Artificial Intelligence

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Recap of Review 1:

- Introduction
- Motivation
- Literature Survey
- Summary/findings of Literature Survey
- Objectives
- Architecture of System

Introduction

- **Domain:** Artificial Intelligence
- **Topic:** Online Student Authentication and Proctoring System Based on Multimodal Biometrics Technology
- **Other technologies required:** Cloud computing, data science applications in education, machine learning, security, etc.
- **Relatability of the topic**

Introduction

- Need of **AI** technology in online examination
- **MOOC** (Massive Open Online Courses) introduction
- **Problems** in online examination
- **Solutions** of such problems

Motivation

- **Reasons for selecting the domain**

1. Versatility, impact on society
2. Fascinating applications
3. Future demand, career opportunities

- **Reasons for selecting the topic**

1. Current situation of all students
2. AI in education
3. Need of an hour due to Pandemic

Objectives

- To have complete understanding of the topic.
- To work on mentioned technologies and enhance the features of online student authentication & proctoring system.
- To make students' and educators' experience better by making system more reliable.

Contents of Review 2:

- Literature Survey
- Summary/findings of Literature Survey
- Architecture of System
- Conclusion
- References

Literature Survey

S.N.	Title of Paper	Journal/Conference Name/Year of publication	Author Names	Summary of Paper (algorithm/methodology used, results obtained etc..)
1	Online student authentication and proctoring system based on multimodal biometrics technology	IEEE,11th May 2021	Mikel Labayen,Recardo Vea,Julien Florez,Naiara Aginako,Basilio Sierra	This paper describes whole system overview and workflow .Also gives an idea of an algorithm with its performance and finally the result of the test.
2	Face recognition for security efficiency in managing and monitoring visitors of an organization	IEEE, 26-27 Aug. 2014	Behzad Shoarian Satari; Nor Azlina Abd Rahman; Zety Marla Zainal Abidin	In this paper a system that is able to manage and monitor the visitors of an organization using face recognition as an authentication method is explained.
3	Authentication Protocol for Real-Time Wearable Medical Sensor Networks Using Biometrics and Continuous Monitoring	IEEE, 21 October 2019	Nada Radwan Mohsen; Bidi Ying; Amiya Nayak	This paper introduces a new ECC based lightweight mutual authentication and key agreement protocol to be used in real-time wireless medical sensor networks between doctors/nurses, trusted servers, sensors and patients.
4	Interaction evaluation of a mobile voice authentication system	IEEE, 16 January 2017	Oscar Miguel-Hurtado; Ramon Blanco-Gonzalo; Richard Guest; Chiara Lunerti	This work aims to create a secure authentication system through mobile devices based on voice and face recognition as two of the most reliable and user-accepted modalities.
5	Deep Face Recognition for Biometric Authentication	IEEE, 26 December 2019	Maheen Zulfiqar; Fatima Syed; Muhammad Jaleed Khan; Khurram Khurshid	This paper presents a convolutional neural network based face recognition system which detects faces in an input image and automatically extracts facial features from detected faces using a pre-trained CNN for recognition

Literature Survey

S.N.	Title of Paper	Journal/Conference Name/Year of publication	Author Names	Summary of Paper (algorithm/methodology used, results obtained etc..)
6	Continuous Multimodal Biometric Authentication Schemes	IEEE, 23 February 2021	Riseul Ryu; Soonja Yeom; Soo-Hyung Kim; David Herbert	This paper provides a systematic survey of existing literature on CMBA systems, followed by analysis to identify and discuss current research and future trends.
7	Fast Biometric Authentication System Based on Audio-Visual Fusion	IEEE, 26 May 2021	Shivani Shenai; Gaurav Patil; Vedant Sawant; Muskan Paryani; Rupali Hande	This paper introduces fast biometric authentication based on audio-visual fusion specially for transaction instead of traditional password authentication.
8	Continuous multi-biometric user authentication fusion of face recognition and keystoke dynamics	IEEE , 24 April 2017	Stuti Srivastava; Prem Sewak Sudhish	In this paper, two widely used unimodal biometric systems, which can both easily be captured on modern computing devices, keystroke dynamics and face recognition, are fused to create a stronger multi-biometric system for continuous authentication
9	Development of a Secure Access Control System Based on Two-Factor Authentication Using Face Recognition and OTP SMS-Token	IEEE, 22 February 2021	Muhammad Dandy Pramana; Anne Lestyea; Amiruddin Amiruddin	In this research, authors have designed and implemented a secure access control system based on two-factor authentication using facial recognition and SMS-token OTP to avoid spoofing attacks and to meet our own needs and avoid reliance on proprietary products.
10	Students Online Exam Proctoring: A Case Study Using 360 Degree Security Cameras	IEEE, 16 February 2021	Aiman A Turani; Jawad H Alkhateeb; AbdulRahman A. Alsewari	In this paper, the usage of the 360-degree security camera over the traditional webcam was investigated in order to enhance the exam security and to minimize the stressful restrictions.

Summary/findings of Literature Survey

- **Literature 1**: challenges and solutions
- **Literature 2**: FRVMS (Face Recognition Visitors Management System) ,security
- **Literature 3**: Mutual authentication
- **Literature 4**: HBSI (Human Biometric Sensor Interaction) model
- **Literature 5**: deep face recognition

Summary/findings of Literature Survey

- **Literature 6**: CMBA(Continuous Multimodal Biometric Authentication)
- **Literature 7**: Safe online transactions using face & voice authentication rather than password system.
- **Literature 8**: Unimodal biometric system –keystroke dynamics
- **Literature 9**: Two factor authentication
- **Literature 10**: 360-degree camera security

Architecture of System

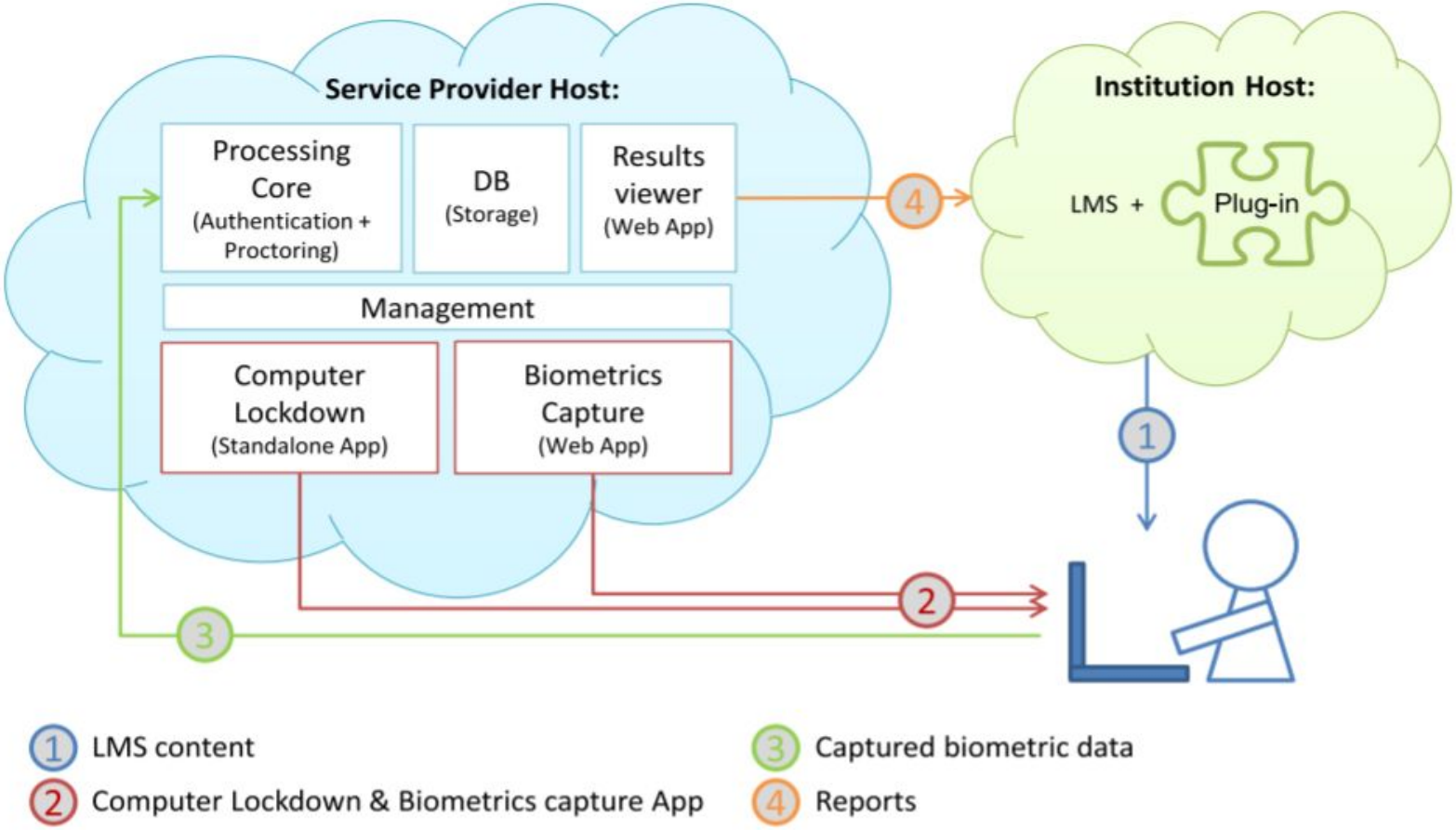

FIGURE 1. Authentication and proctoring system set-up.

Architecture of System

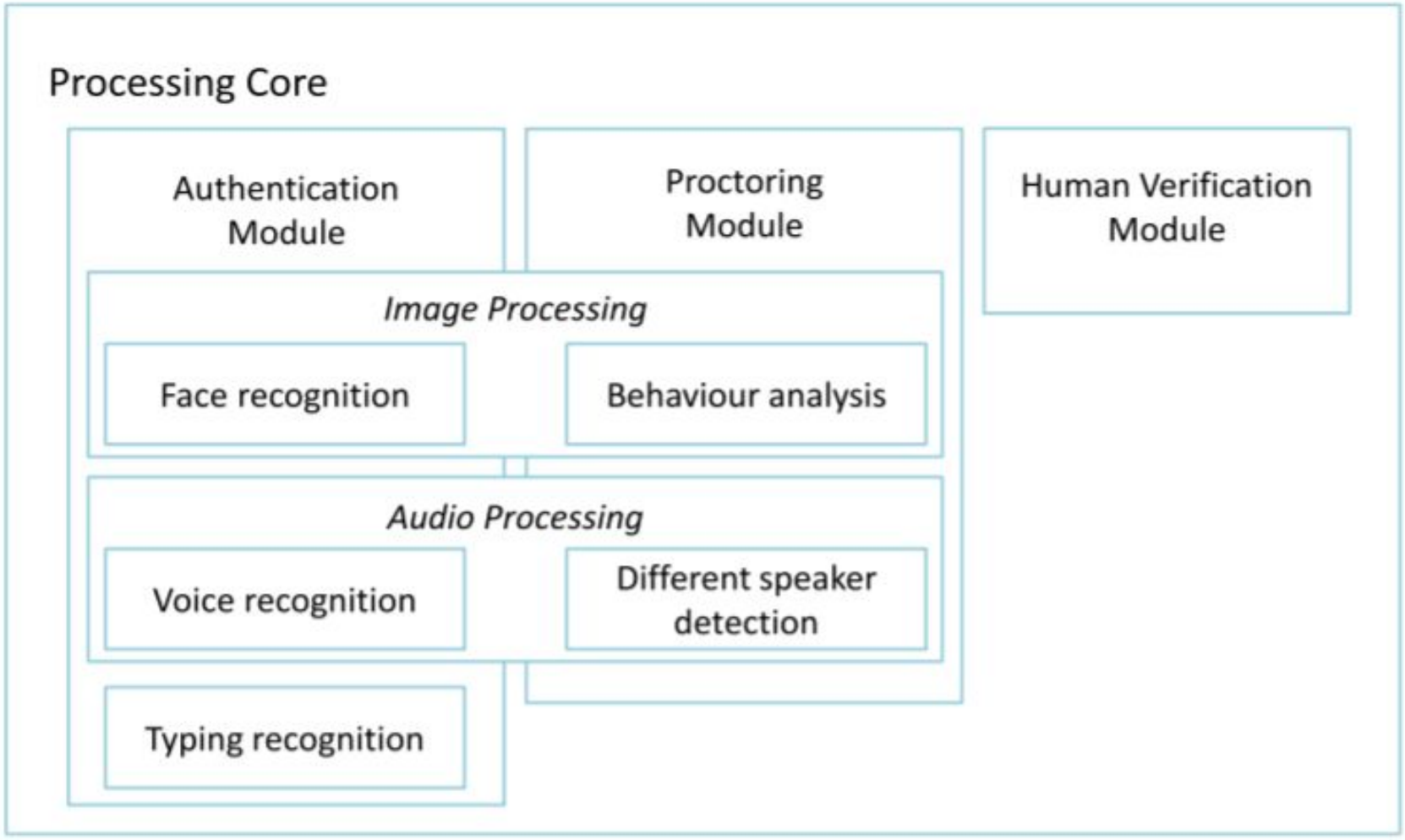

FIGURE 2. Processing core description.

Architecture of System

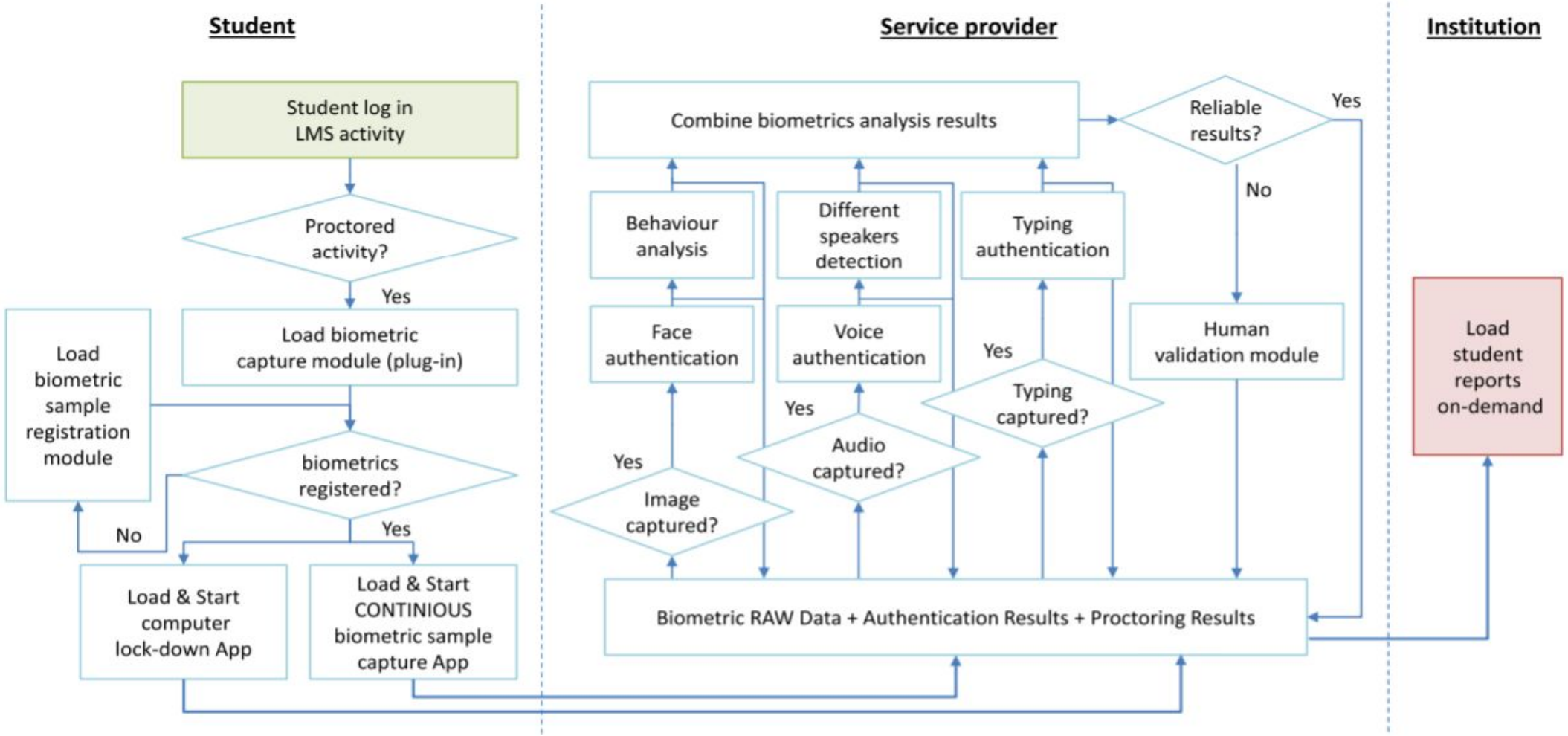

FIGURE 3. System workflow.

Characteristics of system

- Continuous and not scheduled system
- Automatic and scalable
- Few requirements for end user
- Reliable results
- Fully integrated in any LMS(Learning Management System)
- Secured and Private

(a) The 3 images taken for student registration.

(b) Correct student authentication.

(c) Another person.

(d) More than one person.

(e) Nobody in front of the device.

FIGURE 4. Authentication and proctoring system captured and analyzed image examples.

Modules in architecture

- Data capture and storage module
- Authentication module
- Proctoring and computer lockdown module
- Human verification module
- Result representation module

Implementation related points

- FaceBoxes methodology
- M3L(Multi-level, multi-modal, multi-task learning)
- CLAHE (Contrast Limited Adaptive Histogram Equalization)
- VoIP (Voice over Internet Protocol)
- Keystroke dynamics is not reliable
- Electron framework

Conclusion

Key points of today's presentation:

- Interesting literature findings like keystroke dynamics,360-degree camera
- Architecture of system
- Processing cores description
- Workflow of system
- Modules in architecture with characteristics

References

[1] https://ieeexplore.ieee.org/document/9357335

[2] https://ieeexplore.ieee.org/document/5978465

[3] https://link.springer.com/book/10.1007/978-3-030-78270-2

[4] https://link.springer.com/article/10.1007/s10639-021-10597-x

[5] https://link.springer.com/chapter/10.1007/978-3-030-78270-2_26

Thank You