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Design and Implementation of Campus-based Monitoring using RFID

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Abstract
A campus-based monitoring system employing Radio Frequency Identification (RFID) technology is designed and implemented in this article. By tracking staff and student movements across the school, the suggested system seeks to improve the security and safety of a university campus. The system utilized RFID tags that are linked to personnel and student ID cards and are scanned by RFID readers placed in several well-chosen places across the campus. The gathered information is then sent to a centralized server, where it is processed and analyzed using an algorithm designed to identify unusual movement or behavior patterns.
The study's findings demonstrate how well the suggested approach works to track personnel and student movements across the campus. The technology has the ability to recognize unusual movement or behavior patterns and provide warnings that may be utilized to enhance campus security and safety. Moreover, the system may provide insightful data on personnel and student mobility and behavior that can be utilized to enhance campus administration and planning.
The suggested RFID-based campus-based monitoring system has the potential to dramatically improve the security and safety of college campuses. The technology is affordable, scalable, adaptable, and can be changed to meet changing campus demands. Moreover, the system may provide insightful data on personnel and student mobility and behavior that can be utilized to enhance campus administration and planning.
Keywords: *RFID, Campus monitoring, Security*

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I. INTRODUCTION

The invention of technology changes people's life. It has altered and reshaped many aspects of existence living. Technology unquestionably has a significant impact on all aspects of life [1]. People could easily participate in some activities, and they believe that technology have some negative impacts for social relationship. Technology use has grown to be a critical component of learning both inside and outside of the classroom. It benefited from and been enhanced using technology [2].

The study of [3] discussed that the majority of educational institutions use an online system to track students and faculty entry within the school vicinity. For student and teachers to effectively use technology in monitoring entries and exits, they must cover technology in a high-quality manner [4]. In contrast to the previous techniques that are time-consuming and inefficient, student attendance has recently been recognized as one of the critical components or concerns that represent the academic accomplishments and performance provided to any university [5]. The use of RFID technology may be integrated in monitoring students and personnel on the premises by setting up scanners at several sites.

In Central Philippines State University, an academic institution in Kabankalan City with almost six thousand enrolled students and with many nearby communities around its premise, security personnel received several reports of disturbances inside the campus caused by unidentified individuals who seems to try to get in or invade to harsh most especially those with female students that are being alone. This is due to the lack of close monitoring in letting unknown and known people in the campus. Because of this scenario, the researchers came up with an idea to develop a monitoring system that would solve the problem in terms of security purposes. This project is entitled "Campus-Based Monitoring using RFID."

This project aimed to analyze, design, develop, and implement a system that would secure the vicinity of the University most especially the people inside such as students, employees, visitors, and the community including vehicles entering the campus by implementing a security system with RFID integration. The platform would monitor the incoming and outgoing of students, and personnel using RFID and generate daily reports for incoming and outgoing of visitors. It can track anyone who comes in and leaves the campus. An identity card with

RFID will be supplied to each respondent. The security officers in the radio room can monitor the system since it is connected via a network. The technology is only meant to be used on the main campus of CPSU.

II. METHODOLOGY

The study described the procedures used to gather, present, and evaluate the data and information required to answer the study's objectives and questions. The research tools, data sources, data gathering methods, and analytical methods employed are explained and justified. The study's outline of the method used to compile, present, and assess the data and information necessary to address the study's goals and open-ended questions. The used research instruments, data sources, data collection techniques, and analysis techniques are described and justified.

The agile model was used by the researchers. It is an iterative and incremental approach to software development that emphasizes flexibility, collaboration, and rapid delivery of working software as shown in figure 1.

Figure 1. Agile Model

The PIECES framework evaluation in table 1 was done to identify the pros and cons of the present system as a basis for improvement and it is equally suited to analyze the manual and computerized system.

Table 1. PIECES Evaluation Framework

Performance	CPSU security and monitoring system using RFID tags are done manually and user friendly for the passersby.
Information	Lack of knowledge how to lessen the work of the security employees in the campus.
Economy	Cost in maintenance of the gate entrance using RFID tags in CPSU is not totally fix.
Control/Security	Tools are very efficient and effective.
Efficiency	It is very safe most especially for the students and inside the campus for the security purposes.
Service	Lots of people will be secured most especially who living inside the University.

System Analysis

This diagram shows the graphical flow of data using Campus Based Monitoring with RFID tags for CPSU.

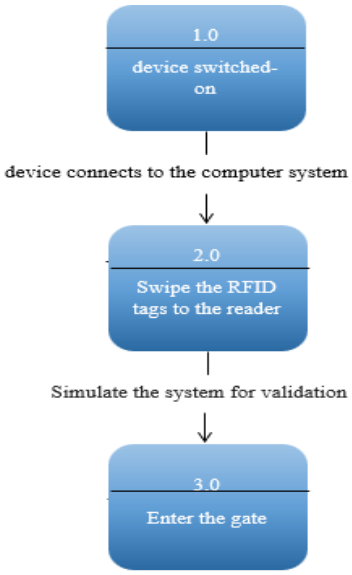

Figure 2. Flow of the process for personnel and students' entry

This diagram below shows the graphical flow of data for monitoring and checking of the entry of personnel and students by the security personnel.

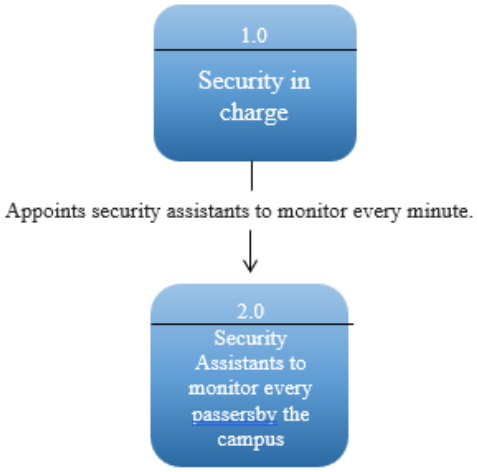

Figure 3. Flow of the process of monitoring for personnel and students' entry

III. RESULT AND DISCUSSION

After a pilot test at the university campus, the suggested campus-based monitoring system employing RFID technology was successfully installed. The system was able to provide real-time data for the immediate area while properly tracking the in and out of personnel, students, and other participants. By monitoring personnel and student movements on campus and notifying authorities of any questionable conduct, the technology also benefited security.

The suggested method offers the university campus several advantages. First off, the technology automates the process of recording the in and out, doing away with the necessity for human attendance taking. This decreases the possibility of human mistakes while also saving time for both personnel and students. By monitoring student movements on campus and informing officials of any suspicious activities, the technology also increases campus security. Lastly, the system gives administrators access to real-time attendance data, enabling them to track student attendance and spot any problems as early as possible.

Notwithstanding the system's advantages, there may be certain disadvantages that need to be considered. First, the system depends on student ID cards having RFID tags, and any problems with the tags might result in erroneous data. Second, since it monitors students' and personnel's movements on campus, the technology may raise questions about student privacy.

System Capabilities	Results of Evaluation	Mean	Description Rating
Security	The system can monitor the security for the whole campus.	4.16	Very Good
Usability	The system is easy to and to learn.	4	Very Good
User Friendly	The system is user friendly	4.28	Very Good
Reliability	The system is very reliable to use by the University	4.24	Very Good
Accuracy	The functionality of the system is very effective and efficient	4.04	Very Good
Grand Mean		**4.14**	**Very Good**

IV. CONCLUSION

Overall, the project was successful and functioned well considering the limits and revisions that were made. The prototype successfully scanned an RFID card, processed the information in the database, and then used vehicle blocking to accurately operate a servo motor. After being idle, the RFID reader consistently and accurately reads fresh cards that are provided. The prototype's success at a small size indicates that the concept may be effectively applied to a large-scale model.

V. RECOMMENDATION

After several times of testing of the project, the researchers have justified the effectiveness of the project. The researchers met their objectives in developing the said project. However, the researchers are looking forward for further development and study about security and security management. Maintenance and checking of the system will be conducted every week to assure that the RFID reader is working according to its function and objective.

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