5th Global Conference on Innovations in Education
12 - 14 November 2026
Nottingham, UK

Vcamdetect: A Novel Dataset for Webcam Spoofing Detection in Intelligent Proctoring Systems

Amadasun Osamuyimen Odion, Prof. Bukola Onashoga, Prof. Ishaq Oyelohan, Dr. Ahmed

National Open University of Nigeria

Abstract

The rapid rise of both virtual learning and assessment has posed new challenges to the integrity of academia. A major risk for smart proctoring systems, or those that use a webcam to observe examinees, is webcam spoofing, when an examinee uses software to create a virtual camera feed from a recorded video or altered data in order to avoid being monitored. This paper extends the body of knowledge pertaining to detection methodologies for virtual camera software by introducing a new dataset and detection framework (VCamDetect). This framework employs a new multi-modal detection methodology to establish the authenticity of different webcam applications based on device fingerprinting, video stream analysis, and behavioral pattern analysis. The dataset covers over 5,000 video samples, collected from 15 different physical camera devices and 9 different popular virtual camera applications, and is labelled with 52 distinguishing features/outcomes across 4 categories: device signatures, stream characteristics, performance metrics, and metadata characteristics. By evaluating a range of different machine learning techniques for activity pattern recognition of virtual cameras, we achieve an accuracy of 96.8% through the use of the ensemble classifier, which represents a significant improvement over previous techniques. The experimental results demonstrate that virtual cameras have unique signatures with regard to the consistency of the timing of frames, the patterns of device resource utilization, and the enumerated characteristics of the devices themselves. The VCamDetect dataset and system provide a strong defense for intelligent proctoring systems against webcam spoofing attacks, thus preserving the integrity of online academic integrity.

Keywords: Detection of Spoofing on a Webcam, Virtual Camera Identification, Intelligent Proctoring, Academic Integrity, Security of Online Exams, Fingerprinting of Devices, Prevention of Deep Fake