

# Abstract

This thesis investigates the impact of students' sentiments and emotions on learning and teaching in a large lecture environment by using a digital backchannel system. In a large traditional lecture, interactions between a lecturer and students are restricted by many factors, such as seating arrangement and time constraint. Limited teacher-students interactions make it difficult for the lecturer to understand students' feedback that may help improve her/his teaching. This problem is more prominent if the lecture is delivered online because the lecturer cannot physically interact with the students.

One of the solutions is to deploy a backchannel system, a virtual space in which students interact with the lecturer and other students by asking questions, sharing their thoughts and engage in collaborative activities without interrupting the current discourse. However, the current backchannel systems have not paid much attention to aggregate and present students' feedback to the lecturer in a meaningful way that is easy to digest in a short time.

The proposed solution in this thesis, *ClasSense*, analyses emotions and sentiments in students' messages in real time and presents results in a morale-graph-based user interface, which is composed of a trend of students' emotions and sentiment associated with morale scores and related posts, to the lecturer. So, she/he can know what students are thinking of and respond to students' feedback accordingly. Also, the *ClasSense* system uses a microblogging user interface that allows students to communicate with their lecturers and other students by using short messages and emoticons to express their opinions and emotions during lecture.

Evaluation of the *ClasSense* system shows that lecturers accept and prefer the morale-graph-based user interface to conventional backchannel user interface, which displays only posts in chronological order. The lecturers like to see the morale graph to get a sentiment trend during the lecture then browse through related posts at a particular minute to investigate in more

details. Students also express positively and agree that the *ClasSense* system make their feedback an important part of the class and increase their interactions with the lecturers.

The contribution of this research is in the design of *ClasSense* user interface that is integrated with a customised sentiment analysis algorithm to provide a sentiment and emotion analysis in the context of teaching and learning in university. A further direction for research is to determine how to improve the sentiment analysis module and user interface to better support users with different requirements and in different contexts.