DESIGNING AN AUTOMATIC GATE SYSTEM BASED ON FACE RECOGNITION USING THE CONVOLUTIONAL NEURAL NETWORK (CNN) METHOD

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ABSTRACT

The demand for security and convenience in managing access to restricted areas, such as residential properties, commercial establishments, and public facilities, has become increasingly significant in contemporary society. Traditional gate systems that depend on physical keys or tokens often exhibit inefficiencies and are susceptible to security vulnerabilities, including theft and unauthorized access. Facial recognition technology utilizing Convolutional Neural Networks (CNN) has demonstrated considerable potential in enhancing security and convenience by accurately and swiftly identifying individuals. Nevertheless, a primary challenge lies in integrating this technology with automation systems to facilitate its practical application in daily life. This study aims to design and develop an automated gate system employing CNN for facial recognition, which is integrated with the Telegram platform to enable remote access control. The research encompasses several stages, including collecting facial image data, data preprocessing, training the CNN model, and system testing. The CNN model is trained using a diverse facial image dataset and integrated with a Telegram bot via an Application Programming Interface (API) to facilitate remote gate control. The results indicate that the CNN methodology can be effectively implemented for facial recognition in conjunction with the Telegram platform as a gate controller. This system employs CNN to detect and recognize the user's face while utilizing Telegram to transmit commands for opening or closing the gate. The findings suggest that this integration allows for automatic and remote gate control with high user-friendliness. This study successfully implements the CNN approach within a facial recognition system integrated with the Telegram platform, enabling efficient and secure gate management and addressing the growing need for security, convenience, and efficiency in controlling access to restricted areas.

***Keywords**: Facial Recognition, Convolutional Neural Network, CNN, Remote Access Control, Telegram Integration.*