

Tecnologías sostenibles que cambiarán el mundo

Sustainable technologies that will change the world

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ABSTRACT

MICA: Revolutionizing STEM Education

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The traditional lecture and laboratory approach used in teaching science and engineering has dominated education at high schools and universities for centuries. Although classroom demonstrations are sometimes used to provide instructive and motivating examples of taught concepts, in large classes they are difficult to see and without direct “hands on” involvement of the students have limited effect.

Our initiative to address this shortcoming is MICA (Measurement, Instrumentation, Control and Analysis) an educational approach designed for subjects in Science, Technology, Engineering and Mathematics (STEM). Students interact with an experimental workstation (MICA workstation) to conduct experiments, analyze data, undertake parameter estimation, and fit mathematical models, while learning the theory and relevant subject history under the guidance of a virtual tutor (MICA avatar).

As students interact with the MICA workstations their skill level, rate of learning and progress is quantified. Based on these data, deep learning techniques and mathematical modelling are then used to generate an individualized model of a student’s state of knowledge which is augmented every time the student interacts with a MICA workstation. This ‘state of knowledge’ model is then used by the MICA tutor to personalize (and eventually optimize) the teaching pace as well as the way in which subject material is delivered.