

# **Productivity During Pandemic: Mobile Based Attendance Taking and Task Management**

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## **Abstract**

Recording attendance and managing work is an issue faced by almost all workers, especially those working from outside the office. This problem should be overcome by taking advantage of current technological advances, one of which is the use of mobile-based applications. The purpose of this article is to propose an attendance application to help employees in the attendance taking and task management process. The development process starts with a comprehensive questionnaire to address the user requirements, then combined by similar application analysis. The problems that were identified were then assessed to create a list of features. It is hoped that this application can help employees to focus less on the attendance and task management, and more towards improved productivity.

## **Keywords**

Attendance Taking, Task Management and mobile Application

## **1. Introduction**

Rapid technological advances in all aspects of life have an impact on the many human activities that are easier and faster to complete. One of them is in the world of work. Currently, many companies have taken advantage of advances in technology to cut business processes so that the desired output is more effective. For example, a company in the field of E-Commerce, this company helps merchants to sell their wares to buyers without having to face to face.

According to Istijanto (2012), the definition of absenteeism is the absence of an employee when the employee is scheduled to work. The number of absences from work in the company illustrates the exchange of benefits between employees and companies that pay. Of course, companies do not want to lose due to high employee absences. Frequency is the total number of absences in a year, regardless of the length of time. Short-term absence is the number of absences for 1-2 workdays during the year. Meanwhile, frequency is the total number of absences in a year, regardless of the length of time. Absence in the short term is the number of absences of 1-2 working days during a year. This causes absences to greatly affect the performance of the personal and the institution where he works, which can be used as advanced considerations and decision-making for the continued development of the agency.

Therefore, the attendance system is very important in knowing the presence of employees in a company. The development of the attendance system has now developed with supporting technology such as computers and gadgets. From attendance systems that use paper, computer programs, fingerprints, eye scans, and now many have switched to using mobile-based applications. With the existence of so many smartphones, several companies can update their

systems using mobile-based applications. Because it is easier to operate and can be accessed anywhere and anytime by the user.

## **2. Literature Review**

Likewise, with the attendance system, it needs a very good update so that employees can attend quickly and do not need to queue to be absent. According to research conducted by Prastian & Ramadhan (2017) in a company regarding this attendance system, according to him one of the best solutions is to use a smartphone. The attendance system in this way can also maximize work time in a company compared to employees having to queue to sign on a form that has been provided or queue in front of the attendance device. These wastes work time, therefore, the use of a smartphone is needed in updating the attendance system.

Apart from attendance using smartphones, another way to make it easier for employees is to implement task management. According to Rickayzen (2004), task management is an activity where an individual or team leader tracks a task throughout the system's life cycle and makes decisions based on the progress of the system. Task management is performed using software that helps organize and manage tasks effectively using functions such as task creation, planning, assigning, tracking, and reporting. According to research conducted by Osman & Osman (2019) regarding the application of task management. The application of task management can increase productivity and efficiency, increase growth, increase the emergence of innovation and reduce costs to users.

Current research has shown a lot of potential specifically referring to attendance management using Artificial Intelligence. Machine vision is used to recognize the attendee and to record their clock in and clock out time (Salman et al, 2022; Kaneez Laila, 2018; Ofualagba, 2018). A slightly less complicated method is by using RFID, although the process is not as fast and seamless compared to artificial intelligence, but it provides more practicality and is easier and faster to implement (Bektassov et al. 2019).

## **2. Objectives**

The author has the idea of making another option that is more beneficial to employees but at the same time, data security and confidence is maintained, namely making a mobile application that can be accessed at any time and provides features that can facilitate the process of activities for employees and supervisors or employees in charge. in a company. Apart from doing attendance, this application will have other features such as viewing employee absences and leave history, making leave requests, and task management to make it easier for employees to complete work.

The author chooses a hybrid-based mobile application so that the developed application can be accessed on multi-OS to make it easier for users to get this application according to the operating system used, namely Google's Android or Apple's iOS. This application will be integrated with the company's internal database using an API so that existing data matches the company's internal properties.

## **3. Methods**

### ***Development Method***

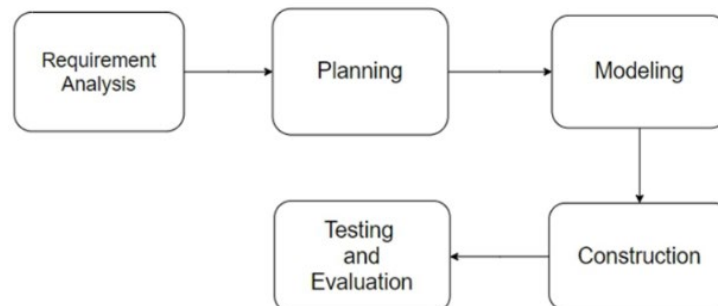


Figure 1. Development Framework

In developing the application, the writer uses a slightly modified waterfall method (Figure 1). The author chose this method because this method has the advantage of reflecting the practicality of engineering, which can maintain the quality of the software. Types of models that are complete so that the maintenance process is easier. This method consists of 5 stages, namely:

**Step 1: Requirement Analysis**

At this stage, the authors collect the aspects needed in application development, such as conducting research on similar applications and spreading surveys to the public.

**Step 2: Planning**

After collecting the things needed, the authors analyzed the results of the survey that had been distributed. From the survey results, the writer can find out the features that many respondents want. In addition, the author also analyzes similar applications that already exist to get a feature reference from the absent application

**Step 3: Modelling**

At this stage, the authors make UML diagrams such as use cases, class diagrams, activity diagrams, and sequence diagrams before being translated into front-end. In addition, at this stage, the writer also makes a screen design to make it easier to determine the flow of the program.

**Step 4: Construction**

At this stage, the author begins coding for application development and creation. Frontend, backend, API creation are all done at this stage.

**Step 5: Testing and Evaluation**

At this stage, the application has been developed and is ready to enter the testing phase and then evaluated so that it can be better in the future.

***Requirement Analysis***

**User Analysis**

The author conducted a survey that was distributed in general to find out user needs. The survey was conducted using a google form consisting of eight questions, here are the questions and answer analysis from the user:

Q1: Please explain whether you ever had difficulty being absent from entering and leaving the office/project?

In the question above, the author tries to ask the respondent whether they have ever found it difficult to be absent in and out when they are outside the office/project, the writer sees this as a potential problem when the respondent is on duty outside the office/project.

Q2: Please explain whether you have had difficulty seeing the history of attendance while at the office or outside the office/project?

In question number 2, the writer asks whether the respondent has ever found it difficult to see the attendance history, this has the potential to be a problem

Q3: Please explain whether you have any difficulties applying for permission/leave while at the office or outside the office/project?

In question number 3, the writer asks whether the respondent has had difficulty getting permission/leave while outside the office/project, this has the potential to become a problem if every time the respondent wants to apply for a permit but is hampered because of the respondent's position outside the office/project.

Q4: Please explain whether you have had difficulty arranging what work you will do while you are at the office or outside the office/project?

In question number 4, the writer asks whether the respondent has difficulty managing work while outside the office/project, this has the potential to become a problem if the respondent does not have a schedule of what work they have to do because the respondent's position is outside the office/project away from office computers.

Q5: In addition to providing information on what work to be done, there is also a description of the work to be done, will it help you in completing the work?

In question number 5, the writer asks whether the respondent would find it helpful to have a more detailed description of each job, this could be a problem if the respondent does not know the details of what work they will do.

Q6: Please explain whether you have difficulty reporting the results of work/meetings while working at the office or outside the office/project?

In question number 6, the writer asks whether the respondent has had difficulty reporting the results of the meeting/meeting while outside the office/project, this has the potential to become a problem if the respondent does not report the results of the meeting to the authorities.

Q7: Please explain whether you will be helped if there is an application that allows you to do attendance via mobile outside the office?

In question number 7, the writer asks whether the respondent will feel helped by the application that the author is designing so that the writer can solve the problems that exist in the world of work related to attendance.

Q8: What features might be useful to you other than the features described in the questions above when you are working outside the office/project?

In question number 8, the writer asks what features will be useful for respondents in the application that the author is designing, this can be input so that the author's application can solve more problems.

Within one week, 55 respondents were collected. The conclusions that can be drawn are:

*The results of the first question, 47 out of 55 respondents agreed that they had had difficulty being absent from entering and leaving the office or at the project site.*

From this, the authors conclude that many respondents find it difficult to do attendance when they are outside the office/project, some explanations from respondents said that the attendance system of the respondent's office is not yet flexible so that respondents have to return to the office just to be absent.

*The results of the second question, 38 out of 55 respondents agreed that they had found it difficult to see the history of attendance when they were outside the office or at the project site.*

From this, the authors conclude that the respondents agree that they have experienced difficulties when looking at the attendance history, this is because the respondents have to access through the office computer to view the absence history.

*The results of the third question, 47 out of 55 respondents agreed that they had found it difficult to apply for leave or permission when they were outside the office or at the project site.*

From this, the authors conclude that the respondents have found it difficult to apply for permission/leave when they are outside the office/project because the permit / leave application system is still manual where the respondent has to print a letter and submit it to a new supervisor then it can be processed, this is very difficult for respondents because it took a long time and the submission process was not easy.

*The results of the fourth question, 48 out of 55 respondents agreed that they had experienced difficulties in arranging what work to do when they were outside the office or at the project site.*

From the respondent's answer, the authors conclude that the respondent has found it difficult to arrange what work to do because the list of jobs to do is on the office computer which cannot be accessed anywhere, this is very difficult if the respondent is in a remote location and hard to signal.

*The results of the fifth question, 50 of the 55 respondents agreed that they would be helped when there was an explanation of their work while doing work outside the office or at the project site.*

From the respondent's answer, the writer can conclude that the respondent will find it helpful when there is an explanation of what work to do, this makes the respondent more focused on one job at a time.

The results of the sixth question, 48 out of 55 respondents agreed that they had experienced difficulties in reporting the results of the meeting/meeting while holding a meeting outside the office or at the project site.

From the respondent's answer, the authors conclude that the respondent has found it difficult to report the results of a meeting/meeting while outside the office, this is because the pic in question is not in one place and must make an official company template to send the results of the meeting/meeting.

The results of the seventh question, 50 of the 55 respondents agreed that they would be helped by an application that allows them to do attendance when they are outside the office or at the project site.

From the respondent's answer, the writer concludes that the respondent will be helped by the application that the author developed, this is because it will make it easier for the respondent to carry out attendance, apply for permission/leave, report meetings when they are outside the office.

The results of the eighth question, 16 out of 55 respondents have provided suggestions about what features will be useful for respondents when they are on an out-of-office project/service: (1) Access the attendance list, (2) Access the leave list, (3) Access to see approval from human capital, (4) Access to remote office PC, (5) Features visualization of work and team progress and conditions such as in job collaboration applications, (6) Features to conduct limited meetings without using outside party systems other than the office, (7) Fill in online timesheet feature, (8) Features to change the password every 3 months, (9) Kasbon feature, (10) Time attendance tracking and salary calculation feature, (11) Features report and next plan schedule, (12) Reminder feature, (13) Emergency share location/emergency call feature, and (14) Enter and exit clock correction feature.

From several suggestions from respondents, several features will be considered for inclusion in the application to make it easier for respondents in their work (Figure 2).

### Similar Application Analysis

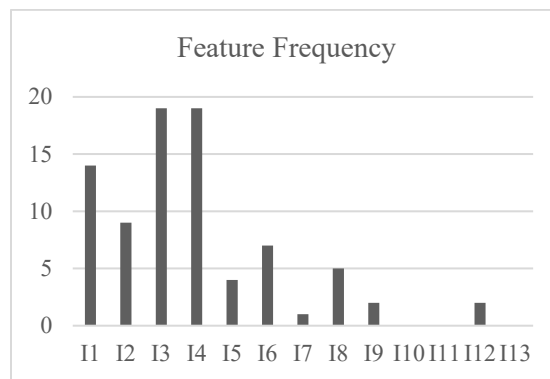


Figure 2. Feature Frequency Chart

Table 1. Indicator Legend

Code	Name
<b>I1</b>	Cloud-Based
<b>I2</b>	Time Tracking
<b>I3</b>	Support IOS
<b>I4</b>	Support Android
<b>I5</b>	Geo-fencing
<b>I6</b>	Biometric
<b>I7</b>	QR code
<b>I8</b>	Web-based
<b>I9</b>	Barcode

<b>I10</b>	Chat
<b>I11</b>	NFC
<b>I12</b>	Geolocation
<b>I13</b>	Facial Recognition

From the twenty applications that have been analyzed by the author, it can be concluded that most of them are mobile-based applications, but there are also mobile-based and web-based applications (Table 1). For the operating system, most applications are available on Android and iOS, which indicates that the application is Hybrid based.

In terms of data storage, many attendance applications have taken advantage of cloud-based technology which has many advantages such as flexibility which will certainly increase the effectiveness of use and efficiency in terms of costs, and where storage is already using NoSQL which can accommodate structured data on a large scale.

In terms of features, most timesheet applications have a time tracking feature where the application can capture employee absences. This feature should be owned by every time attendance application. The attendance function is to find out whether employees are late or not. Therefore the main goal of developing the absent application is to help employees so they are not late.

Another excellent feature for the attendance application is geofencing and geolocation, this feature allows the application to know where the employee is when he is absent so that employees cannot cheat during absences. Geofencing can find out the location via waves such as wifi and satellite. Meanwhile, geolocation can find out the location using the API. As for other supporting features such as NFC, QR code, barcode, and chat.

### Problem and Solution Mapping

Table 2. Problem to Solution Mapping

Problem	Proposed Feature	User Analysis	Similar App Analysis
<b>Absence by queuing is considered ineffective</b>	Absent to use mobile-based applications on employee smartphones	V	V
<b>Employees have difficulty making absences when they are outside the office</b>	Absent to use mobile-based applications on employee smartphones	V	V
<b>Employees have difficulty applying for leave</b>	Apply for leave through the application	V	
<b>Employees have difficulty managing piling up work</b>	<i>Task management</i>	V	
<b>Employees have difficulty reporting work results</b>	<i>Task management</i>	V	

After conducting a survey and analyzing similar applications, the writer juxtaposed the two results (Table 2). From there the authors get some problems experienced by users in this context are employees. The following is the analysis:

The first problem is that "Absence by queuing is considered ineffective." The solution to this problem is to use the attendance feature through the mobile application because this is the main feature of the absent application, which is to make it easier for employees to make absences. All similar applications have this feature because what is being analyzed is a timesheet application which has the main objective of making attendance easier.

The second problem is "It is difficult for employees to do absences when they are outside the office". The solution to this problem is the same as the first problem, namely using the attendance feature via the mobile application, but for the second problem it has a different context, for the second case it is an employee who usually does work outside the office. For the second problem, this is more helpful for employees when doing absent work while for the first problem

it is for absences. Just like the first problem, all similar applications can make this problem easier, because the main purpose of the absent application is to make it easier for employees to do absences.

)The third problem is "It is difficult for employees to apply for leave." The solution to this problem is to change the process of applying for leave through the application. First, employees apply for leave through the application, then the supervisor also follows up on leave requests through the application. After that, it will then be submitted to the HRD or related work unit. Of the twenty applications analyzed, there is no feature to apply for leave

The fourth problem is "It is difficult for employees to manage piling up work." The solution to this problem is to use task management. The main purpose of feature development is to make it easier for employees to determine work priorities and make it easier for employees to report to supervisors. Of the twenty similar applications analyzed, no application has task management because the basis of the application is attendance.

The fifth problem is "Employees have difficulty reporting work results" just like the previous problem, the solution to this problem is to use task management.

## **5. Results and Discussion**

### **Solution and Features**

Attendapps application is a functional mobile-based application to make it easier for employees to do absences in and out and manage tasks. This application will help employees in terms of absences and task management using a smartphone and help employees see a list of what to do without access to an office computer.

### **Login**



Figure 3. Login

The first feature in this application is the login feature, the user is required to log in first before being able to use the other features of this application (Figure 3), when logging in, the user must enter the email and password registered in the application. When the user has entered a new email and password then the login button can be pressed, if the email or password entered by the user is wrong, the system will automatically inform you that the email or password is wrong.

On the Absent Login page, there are several fields that are automatically filled in such as Name, ID, Time / Date, and Location, users are only required to take a photo from the camera to ensure the location is according to GPS. Users cannot take photos from the gallery to minimize cheating.

### **Clock In & Clock Out**



Figure 4. Clock In

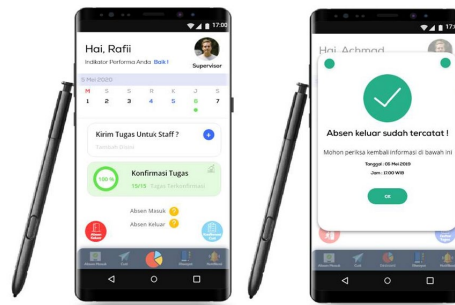


Figure 5. Clock Out

The second feature in this application is the absence of entry and exit (Figure 4 and Figure 5), in this feature the user can do absences in and out, after logging in the user can select the absence feature, after which the user can perform absences in and out. The system will record the name, NIP, time, location when the user is absent. When signing in, the user must also upload photos to minimize cheating. The application will directly access the camera on the smartphone so that users cannot upload photos from the gallery. Meanwhile, for absent time, the user simply presses the absent button. The system will record the date and time when doing a timesheet.

On the Absent Login page, there are several fields that are automatically filled in such as Name, ID, Time / Date, and Location, users are only required to take a photo from the camera to ensure the location is according to GPS. Users cannot take photos from the gallery to minimize cheating. To do a user absence, simply press the absent button on the main menu. After that, a notification will appear that the absence has been recorded.

### Submit Task

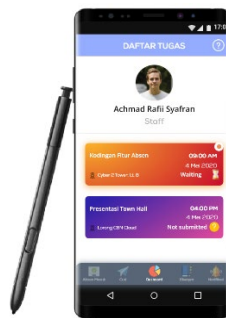


Figure 6. Submit Task



The third feature in this application is submitting completed work (Figure 6). When the user is on the main page the user selects the task management menu and then selects the job that has been completed after the user submits by pressing the task you want to submit, the status of the task will change to waiting. The system will automatically send information to the supervisor regarding this matter, the supervisor will later review the work whether it is correct or not when the supervisor can immediately approve the submitted task, if not the supervisor can reject the task and the system will send a notification to the user that the change in status is rejected. When doing a refusal, the supervisor is required to provide a reason why the task is rejected

On the Task page, there is a list of jobs that have been registered by the supervisor. After the user completes the work, the user can submit the completed work by pressing the task to be submitted. The task status will change to waiting after being submitted.

### Leave Request



Figure 7. Leave Request

The fourth feature is the request for leave, the user will be asked to enter the date of leave, end of leave (Figure 7), and the type of leave submitted when applying for leave. After submitting the application, it will be forwarded to the supervisor. Supervisors can determine whether the proposed leave is approved or rejected.

### History

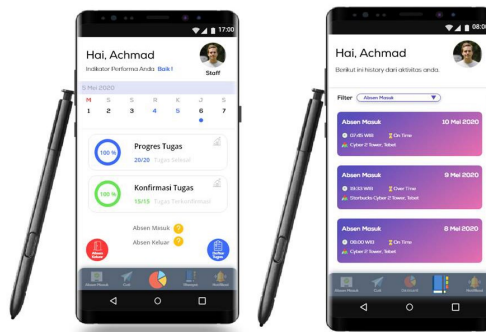


Figure 8. History

The fifth feature is that users can view the history of attendance and leave (Figure 8). This feature provides data about the user's absence and leave history. On this page, the user can filter the data they want to display. To open the leave history page and user timesheet, simply press the history button on the main page. On the history page, there is a filter where the user can select the data to be displayed.

## Admin Function

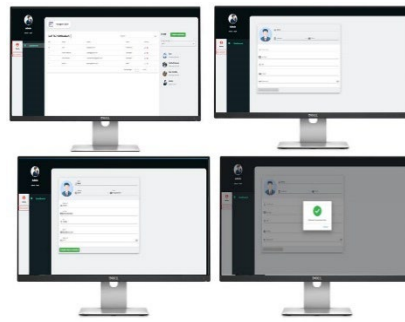


Figure 9. Add Employee

This application has 3 types of users who have different powers (Figure 9). First of all employees, this user has access to the main features. Both supervisors, just like employees, can access all the main features of the application. What distinguishes between these two users is that supervisors can add tasks, approve leave requests, and approve tasks. The third admin, this user access can only add, edit, and delete employee data. Especially for admin, the feature can only be accessed using the web.

In the use of mobile applications developed by users, they are required to have a smartphone-based on the Android or iOS operating system with an available memory specification of 50 MB and have a minimum RAM capacity of 2 GB and an internet connection. Meanwhile, to use a web application developed by a user, it is enough to have a web browser.

## 6. Conclusion

From the results of data collection regarding similar applications, many applications have not met the needs of employees, such as the absence of a leave application feature and task management, even though these features are critical according to the survey conducted by the authors. Data collection is performed using the questionnaire distribution method in the hope that it can get useful input from employees so that the authors can design and develop applications as needed and can assist employees in carrying out their work. After designing and developing this application, a prototype has been designed to be developed and implemented in the future, and the solution is deemed feasible for implementation and should also have significant value for the users.

## 7. Future Works

There are several future works that can be done as a follow up to this research. Firstly, the development of this application should be done, and preferably using a multi-platform approach, meaning the application should be developed for Android and iOS. Suggested framework to enable this development is Flutter. Secondly, there are several features that might be beneficial to improve the value for this prototype, which are: (1) virtual meeting room, (2) salary management, and (3) medical benefit claim.

## References

- Baig, Salman, Kasuni Geetadhari, Mohd Atif Noor, and Amarkant Sonkar. "Face recognition based attendance management system by using machine learning." 2022.
- Bhatti, Kaneez Laila, Laraib Mughal, Faheem Yar Khuhawar, and Sheeraz Ahmed Memon. "Smart attendance management system using face recognition." *EAI Endorsed Transactions on Creative Technologies* 5, no. 17, 2018.
- Dias, Bektassov, Asif Mohammad, He Xu, and Ping Tan. "Intelligent Student Attendance Management System Based on RFID Technology." In *Conference on Complex, Intelligent, and Software Intensive Systems*, pp. 578-586. Springer, Cham, 2019.
- Godswill, Ofualagba, Omijie Osas, Orobor Anderson, Ibadode Oseikhuemen, and Odiete Etse. "Automated student attendance management system using face recognition." *International Journal of Educational Research and Information Science* 5, no. 4, 31-37, 2018.

- Husain, A., Prastian, A. H. A., & Ramadhan, A. Perancangan Sistem Absensi Online Menggunakan Android Guna Mempercepat Proses Kehadiran Karyawan Pada PT. Sintech Berkah Abadi. *Technomedia Journal*, 2(1), 105-116. 2017
- Istijanto, M.M., M.Com. Riset Sumber Daya Manusia. Jakarta: PT Gramedia Pustaka Utama, 2012.
- Osman, A. S. A., & Osman, A. S. A. Evaluating Employee Performance using Automated Task Management System in Higher Educational Institutions. *Indian Journal of Science and Technology*, 12(9), 1-8. 2019
- Rickayzen, A. Challenges for Business Process and Task Management, Walldorf Germany. 2004

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