



SafeRise[®]
Face Recognition
White Paper

SafeRise in General

SafeRise is a comprehensive building security access solution and service that facilitates management and control of building entry points, common areas, elevators & parking for government, commercial and multi-tenant buildings. The system allows entry through a combination of advanced biometric technologies including face, voice, speech, license plate and even behavior. There are of course many other access control systems today as well as facial recognition systems. What makes SafeRise so special is the combination of information collected from the different technologies working together and the patented technology, which enables very high reliability and resilience against fraud.

In designing a high-quality, superior real-life facial recognition system, FST21 set the bar high. Following are the challenges that FST21 needed to overcome:

1. To provide very high accuracy and reliability.
2. To identify faces in a large, open area (up to 10' x 10') and with no limitation of a person's height (2 to 7 feet) or even whether they are in a wheelchair
3. To identify more than one face in the frame and perform just as well with several faces in the same frame.
4. To provide face identification while the person is walking and in real time.
5. To accurately recognize a real face as opposed to a photograph.

To overcome the challenges, FST21 selected a well tested and mature recognition engine from Cognitec (1), combined with its own patent-pending multi-face technique (2) and a proprietary live-face test algorithm (3).

(1) Cognitec Systems GmbH

To meet the above challenges and provide the necessary accuracy and Reliability FST21 has selected and licensed the Cognitec's B5T8 face recognition engine.

About the Cognitec Face Recognition Engine:

The Cognitec Face Recognition Engine was tested and approved by NIST (National Institute of Standards and Technology) in August 23, 2010 using a data base of 4 million faces from visa images, as well as law enforcement photos, and using a variety of characteristics such as sex, ethnicity, age, height and weight. This test was backed by the FBI (Federal Bureau of Investigation).

Cognitec's face recognition engine passed the compliance test of access control without presentation of a credential or PIN. With a data base of pictures that have been enrolled in good conditions and compliant to ISO/IEC 19794-5 standard.

The results showed:

- Ability to recognize a face in spite of changes in age over an 8 year span of time
- Ability to recognize a face in spite of changes in a person's weight
- Race did not affect the results
- Age did not affect the results
- The sex of a person did not affect the results

The overall results is that the likelihood that an image pair identified as a match, has come from two different people is 1 in 300,000 in a test of 400 million comparisons, using a population of 40,000 enrollees, and 10,000 impostors.

In the open-set identification tests, from all 10 leading face recognition algorithms, Cognitec's algorithm had the best performance and the lowest false alarm levels.

(2) SafeRise[®] Face Recognition Implementation

The goal of FST21 was to go beyond the capabilities of the Cognitec system by providing and adding a none intrusive and user friendly feature with the necessary functionality of simultaneous recognition of multiple people, with heights ranging from 2' to 7' in an area of up to 10'x10'.

FST21 has implemented its patented-pending MFMC-SFRT (Multi Face, Multi Camera - Server Face Recognition Technique), using very high resolution 3-10 Mega Pixel IP cameras.

Features of the MFCT (Multi Face Cropping Technique):

The MFCT automatically identifies where the face is by locating the eyes, then cropping a small frame that includes only the face. Each face will be cropped and saved only once from a sequence of frames, since the face tracking algorithm tracks the face until it disappears from the frame. The multi-face photo below and the individual cropped faces show how the technology works.





(3) Live Face Test

In all automated face recognition algorithms, it is possible for an imposter to use a stolen facial photograph of a registered person to gain access to a secured area.

FST21 has developed a proprietary live face test video analytics algorithm that is performed in parallel to the face recognition technology and is adding a “live” score, to the face recognition score.

The FST21 live test algorithm is a combination of face depth detection, frequency response and identifying physiological motion. This combination in our tests has proved to be difficult to deceive.

As the physiological motion test is time consuming, the complete face recognition will be longer by one to two seconds than the standard face recognition.