

Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording

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ABSTRACT

Tuition payment is an important process in educational institutions, but students who mainly use online banking may still need to withdraw or cash out money before they pay in a cash payment. The use of digital payment and cloud-based technologies provide opportunities for more convenient and organized school transactions. Previous studies have also shown the growing use of cloud computing in Philippine higher education and the increasing use of QR-based digital payments. This study proposes a Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording as an alternative method of paying tuition and school fees. The proposed system will use facial recognition to verify the student's identity and provide a passcode as an alternative verification method when facial recognition encounters an error. After successful verification, the kiosk will display the student's tuition balance and provide a QR-based payment option through the integration of PayMongo. Student and payment-related information will be managed through AWS Cloud, while successful transactions will be automatically recorded and a receipt will be printed. The system will be developed and evaluated based on its functionality, student verification, payment processing, transaction recording, and receipt generation. The proposed system is expected to provide students with a more convenient alternative to cash-based tuition payment while helping organize payment transactions through digital processing and cloud-based data management.

Keywords: *Facial Recognition, Payment Kiosk, Student Verification, Student Payment*

SECTION I — INTRODUCTION (THE PROBLEM AND ITS SETTING)

1.1 Introduction

The use of information technology has made many services and transactions more accessible and convenient. The use of digital systems can help reduce manual processes, improve transaction management, and provide faster access to information. These developments have also created opportunities for organizations, including educational institutions, to improve the way they manage student-related services and payments. In educational institutions, tuition payment is an important administrative activity that requires student identification, verification, payment processing, and transaction recording. When these activities are performed manually, they may require considerable time and may create opportunities for errors, especially when many students make payments within a limited period. Long queues, waiting time, manual encoding, and the need for staff assistance may also affect the efficiency of payment services.

The development of automated and self-service technologies has provided new approaches to improving payment-related processes. Self-service kiosks allow users to complete transactions with less direct assistance from staff. Barbado et al. (2025) developed ADUPay, a self-service payment kiosk for Adamson University's recognized student organizations, which included automated receipt generation and centralized transaction logging. This demonstrates how kiosk-based systems can help automate payment activities and organize transaction records in an educational environment.

Facial recognition is another technology that can be used for identity verification and payment-related transactions. Zhong et al. (2021) found that factors such as perceived usefulness, perceived ease of use, facilitating conditions, personal innovativeness, and user attitude were associated with users' acceptance of facial recognition payment. Similarly, Nan et al. (2022) found that relative advantage, performance expectancy, effort expectancy, social influence, and perceived risk were associated with consumers' intention to use facial recognition payment. These studies indicate that facial recognition has potential for convenient transactions while also requiring attention to users' perceptions and concerns.

Privacy and security are also important considerations in systems that use facial recognition because facial information is biometric data. Liu et al. (2021) found that perceived privacy risk and privacy concerns were related to users' resistance to facial recognition payment. In educational settings, Par et al. (2025) also demonstrated the potential of facial recognition to automate student identification through an attendance management system. More directly related to payment, Calulut et al. (2026) developed FeeTap, a smart payment kiosk with facial recognition for automated student department fee collection. These studies provide a

basis for exploring the integration of facial recognition into student payment services while considering convenience, security, and proper transaction management.

Although existing studies have demonstrated the use of self-service kiosks, facial recognition, and automated student fee collection, there remains a need to further integrate and adapt these technologies into a tuition-payment workflow tailored to the requirements of the intended educational institution. The proposed system combines student verification, digital payment processing, automatic payment recording, cloud-supported data management, and receipt generation within a single self-service kiosk. In response to this need, the researchers propose the Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording.

The proposed system will use facial recognition for student verification, PayMongo for online payment processing, and AWS Cloud for the storage and management of necessary student and payment-related data. The system aims to provide a self-service tuition payment option while supporting more organized and automated transaction recording.

1.2 Background of the Study

One of the concerns in a self-service tuition payment system is ensuring that the person accessing the account is the actual student. Facial recognition can be used as an additional method of student verification. Through facial recognition, the system can compare the student's face with the registered facial data before allowing access to the student's payment information. If the system encounters difficulty in recognizing the student's face or detects an identification error, a passcode can serve as an alternative verification method.

The researchers propose a Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording as an alternative method for tuition payment. The proposed kiosk will allow students to verify their identity, access their tuition information, view the amount they need to pay, and proceed with the payment using a QR code. The student can scan the QR code using a supported online banking application. After the payment is completed and verified, the transaction information will be recorded automatically, and the kiosk will provide a printed receipt.

The proposed system will also use Amazon Web Services (AWS) cloud infrastructure to store and manage the required student and payment-related information. The cloud-based storage will allow the system to access the necessary information when a student's identity is successfully verified. This can help organize student payment records and reduce the need for manual recording of transactions.

Therefore, the proposed system is intended to provide an alternative and more convenient method of paying tuition and school fees. By combining facial recognition, alternative passcode verification, QR-based payment, cloud data storage, automatic payment recording, and receipt printing, the system aims to simplify the payment process while providing a more organized way of managing student payment transactions.

1.3 Objectives of the Study

- **General Objective:** The general objective of this research is to develop a Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording that provides students with an alternative, convenient, and organized way to pay tuition and school fees by using QR-based online banking.

- **Specific Objectives:**

The study aims to:

1. Develop a kiosk that uses facial recognition to verify the identity of students before accessing their tuition payment information.
2. Provide a passcode verification option for students when facial recognition cannot properly identify or verify the student identity.
3. Display the student's tuition balance and payment information after successful verification.

4. Integrate PayMongo as an online payment gateway to facilitate QR-based tuition payment and enable the system to receive payment confirmation for automatic transaction recording.
5. Automatically record and update payment transactions after a successful payment.
6. Use AWS Cloud to store and manage the necessary student information.
7. Generate and print a payment receipt after the transaction is successfully completed.
8. Provide an alternative payment method that can reduce the need for cash transactions and make the tuition payment process more convenient for students.

1.4 Scope and Limitation of the Study

- **Scope:** This study focuses on the development of a smart tuition payment kiosk with facial recognition for student verification and automatic payment recording. The proposed system is designed to allow students to verify their identity through facial recognition, view their tuition balance and payment information, and complete their payment through the available payment options. The system will integrate PayMongo to facilitate online payment transactions and AWS Cloud to support the storage and management of student and payment-related data. After a successful transaction, the system will automatically record the payment information in the database. The system will also provide authorized school personnel with access to payment records for monitoring and verification purposes.
- **Delimitation:** This study focuses on tuition payment transactions and student verification within the intended educational institution. The system will only recognize and verify students whose information and facial data have been registered in the system. The proposed system does not cover other school transactions such as enrollment, library payments, cafeteria purchases, or miscellaneous fees unless they are included as part of the institution's tuition payment records. The study also does not include the development of a banking system or payment service itself, as online payment processing will rely on the services provided by PayMongo. The availability of the payment function may also depend on internet connectivity and the availability of the integrated cloud and payment services. Hardware procurement, maintenance, and large-scale deployment of the kiosk are also outside the primary scope of the study.

1.5 Significance of the Study

To the Students - This system provides a faster, more convenient, and secure way to pay tuition fees. It eliminates the need to carry cash, reduces long queues, and ensures every payment is properly recorded and accessible. Students may complete transactions more conveniently while reducing dependence on cash payments. and receive instant verification of their payment status.

To the School Administration and Finance Staff - This study minimizes manual encoding and paperwork by automatically recording all payment transactions. It reduces human error, speeds up payment verification, and creates an organized, centralized record system that makes financial monitoring and reporting easier and more efficient.

To the Parents and Guardians - This system offers a secure and transparent payment method. They can be assured that payments for their children are properly verified, recorded, and accounted for, giving them peace of mind and eliminating concerns about lost or unrecorded transactions.

To Future Researchers - This study serves as a valuable reference and foundation for future research on facial recognition, self-service kiosks, and automated payment systems in educational institutions. It provides insights that other researchers can build upon or expand when developing similar systems.

1.6 Definition of Terms

Amazon Web Services (AWS) Cloud. Refers to a cloud computing platform used to store and manage the student and payment-related data of the proposed system (Alimboyong & Bucjan, 2021; Baharuddin et al., 2021).

Automatic Payment Recording. Refers to the automatic saving and updating of a student's payment transaction after successful payment confirmation.

Facial Recognition. Refers to a biometric technology used to identify or verify a person through their facial characteristics (National Institute of Standards and Technology [NIST], 2025).

Kiosk. Refers to a self-service machine that allows students to access their tuition information and perform payment-related transactions.

Online Banking. Refers to a digital banking service that allows users to access their accounts and perform financial transactions through an internet-connected device (Musyaffi et al., 2021).

Passcode. Refers to a secret code or credential used to authenticate a user and provide access to a system (Temoshok et al., 2025).

Payment Recording. Refers to the process of storing information about a completed tuition or school fee payment in the system.

PayMongo. Refers to an online payment service integrated into the proposed system to facilitate digital payments and provide payment confirmation.

QR Code. Refers to a two-dimensional, machine-readable code used to store and provide information for digital transactions.

Receipt. Refers to a printed document generated by the kiosk as proof of a completed payment transaction.

Student Verification. Refers to the process of confirming that the person accessing the kiosk is the registered student associated with the account. Biometric verification is an automated process of confirming a biometric claim through comparison (NIST, 2025).

Tuition Payment. Refers to the payment made by a student for tuition and applicable school fees through the proposed payment system.

Tuition Balance. Refers to the remaining amount of tuition and applicable school fees that a student needs to pay.

SECTION II — LITERATURE REVIEW

2.1 Introduction to the Review

This chapter reviews literature and studies related to the development of the proposed Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording. The review is organized thematically and geographically, beginning with global studies concerning facial recognition, biometric payment, privacy, security, QR-based digital payment, and self-service technologies. It then discusses studies related to biometric and digital technologies in educational environments, followed by Philippine studies involving payment kiosks, cloud computing, QR-based systems, and student-related transactions.

The review concludes by identifying the similarities and differences between existing studies and the proposed system. The purpose is to establish the technological foundation of the study and identify the gap that the proposed system intends to address.

2.2 Review of Related Literature and Studies

Global

Facial recognition has increasingly been studied as a biometric technology for identity verification and payment-related applications. Zhong et al. (2021) investigated acceptance of facial recognition payment using an extended Technology Acceptance Model. Their study examined factors such as perceived usefulness, perceived ease of use, facilitating conditions, personal innovativeness, and user attitude. The findings

demonstrate that user perceptions and technological conditions can influence acceptance of facial recognition payment.

Yu et al. (2024) conducted a systematic literature review of empirical studies on acceptance of and resistance to facial recognition payment. Their review examined 22 key studies from an initial pool of 1,372 publications and identified 37 factors associated with acceptance or resistance. These factors included performance expectancy, effort expectancy, perceived usefulness, perceived ease of use, privacy, security, and user characteristics.

The findings of these studies indicate that facial recognition payment should not be evaluated only according to technical capability. User experience and perceived usefulness are also important considerations when designing systems involving biometric verification. Privacy is another major concern. Liu et al. (2021) examined privacy-related factors associated with resistance to facial recognition payment in China. Their study involved 1,200 users and found relationships among privacy policy effectiveness, privacy control, perceived privacy risk, privacy concerns, perceived benefits, and resistance.

This is relevant to the proposed system because facial information is associated with student identity. The proposed kiosk must therefore limit access to facial and student information to authorized processes and users. Li and Li (2023) investigated facial recognition payment service usage from a trust perspective. Their study used survey data from 217 facial recognition payment users and found that trust in the technology and service provider was associated with continued use. Perceived security and response efficacy were also associated with trust in facial recognition payment.

Moriuchi (2021) examined consumers' intention to use biometric facial recognition as a payment method and considered factors including trust, attitudes, perceived risk, and performance expectations. This further indicates that biometric payment systems involve both technical and user-perception considerations. Hu et al. (2023) examined the influence of perceived value and trust on users' intention to use facial recognition payment. Their research considered perceived convenience together with financial and privacy risks. These findings suggest that users may evaluate biometric payment based on a combination of benefits and perceived risks.

Liébana-Cabanillas et al. (2024) examined biometric mobile-payment systems using UTAUT2-related variables and perceived risk. Their study used data from more than 2,500 smartphone users and found that performance expectancy, effort expectancy, facilitating conditions, hedonic motivation, and risk were among the factors associated with intention to use biometric mobile payment. These findings support the need for a payment system that is understandable and convenient while maintaining appropriate security measures.

Recent research has also focused on the technical security of facial recognition payment. Pratama et al. (2025) conducted a systematic literature review of secure face recognition payment systems. Their review initially identified 219 articles and selected 10 studies that met their technical criteria. The review identified developments involving deep learning, multimodal features, and transformer-based architectures, while also noting challenges involving cross-dataset generalization, evaluation standards, computational efficiency, deepfakes, and presentation attacks. Although the proposed study is primarily focused on student verification rather than developing a new facial-recognition algorithm, these findings emphasize the importance of testing recognition reliability and considering possible security risks.

Research has also investigated facial recognition in educational environments. Rukhiran et al. (2023) examined user acceptance of biometric recognition technologies for examination attendance in higher education. The study found relationships involving perceived ease of use, trust, security, perceived usefulness, and behavioral intention. Sethukarasi et al. (2023) developed a face-biometric verification-oriented attendance system for educational use. Although their system focused on attendance rather than payment, the study demonstrates the application of facial biometric verification in student-related environments.

Self-service technology is another important component of the proposed system. Self-service kiosks allow users to interact directly with computerized systems to complete services. Ayodeji et al. (2023) examined waiting-time satisfaction and self-service technology in airport environments and found that waiting-time satisfaction and self-service technology were important factors in the service experience. QR-based payment systems also provide a foundation for the proposed payment workflow. Research by Tu et al. (2021) examined the adoption of QR-code mobile payment technology and identified social learning and environmental factors related to users' adoption intentions.

Another study on QR-code mobile payments developed an extended UTAUT model that included perceived security and perceived benefits. The study analyzed 424 valid responses and found that attitude, perceived usefulness, and subjective norms contributed to intention to use QR-code payment.

Research on QR code and mobile payment has also identified transaction convenience and speed as relevant factors in mobile-payment adoption. These global studies collectively establish that biometric authentication, self-service technology, and QR-based digital payment can support automated transaction processes. However, they also demonstrate that privacy, security, usability, reliability, and user acceptance must be considered when developing such systems

National

Philippine studies provide a more direct context for the proposed research. Alimboyong and Bucjan (2021) examined cloud-computing adoption among state universities and colleges in the Philippines. Their qualitative multiple-case study identified slow internet connection and lack of understanding or awareness of cloud computing as important challenges. At the same time, the study identified benefits of cloud computing to the educational environment.

This study is relevant because the proposed system will use cloud-supported information management. The limitation involving internet connectivity must therefore be considered during system development and testing. Barbado et al. (2025) developed ADUPay, a self-service payment kiosk for Adamson University's recognized student organizations. The system incorporated payment-related hardware, RFID-based identification, receipt printing, and centralized transaction monitoring. The study demonstrates that self-service payment kiosks can be implemented in a Philippine university environment.

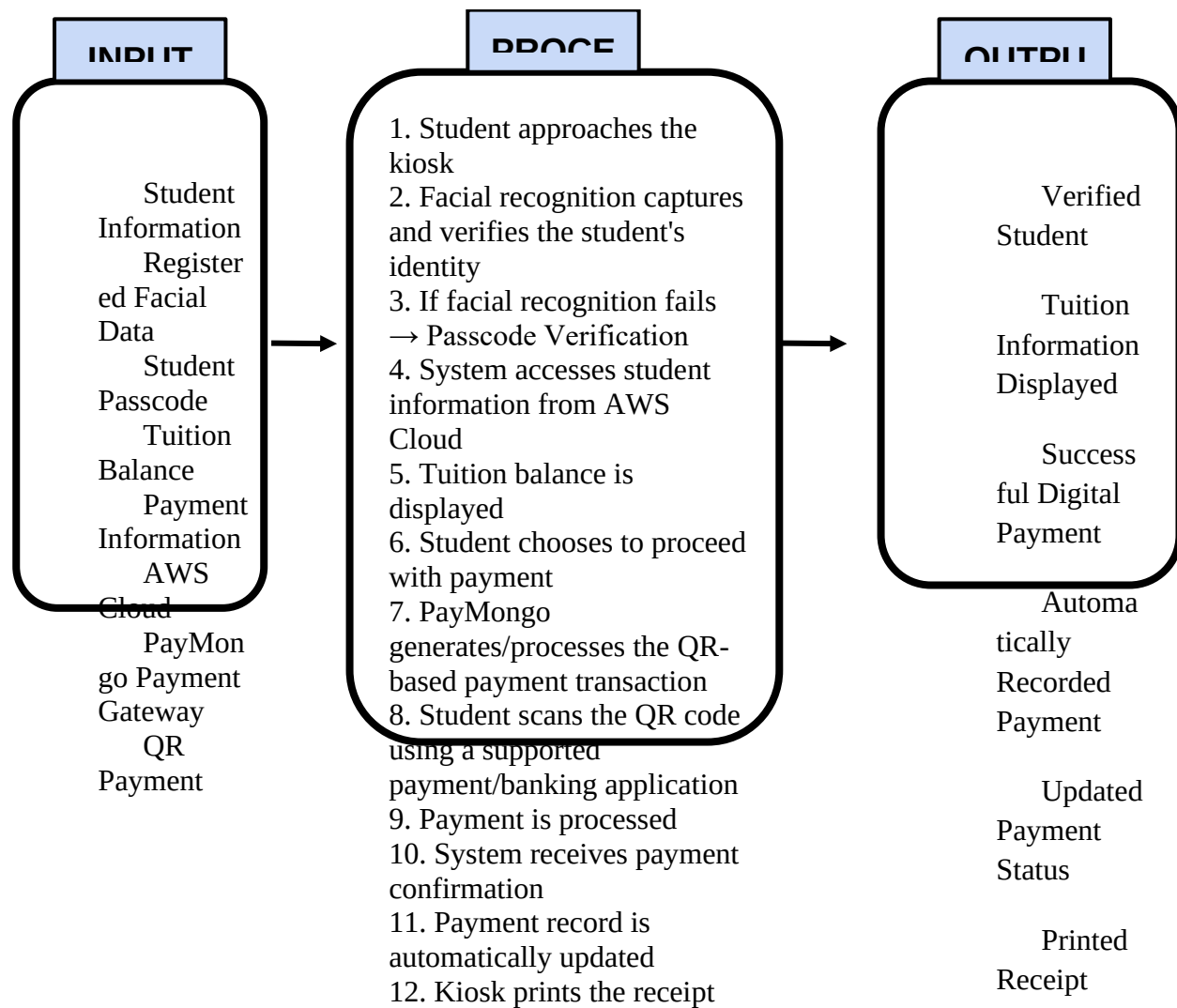
ADUPay is relevant to the present research because both systems use kiosk-based payment and automated transaction recording. However, ADUPay uses RFID-based identification and focuses on recognized student organization transactions, while the proposed system focuses on tuition payment and uses facial recognition as the primary student-verification mechanism. Calulut et al. (2026) developed FeeTap, a smart payment kiosk with facial recognition for automated student department fee collection. The study provides a particularly close reference because it combines facial recognition with a kiosk-based student payment environment.

FeeTap and the proposed system share the use of facial recognition, student-related payment processing, and kiosk technology. However, the proposed study introduces a different transaction workflow that uses an alternative passcode verification method, tuition-balance retrieval, QR-based digital payment, automatic payment recording, cloud-supported information management, and printed receipt generation.

Other Philippine educational studies have demonstrated the use of QR technology for institutional applications. Bregabiel and Santia (2024) developed a QR-code-enabled tracking and monitoring system in an educational institution. Although the system was not intended for tuition payment, it demonstrates the use of QR technology for identification, tracking, and digital record management.

Navalta (2022) also developed a QR-based system for monitoring vehicle entry and exit in a university environment. This demonstrates another application of QR technology in institutional settings. These studies provide support for using QR technology in educational environments, although the proposed study applies it specifically to digital tuition payment. Cloud-based educational applications have also been investigated by Tubay (2021), who studied students' use of cloud storage in a private university in the Philippines. The study demonstrates the relevance of cloud-based services in a Philippine educational environment.

2.3 Conceptual Framework



The conceptual framework of the study follows the Input-Process-Output (IPO) model. The input consists of the student information, registered facial data, student passcode, tuition balance, payment information, AWS Cloud, PayMongo payment gateway, and QR-based payment components required by the proposed system.

The process begins when a student approaches the kiosk and undergoes facial recognition for identity verification. If the system cannot properly verify the student's identity through facial recognition, the student may use a passcode as an alternative verification method. After successful verification, the system retrieves the student's information and tuition balance from the AWS Cloud.

The student can then choose to proceed with the payment. The system uses the integrated PayMongo payment gateway to facilitate the QR-based payment transaction. The student scans the displayed QR code using a supported banking or payment application. After the payment is successfully completed and confirmed, the system automatically records the transaction and updates the student's payment status.

The output of the proposed system consists of a verified student, displayed tuition information, successful digital payment, updated payment record, and printed payment receipt. The framework demonstrates how facial recognition, alternative authentication, cloud data management, payment gateway integration, and automatic transaction recording work together within the proposed tuition payment kiosk.

2.4 Synthesis

The reviewed literature and studies establish that facial recognition, biometric authentication, digital payment, and self-service kiosk technologies can be applied to improve the efficiency and convenience of automated transactions. Studies on facial recognition payment have identified perceived usefulness, ease of use, trust, privacy, security, and perceived risk as important factors that influence users' acceptance or resistance to biometric payment systems. These findings indicate that the development of facial recognition-based payment services should consider not only transaction convenience but also the protection of users' biometric and financial information.

Recent studies have also demonstrated the continuing development of facial recognition technologies for payment security. Research has explored deep learning, multimodal feature integration, anti-spoofing mechanisms, and other approaches intended to improve recognition reliability and protection against fraudulent authentication. These studies provide a technological basis for using facial recognition as a student verification mechanism while emphasizing the importance of security and system reliability.

Studies on self-service kiosks further show that automated service technologies can reduce dependence on staff-assisted transactions and provide users with alternative channels for completing services. However, the effectiveness of self-service systems depends on factors such as processing speed, reliability, usability, and successful transaction completion. This indicates that a tuition payment kiosk should not only automate payment but should also provide a simple and reliable workflow for student verification, payment processing, and transaction recording.

Philippine studies provide additional support for the feasibility of kiosk-based and digital payment systems in educational environments. ADUPay demonstrates the application of a self-service payment kiosk in a Philippine university setting, while FeeTap demonstrates the integration of facial recognition with an automated student fee collection kiosk. These studies show that automated payment and biometric verification can be applied to student-related transactions. However, the existing studies differ in their specific payment processes, authentication mechanisms, and system components.

Based on the reviewed literature, the proposed study combines several functions into a single tuition payment workflow. The proposed Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording will use facial recognition as the primary method of student verification and provide passcode authentication as an alternative when facial verification is unsuccessful. After successful verification, the system will retrieve the student's tuition information and balance, facilitate a QR-based digital payment transaction through the integrated payment gateway, automatically record the confirmed payment, update the student's payment information, and generate a printed receipt.

Therefore, the reviewed studies provide the technological and conceptual foundation for the proposed system. The study will focus on the integration of student verification, tuition payment, automatic transaction recording, cloud-supported data management, and receipt generation within a self-service kiosk. In developing and evaluating the proposed system, considerations such as usability, security, recognition reliability, transaction efficiency, and privacy will also be addressed.

SECTION III — METHODOLOGY

3.1 Research Design

This study will utilize a descriptive-developmental research design with a quantitative approach. The developmental aspect of this research involves the designing and development of the proposed smart facial recognition for tuition payment kiosk for student verification and automatic recording of payment. Developmental research is typically done for the purpose of systematically developing and evaluating a product or system.

The study aims at describing the new system and its performance. Thus, criteria such as functionality, usability, running time, reliability and verification capability of students would be described in the study. The quantitative approach will be used to gather numerical data from the evaluation of the system through the use of a questionnaire, or other tool for evaluation.

For this study, the researcher aims to develop the major features of the kiosk including facial recognition, passcode verification, payment for tuition and other school fees, viewing of tuition balance, payment via QR code through PayMongo, storing of data in AWS Cloud, automatic recording of payment, and printing of receipt. After the development of the system, it will be tested and evaluated to determine if the major features of the system work properly. The proposed payment kiosk will be developed and measurable data will be gathered to assess the performance of the newly developed system. By means of the proposed research design, possible problems of the proposed system can be detected and corrected before the system is put into practice.

3.2 System Development Methodology

The researchers will use the Agile Software Development Methodology in developing the proposed system. Agile software development is a method for managing software development in which requirements and solutions evolve through the stages of iterative development. Agile development involves several stages, which are planning, requirements gathering, system design, development, testing, and improvement (Edison et al., 2022).

The stages of development include planning, requirements collection, system design, implementation, testing, and improvement of the developed system. For the Smart Facial Recognition for Tuition Payment Kiosk proposed in this study, the researchers shall first determine the requirements of the proposed system. The several features of the proposed kiosk such as facial recognition, passcode, balance, scan QR code for payment, integrate with PayMongo for payment processing, store data in AWS Cloud, automatic recording of payments made through the kiosk, and printing of receipt shall be developed and tested one by one.

For the Smart Facial Recognition for Tuition Payment Kiosk, feedback from the selected users and evaluators will be gathered to determine the problems and improvements of the system. By incorporating Scrum and other Agile approaches, the feedback can be adapted to the different needs of the project and can be applied to various settings for development (Hron & Obwegeser, 2022).

3.3 Requirement Specification and Analysis

The researchers outline the requirements for the tuition payment kiosk that will be built in this research. These requirements include the intended users, the features of the kiosk and the hardware and software that will be used to build it. These functions shall be used by students whereas payment transactions shall be managed by school administration. The system will also be designed with the view of securing students' information, ensuring the system's reliability, ease of use and efficiency in processing payments.

3.4 System Design Specification

The proposed Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording is a self-service system. It lets students check who they are, see how tuition they owe pay with a digital method and get a receipt. This system mixes recognition, passcode checks, a QR code for PayMongo payments and AWS Cloud for storing student and payment data. The process starts with student verification using recognition. The system allows students to verify their identity, view their tuition balance, make a digital payment, and receive a payment receipt. If the face matches the system pulls up the student's tuition balance and payment history. If the face does not match the student may enter a passcode that has been registered before to confirm their identity.

After the student is verified the student can pay the tuition. The system shows a QR code that the student can scan with a bank or payment app that works with PayMongo. PayMongo handles the transaction and sends back a payment confirmation. When the payment is confirmed the system automatically writes the transaction details to the student's record. Updates the data in AWS Cloud. The system then prints a receipt that lists the payment details so the student has proof of the transaction. The design of the Smart Facial Recognition, for Tuition Payment Kiosk is meant to give students an easy way to pay tuition. It brings together student

verification, tuition balance viewing, QR-based payment, automatic payment recording, cloud data storage and receipt printing into one self-service kiosk.

3.5 Implementation

The implementation of the proposed Smart Facial Recognition for Tuition Payment Kiosk with Student Verification and Automatic Payment Recording will involve developing the main components needed to create the self-service tuition payment kiosk. The implementation process will utilize the system's developed components to design the smart tuition payment kiosk. The following components will be involved in the implementation: facial recognition, passcode verification, student information management, QR-based payment, PayMongo, AWS Cloud, automatic payment recording, and receipt printing.

Facial recognition will be implemented to verify the identity of every registered student before they can access their student information. The kiosk camera will capture the student's face and compare it with the registered facial data stored in the system. Upon successful facial recognition, the system will fetch the student's information and tuition balance. However, in case of failed facial recognition, the student will be allowed to enter their registered passcode to verify their identity. QR-based payment will be implemented using PayMongo to authorize QR-based digital tuition payments. The system will generate or prompt the scanned QR code once the student has selected the amount they intend to pay. The student can then scan the QR code using their banking app or any other QR scanner to pay their fees.

On the other hand, AWS Cloud will be implemented as the system's storage system. The system will use the cloud to store the student's information, tuition balance, authentication details, and payment information. The system will retrieve and update the required information from the cloud upon facial recognition or successful payment. Automatic payment recording will be implemented after successful payment to update the student's payment record automatically. This feature will reduce the need to manually encode every payment into the system by the school administration. Instead, the system will save the payment details in the student's payment record upon successful transaction.

Lastly, the print receipt feature will be implemented to provide physical copies of the payment record. The system will generate a receipt that the student can collect after successful payment confirmation and transaction. The receipt will include all the student's payment details, which can be used as proof of payment. The above features will be designed and implemented together to create the complete self-serve tuition payment kiosk, which will be able to identify students, collect, and authorize tuition payments, record the payments, and print the receipt.

3.6 Testing and Evaluation

The development of this system will be tested to make sure that the main features of the system will work properly and follow the requirements of the study. The researchers will check facial recognition, passcode verification, display of student information and tuition balance, QR-based payment, payment recording, AWS Cloud data management, and receipt printing.

The system will also be evaluated based on its functionality, reliability, security, and ease of use. Different test scenarios will be used to check how the system responds to normal transactions and possible errors. Selected users will be asked to use the kiosk and provide feedback about their experience. User testing and questionnaires are commonly used in evaluating the usability of technology systems. The results will help the researchers identify problems and areas that need improvement. The feedback and testing results will also be considered before the final implementation of the system.

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