CLOUD BASED SECURE AND EFFICIENT FRAMEWORK FOR ONLINE STUDENT AUTENTICATION BASED ON BIOMETRIC TECHNOLOGY

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ABSTRACT:

Identity verification and proctoring of online students are one of the key challenges to online learning today. Especially for online certification and accreditation, the training organizations need to verify that the online students who completed the learning process and received the academic credits are those who registered for the courses. Furthermore, they need to ensure that these students complete all the activities of online training without cheating or inappropriate behaviours. The COVID-19 pandemic has accelerated (abruptly in certain cases) the migration and implementation of online education strategies and consequently the need for safe mechanisms to authenticate and proctor online students. There are several technologies with different grades of automation. In this paper, we deeply describe a specific solution based on the authentication of different biometric technologies and an automatic proctoring system (system workflow as well as AI algorithms), which incorporates features to solve the main concerns in the market: highly scalable, automatic, affordable, with few hardware and software requirements for the user, reliable and passive for the student. Finally, the technological performance test of the large-scale system, the usability privacy perception survey of the user and their results are discussed in this work.

KEYWORDS: Biometric authentication, cloud computing, computer vision, data science applications in education, distance education and online learning, Machine learning, security, computer vision.

INTRODUCTION:

There are several technologies with different grades of automation. In this paper, we deeply describe a specific solution based on the authentication of different biometric technologies and an automatic proctoring system (system workflow as well as AI algorithms), which incorporates features to solve the main concerns in the market: highly scalable, automatic, affordable, with few hardware and

software requirements for the user, reliable and passive for the student. Finally, the technological performance test of the large-scale system, the usability privacy perception survey of the user and their results are discussed in this work.

E-learning has a serious deficiency, which is the lack of efficient mechanisms that assure user authentication, in the system login as well as throughout the session. Especially for online certification and accreditation, the training organizations need to verify that the online learners who completed the learning process and received the academic credits. In order to prevent compromising the credibility of online accreditation, validation must be carried out in a constant or continuous manner. At the same time, validation should be non-invasive and non-disruptive, and does not distract the learning process. Online proctoring, generally refers to proctors (humans) monitoring an exam over the internet through a webcam.

OBJECTIVES:

To describe a specific solution for the authentications of student based on biometric technology and an automatic proctoring system. The usability privacy perception survey of the user and their results are discussed in this work.

LITERATURE REVIEW:

1. **H. S. G. Asep and Y. Bandung, ‘‘A design of continuous user verification for online exam proctoring on M-learning,’’ in Proc. Int. Conf. Electr. Eng. Informat. (ICEEI), Jul. 2019, pp. 284–289.**

   The answer script evaluation is an important part of assessing students' performance. Typically, an answer script evaluation is done manually that sometimes can be biased. The evaluation depends on various factors like mood swing of the evaluator, the interrelation between the student and evaluator. Additionally, evaluation is a very tedious and time-consuming task. In this paper, a natural language processing-based method is shown for automatic answer script evaluation. Our experiment consists of text extraction from answer script, measuring various similarities between summarized extracted text and stored correct answers, and then assign a weight value to each calculated parameters to score the answer script. For summary generation from the extracted text, we have used keyword-based summarization techniques. Here four similarity measures (Cosine, Jaccard, Bigram, and Synonym) are used as parameters for generating the final mark. Automatic evaluation of answer scripts has been found very useful from our experiments, and often the assigned marks is the same as manually scored marks.

2. **L. K. Musambo and J. Phiri, ‘‘Student facial authentication model based on OpenCV’s object detection method and QR code for Zambian higher institutions of learning,’’ Int. J. Adv. Comput. Sci. Appl., vol. 9, no. 5, Jan. 2018.** (IJACSA)

Facial biometrics captures human facial physiological data, converts it into a data item variable so that this stored variable may be used to provide information security services, such as authentication, integrity management or identification that grants privileged access or control to the owner of that data variable. In this paper, we propose a model for student authentication based on facial biometrics. We recommend a secure model that can be used in the authentication and management of student information in the registration and access of resources, such as bursaries, student accommodation and library facilities at the University of Zambia.

SYSTEM DESIGN

Biometrics are automated techniques of determining a person's identity based on physiological and observable characteristics. Biometric systems have changed the way people identify and verify themselves all around the world. Not only has the way people are identified altered as a result of this technology, but the time it takes to identify and verify persons has also decreased dramatically. Biometric techniques measure different traits such as the face, fingerprints, handwriting, palmprints, hand geometry, gait, iris, retinal, and voice.

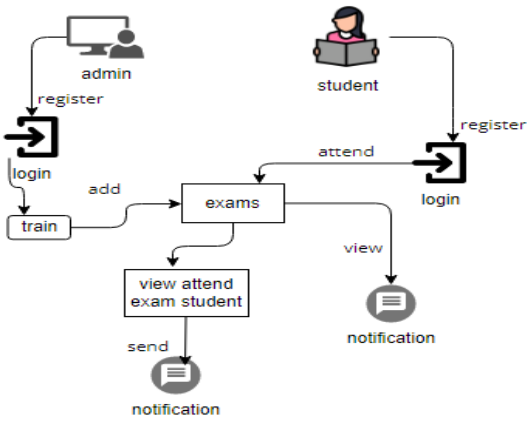

Figure 1

Admin

View students: admin can view registered students details

Train student: Train the registered students face data

Add Questions: admin can add the questions with options(objective type questions)

Create Exam: Admin Creates a new exam for students. the exam contains objective type of questions

view student results: view student attempted exam details.

At the authentication process any student can be act as proxy, admin will retrieve results status is proxy. then admin sends a email to student for exam submission rejected.

Student:

Register: student register with their details

login: login with valid credentials

Take test: Student attempt the available exam.

Authentication Process:

1. collect data from student on registration process
2. Admin will be train the registered students information
3. Checks the student on the student authentication test
4. if student proxy the exam submission status store as proxy, else status original.

ARCHITECTURE DIAGRAM:

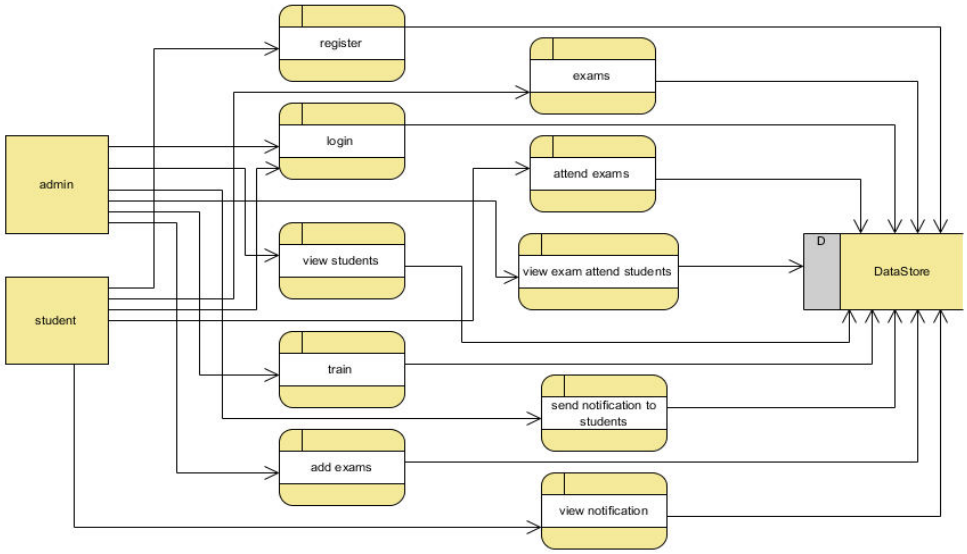

FIGURE 2

Goals:

The primary goals in the design of the uml are as follows:

1. Provide users a ready-to-use, expressive visual modeling language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modeling language
5. Support higher level development concepts such as collaborations, frameworks, patterns and components.

TESTING THE DATASET:

Unit test, Integration test, Functioal test, system test, white box testing, Block Box testing, White box testing.

IMPLEMENTATION:

- View students : admin can view registered student details.
- Trainee student : trainee the registered student face data.
- Add question : admin can add the questions with operations.
- Create Exam : admin can create a new exam for students the exam contains objective type of questions.
- View students results : view students attempted exam details

CONCLUSION

The project concludes that, we have successfully proposed an user friendly application called Online Student Authentication and Proctoring System Based on Multimodal Biometrics Technology with the help of AI algorithms to identify the fake and real students while attending exams by registering all of the real students' faces

FUTURE ENHANCMENT

Biometric usage is accelerating in a variety of domains, including healthcare, government, and banking. With rapid innovations and developments, authentication processes are getting more secure and convenient. Biometric technology has become more accessible to the general public

thanks to the ease with which it can be integrated into wearables and mobile phones.The process also developed in voting and college id purposes.

REFERENCES:

1. S. Zhang, X. Zhu, Z. Lei, H. Shi, X. Wang, and S. Z. Li, ‘‘FaceBoxes: A CPU real-time face detector with high accuracy,’’ in Proc. IEEE Int. Joint Conf. Biometrics (IJCB), Oct. 2017, pp. 297–309
2. W. Liu, D. Anguelov, D. Erhan, C. Szegedy, S. Reed, C. Y. Fu, and A. C. Berg, SSD: Single Shot Multibox Detector (Lecture Notes in Computer Science: Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). Springer, 2016.
3. F. Schroff, D. Kalenichenko, and J. Philbin, ‘‘FaceNet: A unified embedding for face recognition and clustering,’’ in Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR), Jun. 2015, pp. 815–823.
4. R. A. Yeh, C. Chen, T. Y. Lim, A. G. Schwing, M. Hasegawa-Johnson, and M. N. Do, ‘‘Semantic image inpainting with deep generative models,’’ in Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR), Jul. 2017, pp. 6882–6890.
5. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio, ‘‘Generative adversarial nets,’’ in Proc. 27th Int. Conf. Neural Inf. Process. Syst. (NIPS), vol. 2. Cambridge, MA, USA: MIT Press, 2014, pp. 2672–2680
6. D. Povey, A. Ghoshal, G. Boulianne, L. Burget, O. Glembek, N. Goel, M. Hannemann, P. Motlicek, Y. Qian, P. Schwarz, J. Silovsky, G. Stemmer, and K. Vesely, ‘‘The kaldi speech recognition toolkit,’’ in Proc. IEEE Workshop Autom. Speech Recognit. Understand. (ASRU), Waikoloa, HI, USA. Piscataway, NJ, USA: IEEE Signal Processing Society, Dec. 2011, p. 30
7. L. Wan, Q. Wang, A. Papir, and I. L. Moreno, ‘‘Generalized end-to-end loss for speaker verification,’’ in Proc. IEEE Int. Conf. Acoust., Speech Signal Process. (ICASSP), Apr. 2018, pp. 4879–4883
8. Q. Wang, C. Downey, L. Wan, P. A. Mansfield, and I. L. Moreno, ‘‘Speaker diarization with LSTM,’’ in Proc. IEEE Int. Conf. Acoust., Speech Signal Process. (ICASSP), Apr. 2018, pp. 5239–5243
9. Y. Zhong, Y. Deng, and A. K. Jain, ‘‘Keystroke dynamics for user authentication,’’ in Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. Workshops, Jun. 2012, pp. 117–123 Y. Zhong, Y. Deng, and A. K. Jain, ‘‘Keystroke dynamics for user authentication,’’ in Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. Workshops, Jun. 2012, pp. 117–123

10. Z. Zhang, M. Zhang, Y. Chang, S. Esche, and C. Chassapis, ‘‘A virtual laboratory system with biometric authentication and remote proctoring based on facial recognition,’’ Comput. Educ. J., vol. 7, no. 4, pp. 74–84, 2016.

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