

ABSTRACT

Early disease detection is important to reduce the impact of dangerous diseases. However, many people overlook early disease detection. One simple yet often neglected method of early disease detection is through urine and feces analysis. The characteristics of urine and feces can indicate a person's overall health and even symptoms of dangerous diseases such as colon cancer. When disease symptoms are detected early, prompt action can be taken to prevent the disease from progressing to a more serious stage.

The solution to this problem is to create an Internet of Things (IoT) based toilet innovation integrated with an application that can monitor health regularly through the detection of urine and feces in the system. The designed system should be able to classify excretions based on the characteristics of urine and feces using Machine Learning technology. It should provide relevant health information and advice based on the detection results. The system should be able to operate in humid and corrosive toilet environments, and it should differentiate the classification data of each user to monitor and maintain the privacy and security of each user.

The results of the prototype design for a smart toilet show that the system can accurately classify the color of urine with 98% accuracy, the color of feces with 99% accuracy, and the shape of feces with 90% accuracy. The classification model used in the design is the Convolutional Neural Network (CNN) with the MobileNetV2 algorithm. The system can also display information related to the classification results and health advice on an Android application effectively. Additionally, the system can operate in humid toilet environments with an enclosure that can prevent water leakage for about 10 minutes according to the IPX1 standard. The smart toilet system can also recognize and separate the classification results of each user, ensuring the privacy and security of the users.

Keyword: Smart toilet, Convolution Neural Network (CNN), Cloud, Internet of Things (IoT).