

1. INTRODUCTION

Attendance in schools or universities is often managed manually, using paper sheets containing the names of registered students, which are then checked off one by one and called sequentially [1]. In the realm of academia, attendance data holds significant importance for assessing student presence during the learning process, particularly from the perspective of educators [2]. Attendance serves as a gauge of student discipline, with some instructors factoring attendance into the overall grading criteria [3]. Manual attendance systems present challenges such as difficulty in calculation, susceptibility to damage or loss of attendance records, and time-consuming processing [4][5].

The Department of Informatics or Computer Engineering at Ahmad Dahlan University conducts teaching activities not only in classrooms but also in laboratories, where teaching assistants, known as practicum assistants, oversee practical sessions. Currently, the practicum attendance process involves manually recording the presence of students on paper lists, with each student called individually by the teaching assistant. One common issue faced by teaching assistants arises towards the end of the practicum sessions when they must reconcile attendance records with grades recorded in Google Spreadsheets. Furthermore, discrepancies in attendance data can affect the remuneration of teaching assistants, potentially resulting in delayed payments. Another issue is when a student is present during a session but not marked as such on the attendance sheet.

An attendance system serves as a tool for managing individual or institutional attendance data automatically, catering to personal or organizational needs [6]. Its primary purpose is to provide evidence of participation in activities, particularly in educational settings, where it validates attendance during the teaching and learning process [7]. Integrated with GPS technology, attendance systems can accurately detect user locations, providing further validation of attendance [8][9]. Given the widespread integration of GPS technology across devices, attendance systems can seamlessly operate on various user platforms [10].

Research related to the attendance system has realized various scientific studies to solve existing problems. The results of previous research studies identified the implementation of technology as an effort to manage attendance data. In research [11] produced a mobile-based attendance system at a clinic using an authentication method by utilizing Smartphone MAC Address technology as a substitute for identity and using the BSSID and IP address of the Wi-Fi network connected to the smartphone as validation of the correctness of the attendance location. The mobile-based attendance system succeeded in facilitating the process of managing attendance system data and running well from each function performed. In research [12] produced an Online Presence Information System using Face Recognition and GPS technology at SMK Muhammadiyah 1 Weleri. This system can help teachers and employees in controlling attendance to be more effective and efficient, can also prevent cheating in taking attendance and provide complete and fast information to the school regarding the attendance of teachers and employees every day and their accumulation every month. In research [13] produced an automation process in deciding student attendance status through GPS data input using Fuzzy Logic and determining compliance groups using K-Means. The automation process successfully manages the activity monitoring system that is relevant to the principle of efficiency of monitoring remote activities at the PKL (Field Work Practice) site. In research [14] produced an update of the previous application system. This system received a good response from users as evidenced by measurements using the Perceived Ease of Use, Perceived Usefulness and Attitude toward Using variables contained in the TAM (Technology Acceptance Model) model. In research [15] produced a presence system by emphasizing the scrum method as application development. The results of the study were able to overcome cheating and shorten the time in the attendance process and the application has successfully met all the needs of the owner's product.

This research aims to develop an enhanced attendance system to address the shortcomings of manual attendance processes, transitioning to a digital format. The system design will include GPS integration for attendance validation. The goal is to streamline attendance record-keeping for