

## **An automatic teller machine for HIV test based on digital image processing techniques**

Many kinds of HIV testing kits have recently become available to be used in determining whether an individual's blood contains HIV virus or not. In the determine method of the HIV rapid test procedure, when a drop of blood is introduced at the lower testing region of the test kit, a red horizontal line appears on the test section indicating the presence of the HIV virus. The absence of the red line shows that the blood does not contain the virus. However, a similar red line must appear at the control section of the kit to show that the test procedure is successful and complete. The reading, interpretation and confidentiality of the HIV test result has often been abused by the medics and the counselors. There has been an immense widespread of HIV due to people's ignorance of their status. The spread can be curbed by introducing a human friendly, confidential, automatic and reliable testing system that has been developed by this study. In this study, an electronic system that automatically acquires the red color signals that appear on the test kits has been developed. The system analyses the color signals, processes them, displays and relays the test result to the client. The main objective of the study was to design and develop a real-time HIV test analyzer based on computer aided image processing technique. An image processing software in a client/server system using Graphics Device Interface plus (GDI+) Library tool was created. The system used *Complementary metal-oxide- semiconductor* (CMOS) digital camera to capture the image and the programmed software, developed in C#, processes the captured image and sends the testing results to the display unit. This technique will not only eliminate the human error associated with the use of HIV testing kits, but will also improve the testing productivity in comparison to those achieved by the trained technicians. It will also enhance the confidentiality of the test result hence reducing the stigma associated with the disease and encourage more people to know their HIV status. The system can be installed in our medical facilities and at the Voluntary Counseling and Testing (VCT) to aid the medical personnel in HIV screening and testing. The system has been tested successfully and the testing results show a high degree of efficiency and reliability.