

Integrated Workers Navigation Payment System with Enhanced Canteen Facilities

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Abstract

The integration of RFID and GPS navigation in canteen facilities management is set to revolutionize work related tasks in various industries. This innovative system aims to reduce administrative overhead, ensure fair and accurate payment for workers, and streamline communication between workers and management. Features for real-time data collection and reporting will improve management-employee collaboration. RFID-based entry systems provide secure and efficient means of worker identification, while GPS tracking ensures accurate monitoring of worker locations. The integration of canteen facilities simplifies meal access, enhancing worker satisfaction. The project holds promising future scope, including potential expansion to other industries and the integration of advanced features. The "Integrated Workers' Payment System with RFID and GPS Navigation for Enhanced Canteen Facilities" project is poised to significantly impact worker management, attendance tracking, and payment processing, creating a more efficient and satisfying work environment.

Keywords: Navigation of worker, canteen facilities, worker payment system, real time worker monitoring

INTRODUCTION

Implementing a digital system for tracking worker attendance and location can provide real-time data and insights, allowing for better management of resources and improved overall site safety. Construction businesses may optimize their operations and guarantee worker accounted for by leveraging technologies like biometric scanners and GPS tracking. By implementing a digital system that utilizes GPS technology and biometric identification, construction companies can streamline their operations and ensure accurate tracking of worker attendance and location. This raises safety standards on the work site while also increasing overall productivity. Implementing a digital system for tracking worker attendance and location can help streamline operations and improve overall project management [1]. By utilizing technology, construction companies can ensure accurate data collection, increase accountability among workers, and ultimately enhance project outcomes. Manually tracking worker

attendance and location on a construction site is a very time-consuming process. The traditional methods of sign-in sheets and timecards are mostly inaccurate and inefficient. So, it is difficult to track the location of workers on a large construction site [2, 3]. The Construction Worker Attendance System and Location Tracker is a system that uses RFID card readers, GPS modules, and an ESP 32 microcontroller to track the attendance and location of construction workers. The system is designed to improve the efficiency and productivity of construction sites by reducing the time and effort required to manually track worker attendance and location.

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Received Date: May 01, 2024

Accepted Date: May 23, 2024

Published Date: May 30, 2024

Citation:Anushka Sanjay More, Abhishek Satish Dhumal, Ganesh Popat Karande, Rohita Patil. Integrated Workers Navigation Payment System with Enhanced Canteen Facilities. International Journal of Digital Communication and Analog Signals. 2024; 10(1): 8-13p.

RELATED WORK

ESP comprises of 36 ports, and its clock speed is up to 240 Mhz. The first ESP 32 microcontroller is used for the worker entry point, which is to take the output from RFID and check whether the user is valid or not [4]. This data is presented on the LCD screen.. After the successful entry of the worker, the worker goes inside the working area [2]. Every piece of data is kept on the server.

When workers enter the working area, then a GPS module is provided to them to track them. If the workers remain inside the set boundary, then the worker is paid for that work otherwise their payment is not considered. The ESP 32 microcontroller assists in sending all this data to the server.

Within the worker area, there is another system or piece of hardware that is used for canteen facilities where users can order food. RFID modules are also used for worker identification at the food counter [5]. When the system identifies the RFID user as valid, the user gets three food options on the screen, and the worker/s can select which food they want with the help of the keypad and order is successfully placed [6]. Immediately, a SMS is sent to the owner of the canteen as well as the worker with the help of the GSM module. This allows efficient and convenient food ordering for the workers, while also providing a record of their choices for the canteen owner to track preferences and inventory. Additionally, the use of RFID and GSM technology ensures secure and accurate communication between the different components of the system [3]. By limiting access to the system to authorized users, RFID technology improved security. For accountability reasons, the system records each worker's orders and payments [5]. Both the employees and the owner of the canteen benefit from this streamlined procedure in terms of convenience and efficiency [6–9]. Various literature survey is shown in Table 1.

Table 1. Literature survey.

S.N.	Review	Source & Publication Year	Remark
1	Mobile Applications for Workforce Management	A Review on Placement Management System IJRTI (ijcrt.org) Issue 7 July 2021 ISSN: 2320-2882	In this we also learned how we can see our performance and our growth in
2	Market Availability of Integrated Systems	Literature Review on GPS And Tracking System ipl.org	In this we saw that such systems are available in the market and can be used in our project as well as in this project we understand various methods of tracking and alerting the fisherman in Maritime using GPS
4	Hardware Components in Worker Management	RFID Based (IoT) Automatic Attendance System: A Survey Analysis by R.K.A.R. Kariapper, Suhail Razeeth: SSRN 8 Jan 2021	From this analysis we could identify that RFID is a very advanced technology for automatic attendance system and it provides very high accuracy and speed than a traditional paper-based system [10].
5	Success Stories and Best Practices	Canteen management system - Mantra: https://www.mantratec.com/Solutions	Mantra Softec's Canteen Management System provides an end to end solution to other companies to simplify their canteen management operations.

We read the papers on RFID technology and worker identification. RFID-Based (Internet of Things) Automatic Attendance System: a survey analysis, and this method is used with students; nevertheless, as the study concludes, A.A. Olanipekun and O.K. can also be employed in this project. This attendance system program, which is based on automatic attendance systems, was created with VB.net and a database. (Microsoft Access). Each student has an RFID tag attached to their student ID card. There is a serial connection between the computer and RFID. An RFID reader has also been maintained for the connection between RFID and the computer system. The RFID reader is placed at the lecture hall door. Whenever students enter the lecture room, the RFID reader reads the RFID tag, and it stores all information (entry time, name, etc.) of students into database via serial connection and maintains the system. An attendance system with the combination of RFID and web-based system is also used. Such a system uses an RFID tag and reader for getting students' attendance and reading a particular student.

Then this reader connects to an Arduino microcontroller which passes the RFID reader response to the web server by using Arduino shield. Finally the attendance of students can be stored on a web server by using PHP and MySQL. The administrator of the system can view all student documents by logging into this particular web-based application and can also view the student's details using LCD which displays GPS tracking in staff management. The documents make clear that this technique is applied in real-time monitoring for maritime fishing safety, and we are aware of this GPS technology has been the subject of research in the fishing industry to improve worker safety. GPS-enabled gadgets are able to monitor employees' whereabouts and transmit alerts in an emergency. Studies have shown that real-time tracking can significantly improve response times and reduce accidents on construction sites; GPS tracking is useful for managing remote and mobile workforces, allowing employers to monitor their location, track their attendance, and accurately calculate hours worked. Integrated Worker Management System: the integration of multiple systems for comprehensive worker management, attendance tracking, and payment processing is a powerful approach that streamlines various HR and payroll-related processes. Organizations can save time with the aid of this integrated system, minimize mistakes and raise general productivity.

Integrated with the HRIS, time, and attendance tracking systems capture real-time data on when employees clock in and out, their break times, and any absences. This information is essential for processing payroll correctly and keeping track of attendance. Flowchart of the proposed system is shown in Figure 1.

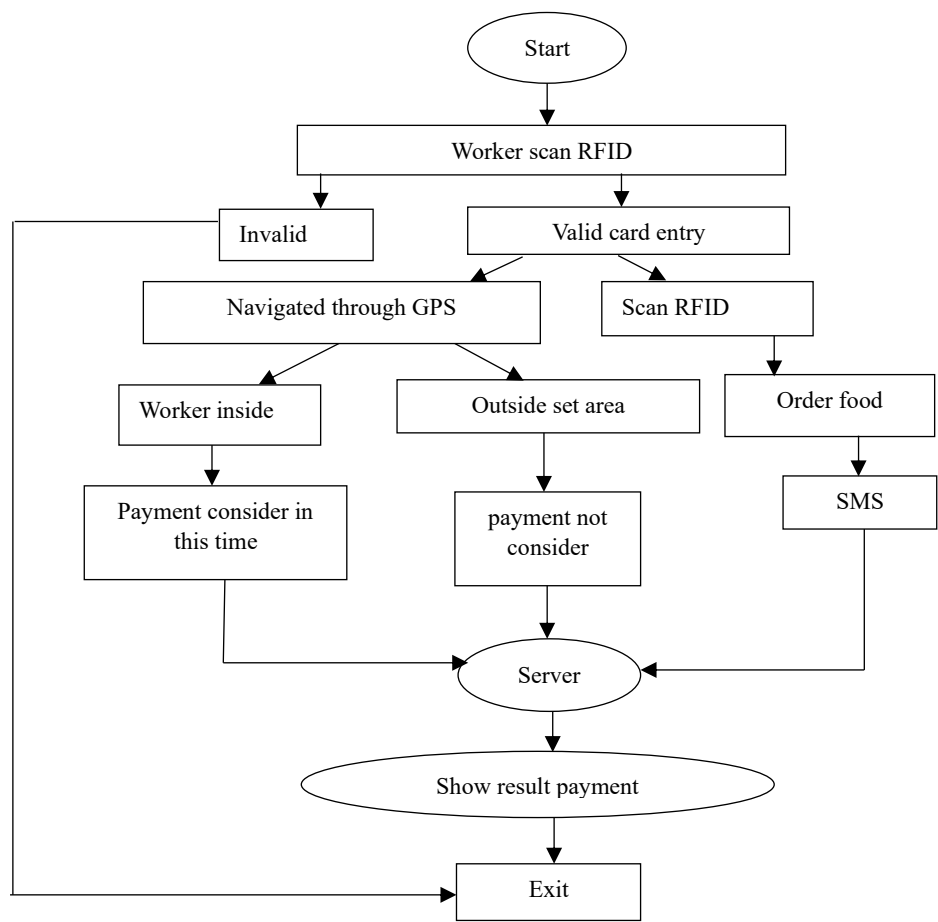


Figure 1. Worker Payment flowchart.

IMPLEMENTATION

Worker entry: The worker needs a RFID card and a scan RFID. After the user verifies if the worker is valid and the details on the data sheet and the worker's RFID card match, the display shows that the

worker can enter the company. If the details do not match, then the display shows that the worker is not valid, and the system does not allow the worker.

When workers enter the company, they can navigate through the GPS module and track how much time they spend in the area; at that time, payment is considered, and if workers go outside the specific designated area, payment is not considered. In the company, we set another device that is a canteen facility that is quite helpful to workers. They order food from the canteen and pay for it. . The canteen facility flowchart is shown in Figure 2.

The flow chart in Figure 2 shows the canteen facility worker can food order on that flow. First, the worker scans the RFID card, and if the card is valid, the worker is allowed to proceed with the process; otherwise, a message appears on the display that the card is invalid. If the card is valid, then it shows three options on the screen, and the worker can choose from 0, 1, or if the worker chooses 1, then this food is an order, and the worker has another chance. If the worker does not press 0, this is similar as the second option, and after the worker's food order is complete, combined food order message is sent to the worker and owner, and all details are saved on the server for ordered food payment cut on worker day salary, and finally the worker can receive food that they ordered and the system exits and shows on screen scan card. This process cycle is repeated.

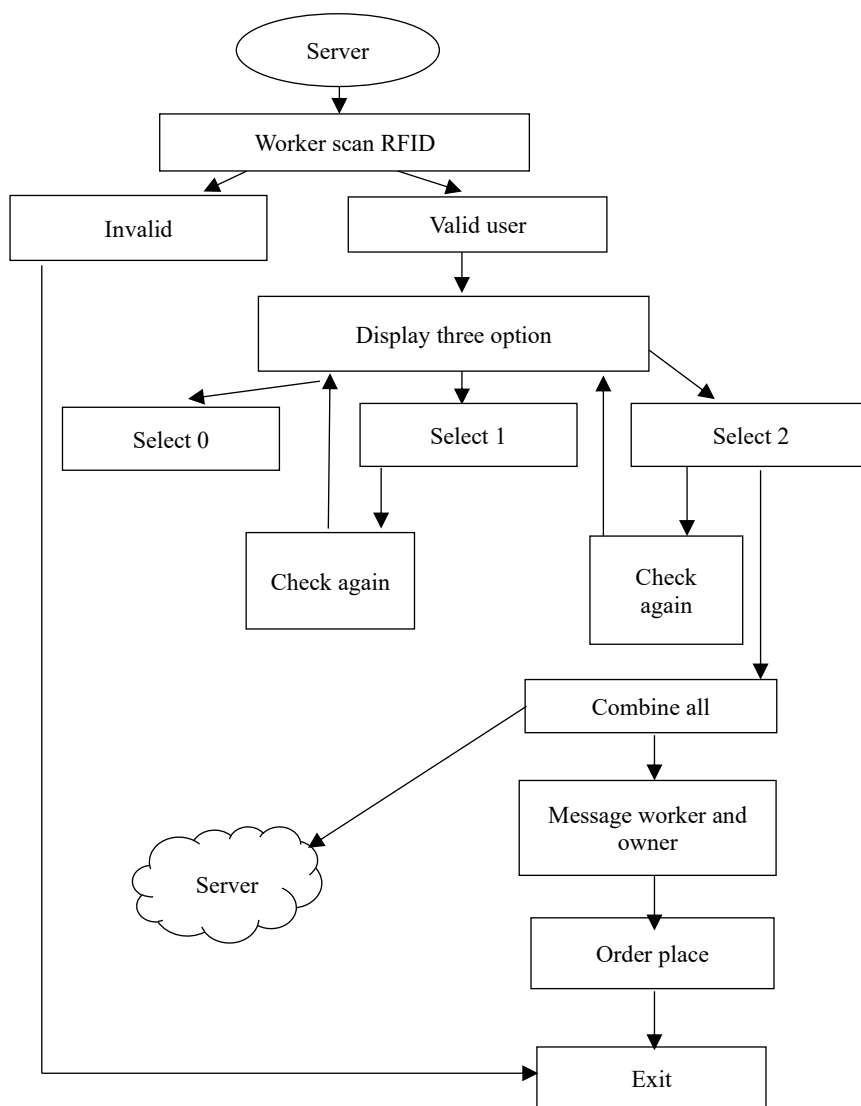


Figure 2. Canteen facility flow chart.

RESULT AND DISCUSSION

Workers can order food through the enhanced canteen system and SMS by successfully placing an order. Tracking of the workers through the GPS tracking system and storing the data on a Google Sheet has become easy. After 5 minutes if the worker is in the allowed area, then calculate it in worker payment. With the help of total hours, they do work in that area, the canteen bill is cut, and calculates the required payment to be made to worker. Access worker attendance data at entry time in the integrated worker navigation payment system with the project Block Diagram.. If the user is valid, then display the valid user you are entering; if the user is not valid, then display the invalid user you are not entering. After the successful entry of the worker, the worker goes inside the working area. All this information is saved on the server. If workers enter the working area, then we provide a GPS module that tracks them. If workers are inside a set area, then worker payment is considered, and if they are outside the area, then payment is not considered. All this information is sent to the server with the help of the ESP 32 microcontroller.

In the inside worker area, we have another system or piece of hardware that is used for canteen facilities where users can order food. For that reason, RFID modules are used for worker identification. This system identifies the user, and if the card is valid, the user can display on the screen three options, and the worker can select which food they want with the help of the keypad, and order is successfully placed, which food they order (Table 2). This SMS is sent to the owner of the canteen and the worker with the help of the GSM module.

Table 2. Screen scan card result.

Entry No	Name	ID Number	IN Time	Out Time	Total Hours
1	Abhishek Dhumal	202311	9:00 AM	12:00 PM	3
2	Anushka More	202312	9:00 AM	2:00 PM	5
3	Ganesh Karande	202313	9:00 AM	1:00 PM	4
4	Abhishek Dhumal	202312	1:00 PM	3:00 PM	2
5	Ganesh Karande	202313	2:00 PM	5:00 PM	3
6	Abhishek Dhumal	202312	4:00 PM	5:00 PM	1
7	Anushka More	202311	3:00 PM	5:00 PM	2

CONCLUSION

"Integrated Workers' Payment System with RFID and GPS Navigation and Enhanced Canteen Facilities" paper represents a significant advancement in optimizing workforce management and improving the overall work experience within various industries. By seamlessly integrating RFID and GPS technologies with canteen services, this paper has successfully addressed several critical objectives. The implementation of RFID technology has enabled secure and efficient worker identification, streamlined entry procedures and enhanced security. GPS tracking has provided accurate and real-time location data, allowing for precise attendance tracking and payment calculations. The integration of canteen facilities has made meal access more convenient and efficient, contributing to worker satisfaction. All things considered, this project has greatly enhanced worker satisfaction and operational effectiveness.

The combination of RFID, GPS, and canteen services has proven to be a successful solution for addressing key challenges faced by industries. Overall, this innovative project has not only improved operational efficiency but also enhanced employee experience within the workplace. The combination of these technologies has proven to be a valuable asset in optimizing daily operations and fostering a positive work environment. Furthermore, the implementation of RFID and GPS has streamlined processes such as inventory management and employee tracking. Additionally, the canteen services have provided convenience and improved overall employee satisfaction. By streamlining processes and providing real time data, employees are able to work more effectively and efficiently. This has led to increased productivity and overall job satisfaction among workers. The implementation of RFID and

GPS technologies has streamlined processes and improved accuracy, while the canteen services have boosted employee morale and productivity. This comprehensive approach has led to a more efficient and satisfying work environment for all involved.

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