

An Indian-Australian research partnership

Intelligent Tutoring Systems

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Monash University supervisors: A/Professor Campbell Charles Wilson, Professor Judithe Irene Sheard

Monash University supervisors: A/Professor Campbell Charles Wilson Email:

Campbell.wilson@monash.edu

IITB supervisors: Professor Sahana Murthy, Professor Sridhar Iyer

IITB contact: Professor Sridhar Iyer Email: sri@iitb.ac.in

The problem

Intelligent Tutoring Systems (ITS) provides personalized learning content to students based on their needs and preferences. The importance of a student's affective component in learning has led ITS to include learners' affective states in their student models. The existing approaches to identify affective states include human observation, self-reporting, data from physical sensors, and mining the students' data in log file. Among these, data-mining offers the most feasible approach in real world settings, which may involve a huge number of students. In existing data-mining approaches, features are selected by correlation analysis of the data in log file, hence these are known as data-driven approaches.

The existing data-driven approaches have following limitations:

1. The existing approaches to predict frustration are often particular only to the ITS under consideration, or specific only to certain type of ITS.
2. The number of features selected for predicting frustration varies for each system and the reasons for selecting the features are usually not made explicit. Hence there is little guidance for deciding the number of features to be chosen, and which features to choose initially.
3. Since these approaches predict affective states, such as frustration, using data-driven selection of features, the contributing factors of frustration remain unknown. Hence most existing ITS that use data-driven approaches lack informed adaptation (addressing frustration based on its known cause).

Due to above limitations we need a different approach to understand the causes of frustration and to do informed adaptation.

The project

This project proposes to address the limitation in the data-driven approaches with the help of theoretical definition of frustration while selecting the features.

The above limitation will be addressed by below steps.

1. Create an approach to select and appropriately combine the features from log file using theoretical definitions of frustration.
2. Create a model to predict the students' frustration while they interact with the ITS.
3. Develop a theory-driven adaptation strategies to mitigate frustration, in a timely manner, during a student's interaction with the ITS.

Expected outcomes

The findings of this project will help ITS developers to predict student's frustration instance while they interact with the ITS, and provide informed adaption to mitigate frustration. The Student's learning process will be improved by addressing frustration and it motivates students to learn.