

Advancing Student Engagement Detection in Online Learning Through a Bagging- Driven Deep Learning Ensemble Model

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Abstract: *The move from regular classrooms to online learning has made it harder for teachers to see if students are paying attention in real time.*

In a physical classroom, teachers can see students' faces and body language, but online learning platforms don't offer the same way to check if students are engaged. To fix this issue, this work introduces a new system that uses a special type of deep learning called a Bagging-driven Deep Learning ensemble. This system combines several different neural networks that are trained on different parts of the data, helping to make the model more accurate and stable. The system uses facial features, eye movements, and head position from video to determine whether a student is engaged. The results show that this method performs better than using a single neural network, making it more reliable for checking student behavior in online classes.

Keywords: Deep Learning, Bagging Ensemble, Student Engagement, E-learning, Computer Vision, Facial Expression Recognition

