Detecting Hidden Security Threats With Thermal Camera

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Biometric authentication has become ubiquitous in the modern world. Other forms of biometric authentication: iris, retina, fingerprint, and face verification, are simple and easy to use, but hand authentication has evident advantages being more cost efficient and universally accepted. Hand geometries can differ from each other among people, like finger lengths, palm sizes, etc. The emphasis is hand geometry can be obtained using cameras. In a previous project studying hand biometric authentication, a problem emerged. The regular cameras could not differentiate between a live hand and a 3D printed (fake) hand. The goal of this project is to use a thermal camera to conduct a liveness detection on the hand scanned while ensuring two different hands can be distinguished. In order to compete the liveness detection, a thermal camera replaced the regular camera to pick up the heat admitted from the real hand. After verifying the hand scanned is real, we perform image data analysis to identify the live hands from the IR camera using MATLAB. It outputs a skeletal image of the hand after removing the only white rows. The pixel points of the hand image are opened in MATLAB. The points on the tips of the fingers and at the intersecting lines are plotted. The measurement was taken of the length of each finger, the length between each finger, and the palm width. After comparing two different hand measurements, the conclusion reached was thermal camera scanning could complete a liveness detection and identify the difference between two hands.

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