

Cloud-based Web Application with NFC for Employee Attendance Management System

Sai Ba Oo^{*}, Nang Hlaing Myat Oo[†], Suparat Chainan[‡], Arpha Thongniam[§] and Waralak Chongdarakul[¶]
 School of Information Technology, Mae Fah Luang University
 Chiang Rai, Thailand

Email: ^{*}1nanghlaing.oo13@lamduan.mfu.ac.th, [†]5731301089@lamduan.mfu.ac.th, [‡]suparataum12@hotmail.com,
[§]arphathongniam@gmail.com, [¶]chwaralak@gmail.com

Abstract—Efficient employee attendance management leads any organizations to increase overall corporate performance and accomplish specific goals. Accurate employee attendance records are importantly used to control working discipline and increase worker’s productivity. Manual attendance-time checking makes increasingly the expense of time-consuming and paper work of the companies. Human actions i.e. mistake at work, and fraudulent time keeping are additional hidden expenses which affect the productivity of the organization. Variation of the attendance policies set up in different companies make more complicated in evaluation of employee working hours. Hence, automated time-attendance management system is the key operational variables for enhancing the performance, and profitability. The attendance management system captures time-attendance data and serves the management of the employee working hour records. However, some existing time attendance systems have limitations in terms of identification speed, cost of system devices, real-time attendance monitoring, and flexibility of database storage size. In this paper, we introduce a cloud-based employee attendance management system using NFC technology. The proposed application provides several important operations such as captured attendance records using NFC, automatic time calculation, leave and overtime checking, working hours evaluation, real-time updated information access, and generating reports. The proposed system also offers online portal which allows multiple company user accounts, requires no special software to install, and provides more flexible data storage. The evaluation of user satisfaction shows that our proposed system is practically used and satisfied.

Keywords: employee attendance; time attendance management system; NFC; cloud computing.

I. INTRODUCTION

Recently, most companies or organizations need the system to record employee attendance. The accurate employees attendance data is very necessary for maintaining the employees supervision and discipline. Traditionally, the employee attendance is manually used by the paper based attendance sheet. In this manual system, manager of the company hardly manages the employees updated information and evaluates their working hours and performance. In general, the supervisor adds working hours by using the employee time card and fill in the time sheet indicating number of working hours for each week or each period time. This process spends inefficient time consuming in attendance records calculation, employee time shifts management, every in/out time tracking, and high cost of the paper sheet [1], [2].

To improve the employee attendance tracking, there are various attendance management systems using current tech-

nologies for person identification i.e. Radio Frequency Identification (RFID) and biometric technologies such as fingerprint recognition. The biometric system is employed to validate the person authorization. However, there exist some limitations of the biometric system. The fingerprint attendance system has a problem of human physical contact. The fingerprint sensor usually touched by a lot of people may cause some disease infects. Dryness or dirty of the finger skin probably make inaccuracy of the matching results. The image captured of finger demands a large memory space so that the system has slow running time when the volume of employee data highly grows. The memory device used to store employee data in many separate locations make the data management more complicated. Additionally, the cost of the fingerprint system is relatively expensive. Several attendance monitoring systems using fingerprint technology were proposed in [3], [4].

On the other hand, the contactless attendance checking device i.e. Radio Frequency Identification (RFID) and Near Field Communication (NFC) technology give more efficiency of flexible data integration, and more efficient cost in commercial and industrial use. NFC is newer version type of RFID which is currently integrated with mobile devices in two way communication between NFC tags and reader. RFID itself is mainly used in identification and tracking applications i.e. inventory, package tracking, highway toll gate, baggage load control, while NFC is used for more sophisticated and data secure transaction i.e. person identification, payment system, or other contactless access control. NFC is also embedded in smartphones to support the new trends of life styles such as buying tickets, access the room lock, parking, check-in at the airport, and business cards exchanges. The NFC and RFID applications and implementations were described in [5], [6], [7].

Some other employee attendance systems using different technologies have been proposed. We compared them with respect to the fundamental parameters related to attendance checking environments. Three time attendance systems were discussed as follows. Firstly, Cloud-TA Time and Attendance System [8] uses the fingerprint reader to capture the employee data and transmit the data to server through Internet communication and also includes door lock control and data backup. However, the system has some limitations of the identification speed. For verifying a single fingerprint, it must check the one with all other templates stored in the database server that is time consuming [9]. Secondly, First Time Attendance Management [10] was designed for a small-size company