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DESIGN AND IMPLEMENTATION OF SMART ATTENDANCE MONITORING SYSTEM USING BLE (SAMBLE) TECHNOLOGY

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ABSTRACT

The effectiveness of recording, managing and monitoring faculty class schedules and student attendance has always been a challenging task for most Institutions of Higher Learning (IHLs) in Malaysia. Traditionally, in most IHLs in Malaysia, attendance recording is basically done with pen/paper or using a simple web-based system which is time consuming and difficult for faculties periodic monitoring. To overcome the identified difficulties, this research aims to develop a Smart Attendance Monitoring System using Bluetooth Low Energy (BLE) Technology, namely SAMBLE system to assist lecturers in recording, managing and monitoring students' attendance and class schedules automatically with the integration of BLE beacons. In addition, the system provides notifications to monitor students' absenteeism based on permissible percentage stated in an academic regulations handbook. The system is developed using an agile methodology consists of iteration and incremental approaches. Server back-end frameworks that is used by the system is Apollo server by spec-compliant with GraphQL server. Furthermore, the web-based platform is developed using the Vue front-end framework. While, React Native and UI Kitten for mobile front-end frameworks. The databases used are MongoDB and Redis. Thus, to evaluate the perceived effectiveness of SAMBLE system, a survey was conducted with the participation of 32 lecturers and 108 students of Kolej Universiti Poly-Tech MARA (KUPTM). Respondents were selected using purposive sampling and the statistical method used is a descriptive analysis. The system was evaluated based on its functionality and usability test. The results showed that the SAMBLE system is perceivably effective in assisting lecturers to record attendance, manage class schedules and student attendance as well as to assist faculty in monitoring students' absenteeism effectively. Furthermore, in-app and email notifications provided by the system is very useful for faculty to notify the parents, mentors and the subject's lecturers regarding students' absenteeism for further action taken.

Keywords: smart attendance system, attendance monitoring system, students' absenteeism, Bluetooth Low Energy (BLE) Technology, beacon-based application.

