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FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería de Sistemas e Informática

Tesis

Moodle plugin for real-time face recognition in online exams for Systems Engineering and Computer Science students at Universidad Continental, Huancayo, Peru

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Moodle plugin for real-time face recognition in online exams for Systems Engineering and Computer Science students at Universidad Continental, Huancayo, Peru.

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Facial recognition systems on learning platforms like Moodle enable fast and efficient evaluation, automating the detection of impersonation in online exams. This project implements a Moodle plugin that performs facial recognition on the student attempting to take a quiz. It consists of two parts for authentication through a webcam: the first part occurs before accessing the quiz, and the second part involves surveillance through a camera during the quiz. The plugin was developed using the PHP and JavaScript programming languages, as well as Face-api. The JavaScript API detects and recognizes faces in the web browser using Tiny Yolo v2 and FaceRecognizerNet. It compares a student's photo or image with the image from their webcam while they are taking the quiz. The Moodle plugin achieved an average error probability of 39.39% for face detection similarity distance.

Keywords—moodle, face recognition, plugin.

I. INTRODUCTION

Biometric systems are used to identify and analyze human body characteristics such as fingerprints, retinas, sound patterns, facial patterns, and other structures that can be used for authentication. Facial recognition technology, in particular, is being increasingly utilized and enhanced for security systems, attendance systems, and other applications [1].

Plagiarism detection and its corresponding manual control are a slow process that requires an electronic solution integrated into the Learning Management System (LMS) to achieve fast and accurate evaluation of students' digital submissions. While there are systems and algorithms available for detecting plagiarism, they are not open source and are not integrated into the LMS [2].

Facial recognition algorithms like Attentive System include four components to detect irregularities, such as facial detection, multiple people detection, facial spoofing, and head pose estimation, achieving an accuracy of 0.87 with the combination of Attentive Net and Liveness Net [3]. In educational settings, the concept of machine learning is employed in a Deep Neural Network (DNN) model to record participants' facial expressions while solving problems during an exam. This algorithm learns from facial expressions based on Convolutional Neural Networks (CNNs) to classify and identify participants' sentiments regarding the difficulty level of problems posed in online exams [4]. The three-layer framework called Student Identification by Face Recognition (SIFR) determined that feasibility and accuracy depend on the facial feature extraction module [5].

Object identification is the process of determining the position of various elements within images or videos, and Yolo v5 (You Only Look Once version 5) is an effective facial recognition system for verifying that people comply with the use of masks in public places as a preventive measure against Covid-19 [6]. Previous versions like Yolo v2 (You Only Look Once version 2) demonstrate improved accuracy compared to other models [7], establishing it as a robust model for object detection applications.

Online education has become a reality in today's world due to the rapid evolution of technology. Moodle is a popular open-source Learning Management System (LMS) widely used worldwide due to its flexibility and open nature. The user-friendly system caters to the learning and training needs of individuals from various institutes and organizations, with over 68 million Moodle users and more than 55,000 Moodle systems being utilized for different purposes [8]. However, a significant issue with this method is the presence of anomalies during the assessment process. To address this, the implementation of plugins is proposed, focusing on detecting anomalies in the examination systems of the Moodle environment [9].

The objective of this study is to develop and implement a plugin for Moodle that performs facial recognition on the student attempting to take a quiz. It consists of two parts for