Stream Mining in Education? Dealing with Evolution

Prof. Myra Spiliopoulou, Knowledge Management and Discovery Lab KMD, Faculty of Computer Science, Otto-von-Guericke-University Magdeburg, Germany

EDM methods that suggest materials to students are based on student models, and/or on the behavior of other, similar students. Whenever a recommendation is formulated, though, or the similarity between two students is assessed, each of the observed individuals is at some, a priori unknown and typically not observable intermediate state of the learning process. This process manifests itself as a drifting stream of activities. Learning methods that adapt their models to the current state of this stream allow the formulation of recommendations aligned to the current learning stage of a student, taking into account students that evolve/learn similarly to her. The underlying technology is that of stream mining, rather than data mining.

This talk is on the potential and challenges of conventional stream mining and relational stream mining for educational purposes. We start with mining over a conventional stream of activities, such as the interaction with a platform containing learning materials. The typical learning task is predicting the next course material, given the changes in the preferences and experience of the individuals. Then, we move over to the learning task of discovering groups of individuals that evolve similarly over time. Finally, we discuss the supervised task of learning a model of performance, taking into account that the performance of each individual may change (unexpectedly) during the observation process.

The examples of this talk do not come from the field of Educational Data Mining but from closely related fields -- formulating recommendations for products, and model adaptation as people's behavior change.