

Implementation Internet of Things (IoT) for Student's Attendance

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Abstract—Internet of Things (IoT) can be implemented in education. In this research, IoT can be implemented in managing student attendance. There are four stages in realizing IoT implementation: defining the specifications of the biometric device to be used, defining the process flow, building the application, deploying and testing the application. This IoT implementation requires a biometric device that supports data communication via the internet. To manage student attendance data from data collection to reporting, two applications are needed: an application used to retrieve data and an application used to process student attendance data.

Keywords— IoT, internet, attendance, student, biometric.

I. INTRODUCTION

The internet is the largest computer network in the world. Now, the internet has become a mandatory requirement for everyone. Data and information can be accessed easily through the internet network. Information can be distributed more quickly over the internet than on television. By the internet, people can do many things, such as ordering food, buying books online, and transportation services [1].

Internet of Things (IoT) is a technology that facilitates data or information communication between devices via the internet network. In information and communication technology, IoT has become a main trend [2]. The IoT concept facilitates data or information communication between devices. A device can send or receive data or information from other devices. In this case, the internet has an important role. By combining physical devices and digital technology, IoT is making the world smarter [3].

IoT will have an impact in various fields, for example: transport, education, home, business, energy, earth, and others [4]. In transport, IoT can be implemented to create smart cars, traffic light management, and payment management on toll roads. In education, IoT can be implemented for Computer Based Test (CBT), online registration, Learning Management System (LMS), and student attendance.

Tracking student attendance in educational establishments is essential to ensure student engagement and effective administration [5]. Attendance management can be done manually or can apply a technology. The manual way is a simple way. The teacher checks directly with students. In this case, the teacher can call students or count the number of students present.

Another way is to apply IoT technology. In this case, the device that can be used is a device that can identify students. The device is a device that uses a biometric system. The

biometric system will recognize a person's identity automatically by matching the biometric characteristics stored in the database [6]. Biometric device can identify students through their faces, eyes or fingerprints. The biometric system can decide whether the identification results are valid or invalid, recognized or not recognized, accepted or rejected [6]. The device will identify students and then record the date and time as student attendance data.

II. METHODOLOGY

This research tries to implement IoT technology in education. The case used is how to process student attendance data at school using IoT.

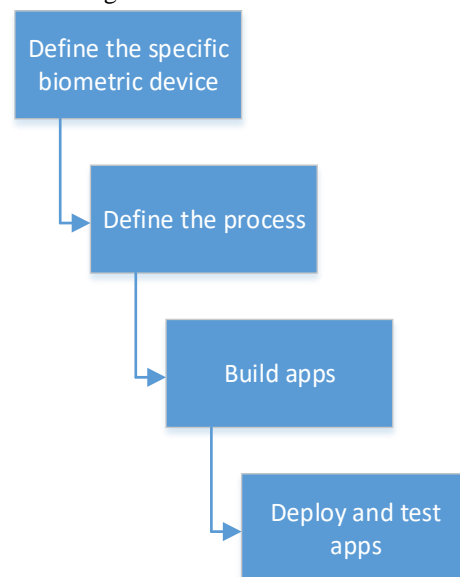


Fig. 1. Methodology

The stages in this research are:

A. Define the specific biometric device used

This stage determines the specific biometric device to be used. There are biometric devices to identify faces, eyes or fingerprints. However, the biometric device must support data communication via the internet.

B. Define the process from student identification to reporting

The process flow from student identification until the report is made must be clear. At this stage it also define what applications must be built and the server that will be used.

C. Build apps

The application building stage can use one of the software development methodologies.

D. Deploy and test apps

The results of application development are deployed and tested in the actual environment.

III. RESULT

IoT implementation in managing student attendance requires biometric devices. This biometric tool is used to identify students and then record the date and time of attendance of the student. Student attendance data is processed and presented in report form.

The concept of IoT implementation can be view in Figure 2.

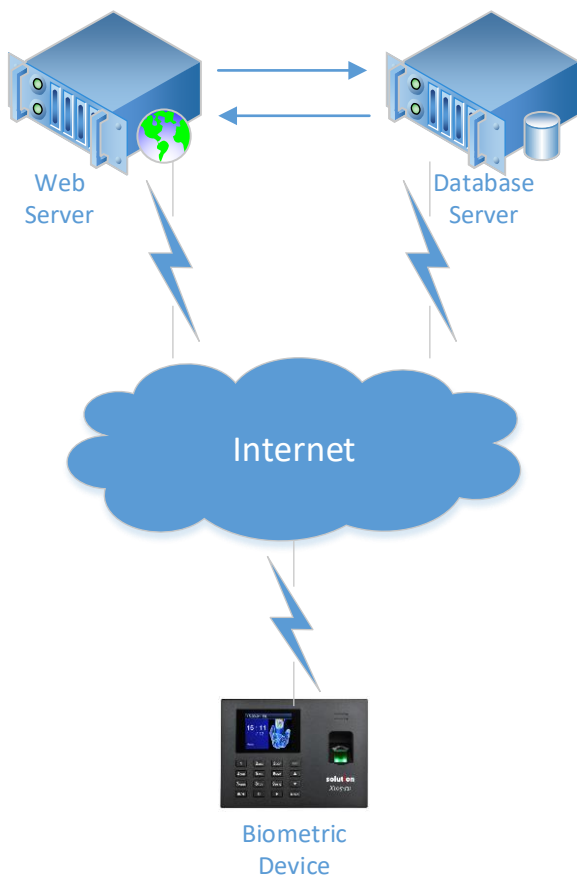


Fig. 2. The concept of IoT for student’s attendance

In Figure 2 there are two servers: a web server and a database server. The web server is used to run two web applications: Automatic Data Attendance (ADP) and Attendance Information System (PIS). ADP is used to automatically retrieve student attendance data from a biometric device and then send it to a database server. Student attendance data stored in the database server is processed by PIS and then presented in the form of a report.

The flow of data processing can be seen in Figure 3.

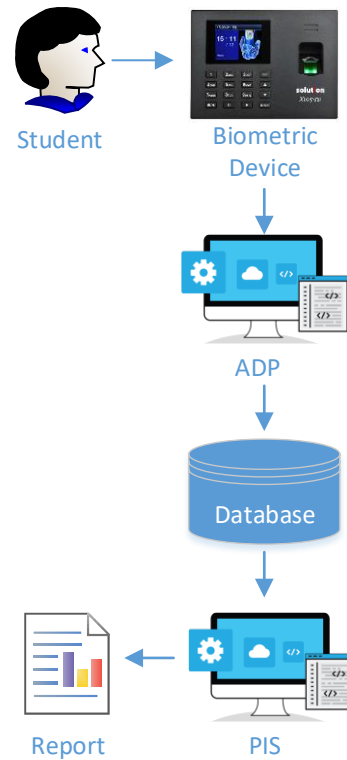


Fig. 3. The flow of data processing

Processing student attendance data through four stages:

A. Student registration and biometrics

At this stage student data is registered using PIS. Then the student's biometric data is registered on the biometric device. In this process, the student ID on the PIS must be the same as the student ID on the biometric device.

B. Retrieve attendance data automatically

The next stage is the process of retrieving student attendance data stored on a biometric device. This process is done with the ADP application. Student attendance data is taken, sent to be stored in the database server. The data collection process is carried out at certain intervals.

C. Processing of attendance data

Student attendance data retrieved and stored on the database server is datetime data. The data is processed in order to know students who are on time and who are late.

D. Reporting

The final stage is reporting. The results of processing attendance data in the previous stage are presented in the form of a report according to the needs of the school

IV. CONCLUSION

IoT technology can be implemented in managing student attendance. This implementation requires a biometric device that is used to identify students by face, eye or fingerprint. After successfully identifying the student, the biometric device will store the date and time of the student's attendance. The biometric device used must support internet communication. There are two web applications used: ADP and PIS. The ADP

application is used to retrieve student attendance data automatically. The PIS application is used to process student attendance data and generate reports.

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