Towards effective and efficient online exam systems using deep learning-based cheating detection approach

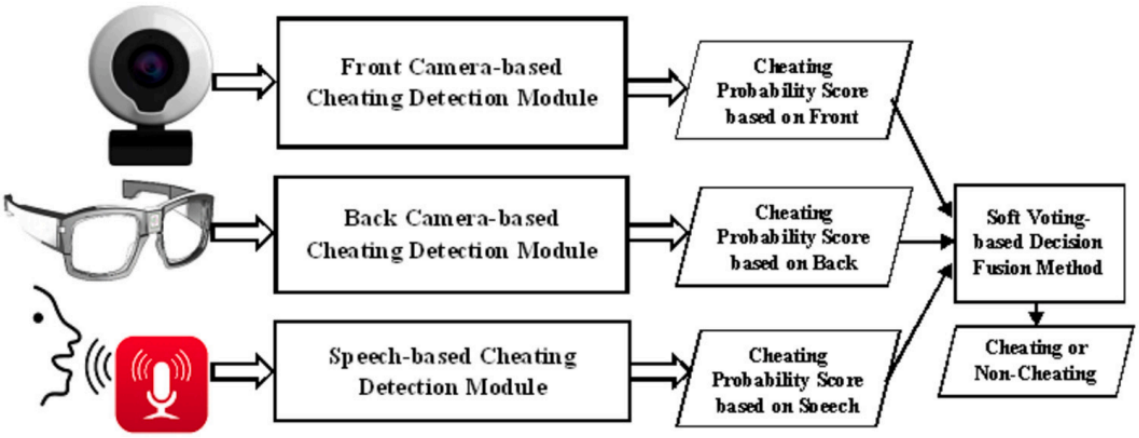

Fig. 1. The diagram of the proposed approach.

The accuracy rates achieved by the developed front camera deep CNN model are 99.83% and 99.81% on 30% test set size and 40% test set size. Furthermore, the accuracy rates for the back camera deep CNN model are 98.78% and 98.78% on 30% test set size and 40% test set size, respectively. The computational costs of the proposed approach's methods are 0.028 seconds for detecting one sample image and 0.082 seconds for detecting speech in a second of voice.

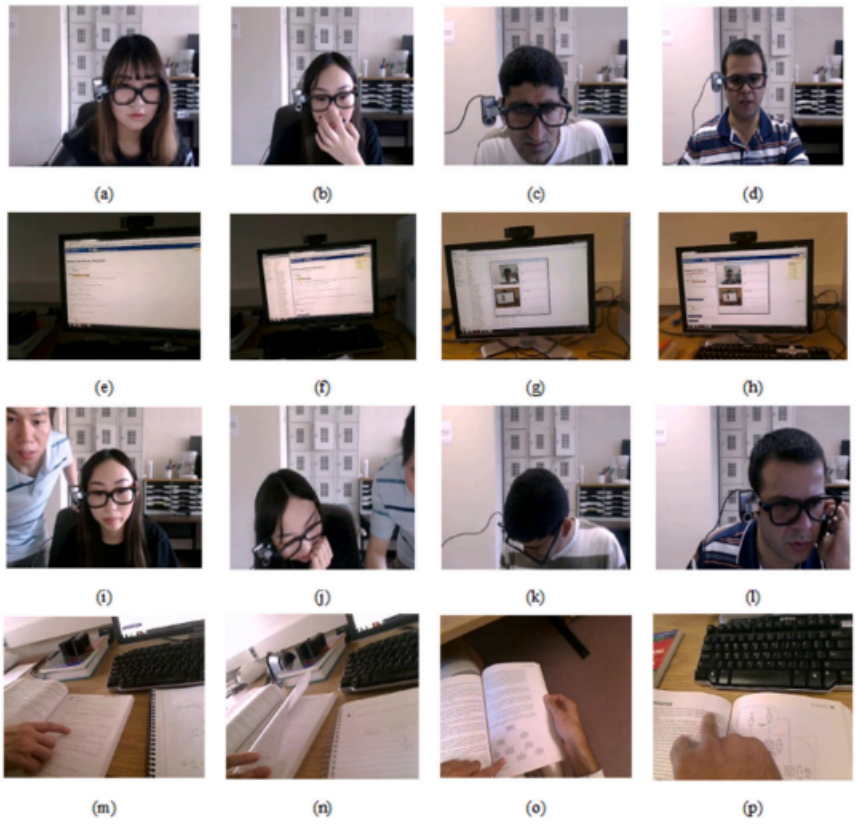

Fig. 4. Some samples taken from the OEP database videos [5]: (a)-(h) are for non-cheating class captured from front and back camera videos; (i)-(p) are for cheating class captured from front and back camera videos.