CIFAR AI FUTURES: CASE STUDY (2018 → 2028)

Nestor → Quantifying the Classroom

Theme: Education

2018 AI Use Case: [Nestor](http://ai.lcalearning.net/)
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Nestor, developed by LCA Learning, is an artificial intelligence class assistant that uses machine learning algorithms and advanced facial recognition to analyze student attention while listening to online lectures. The software is currently being used for two online courses offered through the ESG business school in Paris, France.

Nestor aims to enhance the performance of both the student and the teacher. By tracking student attention and flagging when focus decreases, teachers can learn how to structure lessons differently in order to increase classroom attentiveness.

Using students' webcams, Nestor's facial recognition software tracks 20 key landmarks on the students face - including the eyes, brows, mouth, and jaw - and can even detect when a student has pulled out their phone. Facial expressions are measured using three variables. The first is *engagement*, which measures facial muscle activation that detects expressiveness and responsiveness. The second is *valence*, which measures the positive and negative facial expressions. The third is *attention*, which measures focus according to head orientation.

Once the system detects the student has lost focus, it can send a message alerting them to pay attention. Nestor can also predict when a student may start to drive away again, sending them a signal to stay focused before attention is lost. Nestor also quizzes students on content that was covered while they appeared to be distracted. Student performance and attention analysis is then relayed to the teacher, who can then adjust future lessons appropriately.

Nestor's software can also integrate with students' social network profiles and calendars to suggest study times and foster more effective study habits. For example, if a student has a tendency to watch YouTube videos at 8pm on weekday nights, Nestor can suggest that as a time for a study session instead.

Nestor encrypts, anonymizes and stores analysis data, but does not currently keep video footage or sell it to advertisers.

Potential Future: Adaptive Education

An increasing number of services and devices, from websites to wearables to toys, seek to monitor and optimize children's learning abilities. These range widely in terms of proven efficacy, standards, cost, accessibility, and data portability. In response to the growing market of smart educational devices, school boards have taken different approaches to whether--and how--to integrate these technologies into the classroom. Some private and charter schools have piloted the integration of smart toys to aid in student learning evaluation classroom-tracking, in which a software tracks each student's progress in real-time, to building profiles of strengths, weaknesses, as well as and identifying at-risk students.

However, public school boards have banned the use of these products in the classroom on the grounds that they interfere with teachers' ability to manage their students and that perceptions of a student's interest and abilities shouldn't be coloured by unproven technology.