ABSTRAK

Pengelolaan kehadiran guru dan siswa di Madrasah Tsanawiyah Azizah Sungai Dua masih dilakukan menggunakan buku presensi. Proses tersebut berpotensi menimbulkan keterlambatan pencatatan, kesalahan data kehadiran, kesulitan dalam rekapitulasi, serta risiko kehilangan arsip. Penelitian ini bertujuan mengembangkan aplikasi manajemen kehadiran guru menggunakan face recognition dan kehadiran siswa menggunakan *Quick Response Code (QR Code)* di Madrasah Tsanawiyah Azizah Sungai Dua, Kecamatan Rambutan, Kabupaten Banyuasin. Metode pengembangan sistem yang digunakan adalah Waterfall, yang meliputi tahap analisis kebutuhan, perancangan sistem, implementasi, pengujian, dan penerapan sistem. Data penelitian dikumpulkan melalui observasi, wawancara, dan studi pustaka. Aplikasi dikembangkan berbasis web menggunakan *PHP native* serta *MySQL* sebagai basis data. Penerapan *face recognition* pada kehadiran guru menggunakan metode *Convolutional Neural Network (CNN)* melalui tahapan pengumpulan citra wajah, praproses, augmentasi data, ekstraksi fitur, klasifikasi, dan evaluasi model. Sementara itu, *QR Code* digunakan sebagai identitas unik siswa dalam proses pencatatan kehadiran. Hasil pengujian black box menunjukkan bahwa 26 fitur utama aplikasi dapat berjalan sesuai dengan kebutuhan fungsional sistem. Hasil percobaan pengenalan wajah guru berada pada kisaran 73,00% hingga mendekati 85,00%. Aplikasi yang dibangun dapat membantu proses pencatatan, pengelolaan, rekapitulasi, dan pelaporan kehadiran guru dan siswa secara lebih terstruktur.

Kata kunci: Aplikasi manajemen kehadiran, *Convolutional Neural Network, Face Recognition, QR Code, Waterfall.*

ABSTRACT

The management of teacher and student attendance at Madrasah Tsanawiyah Azizah Sungai Dua is still conducted using attendance books. This process may cause delays in recording attendance, errors in attendance data, difficulties in data recapitulation, and the risk of losing archives. This study aims to develop an attendance management application for teachers using face recognition and for students using Quick Response Code (QR Code) at Madrasah Tsanawiyah Azizah Sungai Dua, Rambutan District, Banyuasin Regency. The system development method used in this study is the Waterfall method, which includes the stages of requirements analysis, system design, implementation, testing, and deployment. Research data were collected through observation, interviews, and literature review. The application was developed as a web-based system using native PHP and MySQL as the database. Face recognition for teacher attendance was implemented using the Convolutional Neural Network (CNN) method through the stages of facial image collection, preprocessing, data augmentation, feature extraction, classification, and model evaluation. Meanwhile, QR Code was used as a unique student identifier in the attendance recording process. The results of black-box testing showed that 26 main application features functioned according to the system's functional requirements. The results of teacher facial recognition experiments ranged from 73.00% to nearly 85.00%. The developed application can assist the process of recording, managing, recapitulating, and reporting teacher and student attendance in a more structured manner.

Keywords: Attendance management application, Convolutional Neural Network, Face Recognition, QR Code, Waterfall