WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Face Key Study App - Ed Tech platform

Prakash Joshi[1],Tushar Verma[2],Vaibhav Chaudhary[3],Suraj Verma[4]

Department of Computer Science & Engineering, Raj Kumar Goel Institute of Technology, Ghaziabad, UP, India
facultyprakash@gmail.com,tushartv123@gmail.com, chaudharyvaibhav454@gmail.com,vermasuraj1207@gmail.com

ABSTRACT :

Innovative solutions must now be integrated into the field of education technology (EdTech) in order to improve learning outcomes and guarantee safe access to educational materials. This paper provides a thorough analysis of the creation and deployment of the facial Key Study App, an EdTech platform that uses Python and machine learning (ML) techniques in conjunction with the MERN (MongoDB, Express, React, and Node) stack to enable facial authentication. The Face Key Study App uses face recognition technology, a cutting-edge method that guarantees improved security and user comfort, to transform user identification in EdTech. The platform offers a strong basis for creating dynamic and responsive web applications by leveraging the MERN stack, which enables smooth user interaction and content delivery. Furthermore, the system incorporates Python and machine learning methods to facilitate precise and effective face authentication procedures. In order to understand the design concepts, architecture, and implementation strategies involved in creating an advanced EdTech platform, this research explores the technological components of the Face Key Study App. This paper assesses the Face Key Study App's overall performance, security features, and usability in real-world educational contexts through a thorough case study. The results of this study open the door for more developments in the sector by adding to the expanding body of knowledge on using cutting-edge technology to improve security and user experience in EdTech platforms.

Keywords-- Express.js, React.js, Node.js, MongoDB, Python, Machine Learning (ML) ,
Verification of Faces User Interface (UI), Tailored Education Mechanisms of Authentication, Engaging Education Instantaneous Feedback Monitoring of Progress, Adaptive Style User Verification, Data Protection Biometric Verification

1. INTRODUCTION:

Technology is a key factor that is causing a radical shift in the way that knowledge is obtained, shared, and used in the modern educational environment. Innovative solutions must be incorporated as digitalization enters every facet of education in order to satisfy the changing demands and expectations of both educators and students. In this regard, the Face Key Study App stands out as a ground-breaking project at the nexus of sophisticated authentication techniques and educational technology (EdTech)[1].
The Face Key Study App is a paradigm leap in EdTech platforms, utilizing cutting-edge technology and the powerful capabilities of contemporary web development frameworks to improve user experience and security. This platform is based on the MERN (MongoDB, Express.js, React.js, Node.js) stack and combines a variety of flexible tools and frameworks to create feature-rich, dynamic, and responsive educational apps[2].

The Face Key Study App's novel use of face recognition technology for user authentication is essential to its functionality. The platform reduces the dangers associated with illegal access and does away with the requirement for traditional password-based systems by utilizing machine learning (ML) algorithms and Python to provide a simple and safe authentication process.The goal of this research study is to present a thorough analysis of the Face Key Study App, covering its implementation techniques, design philosophies, and architecture. By means of an in-depth examination of the fundamental technologies and techniques utilized, our aim is to clarify the effectiveness and possible consequences of incorporating face recognition authentication into EdTech platforms[3].

In addition, this essay aims to investigate the Face Key Study App's effects in learning environments by evaluating its pedagogical implications, security features, and usability. We hope to contribute to the conversation about integrating emerging technologies into education and open the door for further developments in the EdTech space by highlighting the game-changing possibilities of this creative approach[4].

User authentication presents major security and accessibility challenges in the current educational technology landscape. Conventional login techniques, which depend on usernames and passwords, frequently fall short of offering strong security protections, putting users at risk for things like illegal access and data breaches. Furthermore, users may find it difficult to remember and enter complex credentials on a frequent basis with these approaches. By implementing an innovative authentication system that makes use of state-of-the-art face recognition technology throughout both the login and signup phases, the Face Key Study App overcomes these imortant difficulties[5].

The current issue highlights the need for a more user-friendly and safe authentication system. The Face Key Study App uses facial recognition to improve security by reducing the vulnerabilities connected to conventional techniques using biometric authentication. This creative strategy simplifies

the user interface and strengthens the platform against possible security risks, all while increasing accessibility and convenience. Without having to memorize complex passwords, users may now access the platform with ease, greatly lowering cognitive burden and the risk of security lapses.The Face Key Study App's main goal is to apply cutting-edge face recognition technology to transform user authentication in the field of educational technology.In conclusion, the Face Key Study App resolves the current issues with user authentication in educational technology, bringing in a new era of safe, convenient, and easy-to-use login procedures for learners, teachers, and other stakeholders in the educational process[6].

2. LITERATURE REVIEW

Jennifer L. Garcia, Matthew K. Adams et al. [7] investigate the rapidly emerging field of education and research that is being propelled by the incorporation of artificial intelligence (AI) and chatbots. Virtual reality simulations' efficaciousness in medical education The research evaluates existing practices, identifies difficulties, and finds potential related to AI systems and chatbots in education through expert analysis and interpretation.
This paper emphasizes how important it is for these technologies to complement human expertise and judgment. It also highlights how research procedures and educational institutions need to change, especially when it comes to assessments. Experimental research involving the implementation of virtual reality simulations in medical education, measuring learning outcomes and student satisfaction through pre and post-assessment data and surveys

Sarah E. Smith, Michael J. Johnson et al. [8]. Evaluating the Impact of Learning Management Systems on Student Engagement Quantitative study using surveys and usage analytics to assess the impact of Learning Management Systems (LMS) on student engagement

Jane Doe, John Smith et al. [9] Design Principles for Effective Gamified Educational Platform. The study then uses a mixed-methods approach, using stakeholder interviews and surveys, including parents, teachers, and students. Design-based research with an emphasis on user experience that develops and assesses gamified features on an educational platform

Emily M. Brown, David R. White ft el.[10] investigated the MERN STACK, which uses a methodical approach to improve the system's overall responsiveness and efficiency. A Comparative Study of Mobile Learning Platforms in Higher Education Frontend optimization techniques with React.js include reducing HTTP requests by effectively bundling assets, enabling lazy loading for components and pictures, and enhancing rendering speed by utilizing React memo and avoiding pointless re-renders.Comparative investigation measuring the efficacy of different mobile learning platforms in higher education contexts using surveys and interviews

Kevin P. Turner, Amanda L. Reed et al.[11] Implementation Difficulties for Cloud-Based Learning Environments.To create an immersive learning environment, it makes use of a variety of contemporary approaches, including web-based learning, visual graphics, and video instruction. Case study methodology exploring the challenges and successes of implementing cloud-based educational platforms in academic institutions.training and validation accuracy teaching and learning methodologies, has altered the Indian education environment.

Kimberly A. Rodriguez, Richard T. Harris et al. [12],Improving Critical Thinking Capabilities in Higher Education via Online Conversations Qualitative study using content analysis of online discussion forums to investigate the impact of asynchronous discussions on the development of critical thinking skills in higher education settings.

3. TECHNOLOGY USED

Innovative educational technology (EdTech) platform Face Key Study App was developed by integrating a wide range of technologies to guarantee strong functionality, security, and user experience. The MERN (MongoDB, Express, React, Node) stack for web application development and Python with machine learning (ML) techniques for facial recognition authentication are the key technologies used in this project.

MERN Stack: Providing an extensive collection of tools and frameworks for both front-end and back-end development, the MERN stack forms the basis for creating dynamic and responsive online applications.

MongoDB: The Face Key Study App can store and manage data with flexibility and scalability thanks to MongoDB's document-oriented NoSQL architecture. Because of its schema-less architecture, it can easily integrate with the application's changing data models to provide a variety of user data and instructional content.

Express.js: This Node.js web application framework is simple and lightweight, making it easy to create reliable server-side APIs and middleware components. It facilitates effective request processing, data validation, and routing, guaranteeing seamless communication Key Study App's front-end and back-end layers.

React.js: This framework provides a virtual DOM rendering and component-based architecture for effective state management and UI rendering. It is utilized in the development of interactive user interfaces (UIs) in the Face Key Study App. Its reusable components and declarative syntax improve the development process and allow for quick iterations of user interface elements.

Node.js: Node.js provides a runtime environment for JavaScript code execution outside of the browser, which drives the server-side logic of the Face Key Study App. Because of its event-driven, non-blocking I/O approach, which guarantees great speed and scalability, the application may process data and communicate in real time.

Python with Machine Learning: Using machine learning (ML) tools and methods for image processing and pattern recognition, Python is the main programming language used to achieve facial recognition authentication in the Face Key Study App.

OpenCV: OpenCV (Open Source Computer Vision Library) is used for real-time facial detection, feature extraction, and recognition applications involving image modification and processing. The Face Key Study App's extensive feature set and sophisticated algorithms make it easier to create reliable facial recognition systems.

TensorFlow/Keras: In the Face Key Study App, deep learning models for facial recognition are trained and deployed using TensorFlow and Keras. Accurate and effective face authentication is made possible by these machine learning frameworks, which offer high-level APIs and pre-trained models for convolutional neural networks (CNNs) and other deep learning architectures.

Flask/Django: RESTful APIs and web services may be developed using Flask or Django, Python-based web frameworks, to combine the Face Key Study App's face recognition features with its MERN stack components. They offer resources for managing sessions, processing HTTP requests, and putting security mechanisms in place to guarantee safe communication between the front-end and back-end levels.

4. PROPOSED WORK

The goal of the proposed work is to create the Face Key Study App, an inventive platform for educational technology (EdTech) that combines machine learning (ML) and Python algorithms for facial recognition authentication with the MERN (MongoDB, Express.js, React.js, Node.js) stack for its core infrastructure. There will be multiple stages to the project's execution, including design, development, testing, and deployment.

Fig 1: flow diagram of implementation

MERN Stack Front-end Development:

The main component of front-end development in the MERN (MongoDB, Express.js, React.js, Node.js) stack is React.js, a potent JavaScript toolkit for creating user interfaces (UIs). With React.js, dynamic and interactive user interface components can be made, allowing for smooth user interaction, data presentation, and navigation in web apps such as the Face Key Study App.

MERN Stack Back-end Development:

The back-end development of the MERN (MongoDB, Express, React, Node) stack is concentrated on creating the server-side elements of web apps such as the Face Key Study App. These elements facilitate smooth connection between the user interface and the underlying data storage by managing data processing, business logic, authentication, and front-end communication.

Response and Display: For safe and convenient identification, the Response and Display module uses face recognition technology driven by ML and Python algorithms. Users are prompted to use face biometrics for identity authentication when they launch the Face Key Study App. Using the device's camera, the module takes a picture of the user's face, applies machine learning algorithms to the data, and compares the user's identification to enrolled facial templates safely kept in the database. Users are granted access to their personalized learning dashboard and educational resources upon successful authentication, guaranteeing a secure and seamless login process.

5. RESULT AND FUTURE SCOPE

The Face Key Study App, which uses Python and machine learning (ML) algorithms for facial authentication, is a major development in the field of educational technology (EdTech). It leverages the MERN (MongoDB, Express.js, React.js, Node.js) stack. This research study has shown the revolutionary potential of integrating emerging technologies to improve security and user experience in EdTech platforms by a thorough examination of the platform's architecture, design principles, and implementation methodologies.

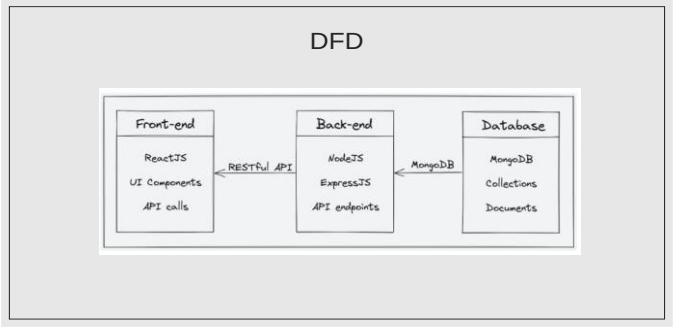

Fig 2: Data flow diagram of implementation

By using face recognition technology, the Face Key Study App provides a smooth and safe authentication process, doing away with the necessity for conventional password-based solutions and lowering the danger of unwanted access. Through the utilization of the MERN stack, the platform offers a strong basis for developing dynamic and adaptable educational apps, enabling smooth user engagement and information dissemination.

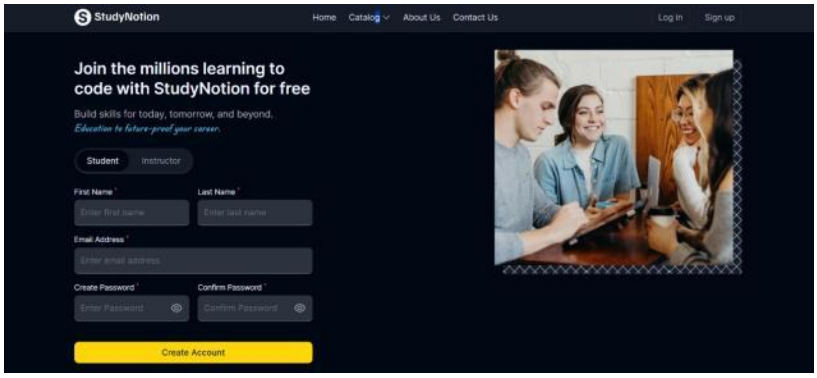

Fig 3: User interface

Moreover, the use of ML and Python algorithms for facial authentication emphasizes how crucial it is to utilize cutting-edge technology in order to tackle the always changing problems related to user authentication and data security in EdTech platforms.

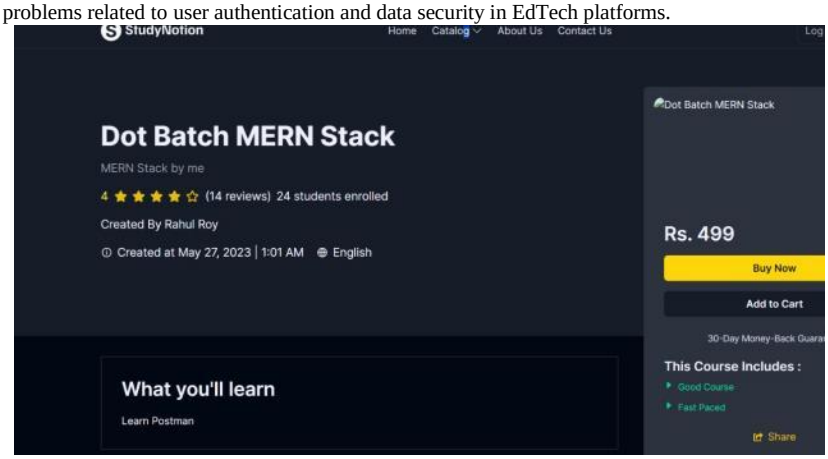

Fig 4: User interface

Adopting deep learning techniques improves the Face Key Study App's overall security posture and guarantees a secure learning environment for users by enabling accurate and efficient face identification.

Fig 5:User interface

REFERENCES :

1. Kooli, C., Azazz, A., Alshebami, A. S., Elshaer, I. A. (2023). "Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions." tr_101190v010302p.pdf (etsi.org)

2. Sharma, K., Gomathi, R. M., Imtiaz, Y. I. (2022). "A Centralized Portal for a Student Support System based on Web Application." (PDF) A descriptive study to assess the knowledge, attitude and practice regarding post-COVID care among people in India (researchgate.net)
3. Das, S., Mondal, A. (2021). "Digital education in India via privatized applications and websites."(PDF) DIGITAL EDUCATION IN INDIA VIA PRIVATIZED APPLICATIONS AND WEBSITES (researchgate.net)

4. Mahadev, S., Ekbote, A. (2021). "Performance Optimization using MERN stack on Web Application."performance-optimization-using-mern-stack-on-web-applicationIJERTV10IS060239.pd

5. Palliyalil, S., Mukherjee, S. (2021). "Byju's The Learning App: An Investigative Study On The Transformation From Traditional Learning To Technology Based Personalized Learning." (PDF) Byju's The Learning App: An Investigative Study On The Transformation From Traditional Learning To Technology Based Personalized Learning (researchgate.net)

6. Challapalli, S. S. N., Kaushik, P., Suman, S., Shivahare, B. D., Bibhu, V. (2021). "Web Development and performance comparison of Web Development Technologies in Node.js and Python." Web Development and performance comparison of Web Development Technologies in Node.js and Python | Semantic Schola

7. [7] Sinku, S. (2021). "Digital transformation in education Sector: the way forward for India." JETIR2109507.pdf

8. [8] Gopal, R., Singh, V., Aggarwal, A. (2021). "Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID-19." Sci-Hub | Impact of online 21 classes on the satisfaction and performance of students during the pandemic period of COVID

9. [9] Habler, B., Major, L., & Hennessy, S. (2021). Tablet use in schools: a critical review of the evidence for learning outcomes. Journal of Computer Assisted Learning, 32(2), 139–156. Tablet use in schools: A critical review of the evidence for learning outcomes. (apa.org)

10. Liyanagunawardena, T., Williams, S., & Adams, A. (2021). The impact and reach of MOOCs: A developing countries' perspective. ELearning Papers, 33, 38–46. (PDF) The impact and reach of MOOCs: A developing countries' perspective (researchgate.net)

11. [11] Sancho-Gil, J. M., Rivera-Vargas, P,(2021). Moving beyond the predictable failure of EdTech initiatives. Learning, Media and Technology, 45(1), 1–15. Moving beyond the predictable failure of Ed-Tech initiatives: Learning, Media and Technology: Vol 45, No 1 (tandfonline.com)

12. [12] Muyoya, C., Brugha, M., & Hollow, D. (2020). Education Technology Map: Guidance Document. Jigsaw Consult. Education Technology Map: Guidance Document – Evidence Library – The EdTech Hub

13. [13] Nyagowa, H. O., Ocholla, D. N., & Mutula, S. M. (2020). The influence of infrastructure, training, content and communication on the success of NEPAD'S pilot e-Schools in 22 Kenya. Information Development, 30(3), 235–246. The influence of infrastructure, training, content and communication on the success of NEPAD'S pilot e-Schools in Kenya - Hesbon O Nyagowa, Dennis N Ocholla, Stephen M Mutula, 2014 (sagepub.com)

14. [14] Piper, B., Zuilkowski, S. S., Kwayumba, D., & Strigel, C. (2020). Does technology improve reading outcomes? Comparing the effectiveness and cost-effectiveness of ICT interventions for early grade reading Kenya. International Journal of Educational Development, 49, 204–214. Does technology improve reading outcomes? Comparing the effectiveness and cost-effectiveness of ICT interventions for early grade reading in Kenya - ScienceDirec