

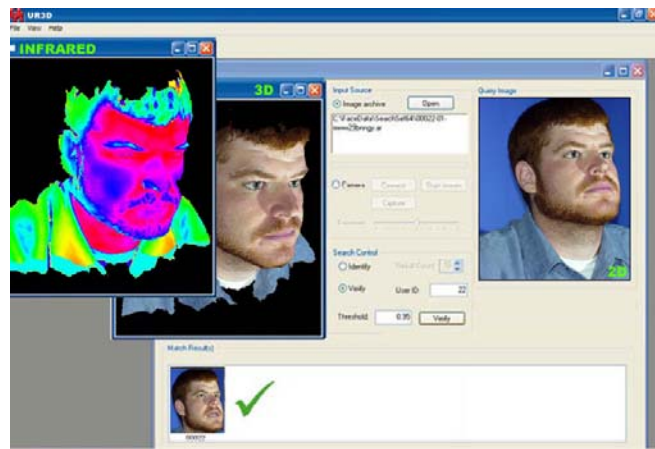
R&D Division Project Summary

Monitoring ingress and egress is vital to maintaining a secure access-control environment. Biometrics-based automated systems are not foolproof, but add a layer of redundancy, making the entire identification process less error-prone and more efficient. Face recognition is perhaps the most attractive biometric technology since, unlike fingerprints and retina scans, it has the potential to be done passively and unobtrusively at a comfortable distance. So far, automated face recognition systems have met with little success. Their performance is moderate when employed in access control applications (cooperative subjects) and degrades significantly when employed in surveillance (uncooperative subjects).



Currently, such systems are typically limited to comparing 2-dimensional images of face appearance, resulting in poor performance due to the need to compensate for changes in image intensity caused by ambient brightness (indoors, outdoors), angle of incidence to the source of illumination (shadows), differences in color calibration, the existence/appearance of facial hair or accessories such as glasses, etc. Equally important, such methods require an approximate match of pose between the probe and gallery of stored images to function properly, and acquisition/storage of 2D images of a subject's face in every possible pose and/or orientation is not practical, even if the subject is fully cooperative during the enrollment phase.

The objective is to design and develop UR3D, an unobtrusive, automated face recognition system based on comparing the 3-dimensional geometry of the face. Previous work at the Southwest Public Safety Technology Center was conducted to demonstrate the feasibility of the design concept. Software algorithms developed to process facial geometry characteristics produced the best results yet on data provided as part of the ongoing NIST Face Recognition Grand Challenge.



As part of continuing test and evaluation, the prototype system will be deployed in day-to-day service as an automated monitor augmenting existing ingress/egress protocols in the correctional facility operated by the Texas Department of Criminal Justice at Huntsville, Texas. The sensor element will be based on a commercially available stereo camera, and the data processing will be done using algorithms developed at SWTC's Visual Computing Lab at the University of Houston.

