

ABSTRACT

One of the main issues in face-to-face learning is the lack of objective monitoring of student behavior in the classroom, particularly regarding their level of focus during learning activities. Inattentive behaviors such as sleeping or using a mobile phone often go unnoticed in real time by the lecturer, negatively affecting the effectiveness of the learning process. To address this issue, this study proposes a behavior detection system based on the YOLOv11 algorithm, which is designed to detect three types of actions: sleeping, using a phone, and paying attention. The image data was collected through in-class video documentation, manually annotated, and trained using the YOLOv11 model with 50 epochs, 640-pixel image size, and a batch size of 16.

The model was evaluated using performance metrics including accuracy, precision, recall, F1-score, and mean Average Precision (mAP). The evaluation results showed accuracy of 0.9652, precision of 0.9457, recall of 0.9575, F1-score of 0.9515, mAP@50 of 0.9672, and overall accuracy of 0.9662. The system output is presented in an Excel (.xlsx) file containing the timestamp, detected behavior type, confidence score, and percentage distribution of attentive and inattentive behavior in the classroom.

Based on these results, it can be concluded that YOLOv11 can be effectively applied to detect and classify student behaviors, providing an objective overview of classroom conduciveness during the learning process.

Keywords: YOLOv11, behavior detection, computer vision, learning focus, deep learning.