 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

7

- Help Avoidance (Alevan et al., 2004, 2006)
- Unscaffolded Self-Explanation (Shih et al., 2008)
- Exploration Behaviors (Amershi & Conati, 2009)

# Teacher Strategic Behaviors

8

- 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

10

- 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

11

- 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

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- Ground Truth