

ABSTRACT

Conventional parking systems often face challenges such as difficulty finding vacant spots, a lack of real-time information, and the potential loss of parking tickets. To address these issues, this research focuses on the design and development of a smart parking system that utilizes IP camera technology for vehicle identification. The integration of SMS notifications aims to provide users with direct information regarding parking status, thereby increasing efficiency and convenience. This system is expected to be an effective alternative solution in managing increasingly crowded parking areas.

The research methodology includes the hardware design consisting of an IP camera as a visual sensor, a microcontroller as the main processing unit, and a GSM module for sending SMS notifications. Software is developed to perform image analysis from the IP camera to detect the presence of vehicles in each parking slot. Object detection and license plate recognition (optional) algorithms are implemented for identification. The parking availability data is then processed by the microcontroller and sent via the GSM module as SMS notifications to registered users or those requesting information. System testing is conducted on a small scale to evaluate detection performance, notification accuracy, and overall system responsiveness.

The test results indicate that the system is capable of detecting the presence of vehicles in parking area with an accuracy rate 73.33% under varying lighting conditions. SMS notifications were successfully sent in real-time with accurate parking status information. The implementation of this system has significant potential to improve parking management efficiency, reduce parking search times, and provide ease of information for users. Further development can be carried out by adding features such as electronic payment and integration with mobile applications for a more comprehensive user experience

Key Words: IP Camera, Smart Parking, SMS Gateway OCR Algorithm