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IEEE Journal of Selected Topics in Signal Processing

Special Issue on Signal Processing and Machine Learning for Education and Human Learning at Scale

Aims and Scope

The surge in popularity of Massive Open Online Courses (MOOCs) and other online and blended learning platforms has demonstrated the potential of the Internet for scaling education. While advances in technology have enabled content delivery to massive numbers of students, these platforms remain limited in their ability to provide an effective learning experience for each individual.

Recent advances in machine learning and signal processing offer promising avenues to move beyond this "one size fits all" educational approach. The key is that today's learning technology platforms can capture big data about learners as they proceed through courses. Examples of learning data include performance on homeworks and exams, click actions made while watching lecture videos or interacting with simulations, the social learning networks formed among the students, and the content posted on discussion forums. Going even further, prototype platforms are being built that use cameras and other sensors to continuously monitor students' affect and engagement. The large volumes of empirical learning data being collected present novel opportunities to study the process of student learning, to design systems that improve learning at scale by closing the learning feedback loop.

This special issue of IEEE J-STSP will showcase the research from the signal processing community that is providing leadership in advancing effective learning at scale. Particularly of interest to this special issue will be novel methods for defining and extracting signals of a student's behavior and performance from big learning data and using these measures in the design of intelligent algorithms and systems.

Topics of interest in the special issue include (but are not limited to):
- Processing and Representing Learning Behavioral Data
- Generative/Low Dimensional Modeling of Student Learning
- Learner Knowledge Tracing and Performance Prediction
- Social Learning Networks
- Algorithms for Identifying Learner Collaborations
- Automating Course/Content Individualization, Automatic Grading Methods, Automatic Feedback Generation
- Learning Analytics with Actionable Intelligence for Instructors
- Algorithms for More Effective Peer Grading Allocation
- Relationships between Learning Behavior, Performance, and Content
- Machine Vision Algorithms for Processing Student Biometric Data
- Trials for Demonstrating Efficacy for Learners and/or Instructors

Important Dates:

Manuscript submission due: ~~October 1, 2016~~ **EXTENDED**: October 15, 2016
First review completed: December 15, 2016
Revised manuscript due: February 1, 2017
Second review completed: May 1, 2017
Final manuscript due: June 15, 2017
Publication: August 2017

Prospective authors should visit http://www.signalprocessingsociety.org/publications/periodicals/jstsp/ for information on paper submission. Manuscripts should be submitted using the Manuscript Central system at http://mc.manuscriptcentral.com/jstsp-ieee.

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