Law Enforcement Departments Identify Criminals using Facial Recognition

A timely identification of individuals by law enforcement and counter terrorism officials is critical to the safety and security of facilities and general public. Hardened criminals either do not carry identifications or have stolen identifications. Some violators if not positively identified within certain time, such as a person arrested for disorderly conducted, must be released but he may be wanted for a crime in another jurisdiction.

Inmates in the custody of the Sheriff's department must be positive identified every time they leave and enter the holding area. Many departments use finger prints as the way of positively identifying inmates, which is slow and requires inmates' cooperation. The challenge becomes even more critical in the field when an intoxicated non-cooperative person involved in a criminal act is investigated.

Quick screening of suspected terrorist at secured facilities such as airports, train stations and government buildings is also critical. So the ability of law enforcement officials to quickly identify such individuals and making timely decisions is extremely important. These result in solving crimes; simplify inmate bookings & release, securing key facilities, protecting general public, and expediting processes for the law abiding public. It is therefore imperative to use the tools and technologies now available, such as biometrics and mobile technologies, to help the law enforcement deal with criminals quickly and accurately.

Customer
Include Sheriff's department and other law enforcement agencies in 12 US cities and counties

Industry
Government,
Identity Management

Offering
Software Product Engineering

About the Client

The solution is developed for one of the leading providers of Biometrics and Secure Credentialing systems in North America for over 20 years. Techlogix has been a solutions provider for them for the past 14 years.

The Solution

Techlogix has developed a state of the art identification system using facial recognition and an easy to use booking workstation software for use by Sheriff's departments and other law enforcement agencies.

The inmate booking system uses a proprietary facial recognition technology provided by our client for identification. It then uniquely links facial information of inmates to their demographic records for booking and checkout. This record is then stored in a central system of record. The system can perform one-to-many searches to match a face against criminal database as well as one-to-one searches for positive identification. The system includes a print module for printing Identification badges and an administrative module including several demographic and performance reports.

A mobile version of the software allows a patrol officer to take mugshot style pictures with a digital camera. The camera when placed on its cradle which is connected to a Laptop that launches facial recognition software for one-to-many searches against the criminal database that is stored locally on the Laptop and against a larger central database connected via wireless Internet in a few seconds. The system displays closest matches found along with key demographics for visual comparison by the patrol officer.

Sheriff's Department Booking System

The Sheriff's Department booking system is designed to meet the inmate booking requirements of a typical law enforcement department. The application provides customizable modules to support their specialized needs of booking and release. The major modules of this system include:

- **Triage** - On arrival at the Sheriff's holding cell, inmates are immediately photographed. Using the photo, an investigative officer conducts preliminary facial recognition search to attempt to identify the individual and verify any past criminal history. This is also placed in a queue for booking.

- **Booking** - Booking deputy selects a record that matches the inmate by visually comparing the captured photograph against the set of matching photographs and updates any incorrect or missing information. In case of no match, the deputy enters demographic details and physical attributes of the inmate. Additionally, multiple photographs including frontal face, Left and Right profiles and pictures of scars, marks and tattoos are captured. A badge is printed for identification purposes. All data is then uploaded to central system of record.

- **Release** - All inmates must be positively identified before the can be released. This is done by capturing a facial picture at the time of release and one-to-one comparison with the stored photos in the inmate's record in the database. The system also provides a metered level of match that can be color coded based on the strength of the match to help the deputies with their own match tests.

- **Reports** - The Reports module includes investigative searches by range of demographic and physical characteristic fields such as tattoo description, facial hair, and weight-height range etc. The investigators can also perform facial recognition searches using an external probe images against the criminal database or configurable watch-lists. The line-ups or photo-packs can be created based on similar physical features to identify suspects during interrogation. The reporting module also includes statistical reporting on capture & release in a time period, new and repeat criminals in a time period etc. The reports can include Key Performance Indicators about positive matches and false positives over a selectable period of time.

- **Administrative** - The administrative module provides back-end features to create watch-lists, update booking records with additional information, linking multiple records together, and corrective measures like delinking and disenrollment of booking records or deletion of inmate's images.

Law Enforcement Departments using Facial Recognition System
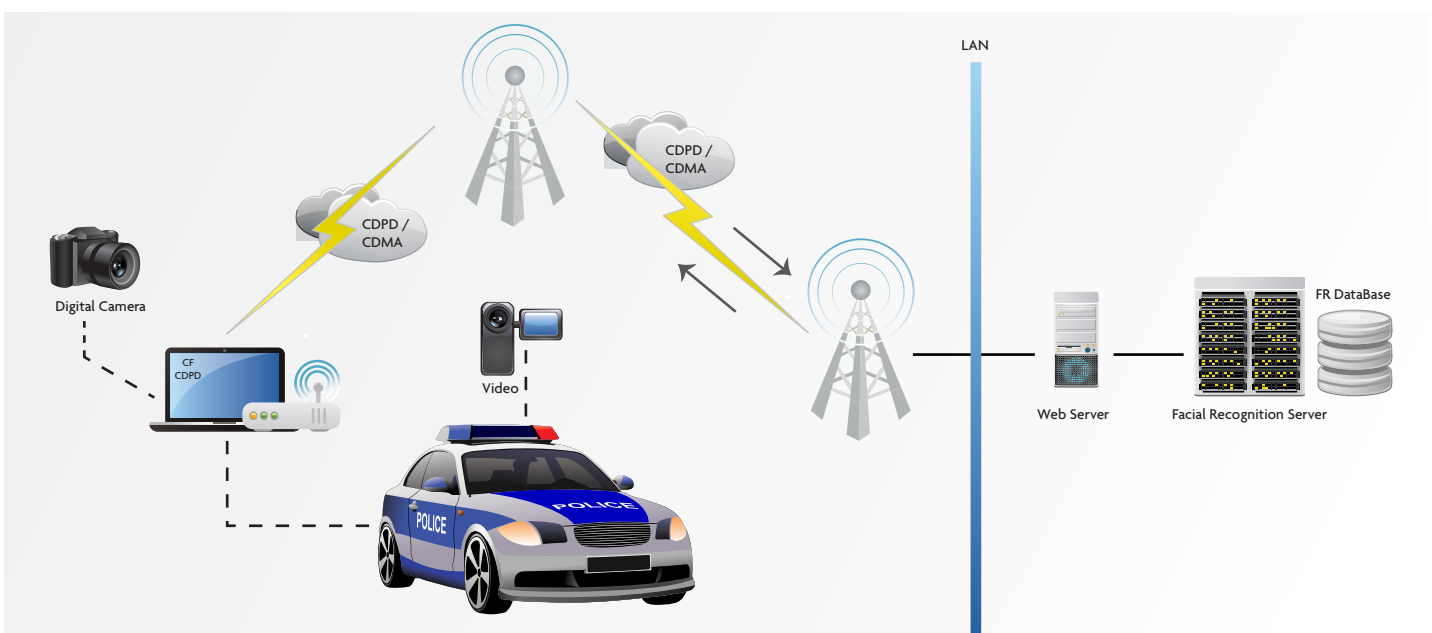
Flexible System Design

The biometric identification system is a rich client application designed to run on a workstation platform. The application is designed to provide high performance, interactive and rich user experiences. The application will mostly operate in connected scenarios in which the application will retrieve and upload data to a central system in real-time. However, the application can also operate in stand-alone / semi-connected scenarios by using a local data store and data relay technology for fast transactions. The application is developed in .NET framework using .NET components like Windows Presentation Foundation (WPF), Windows Communication Foundation WCF and Windows Workflow Foundation (WF).
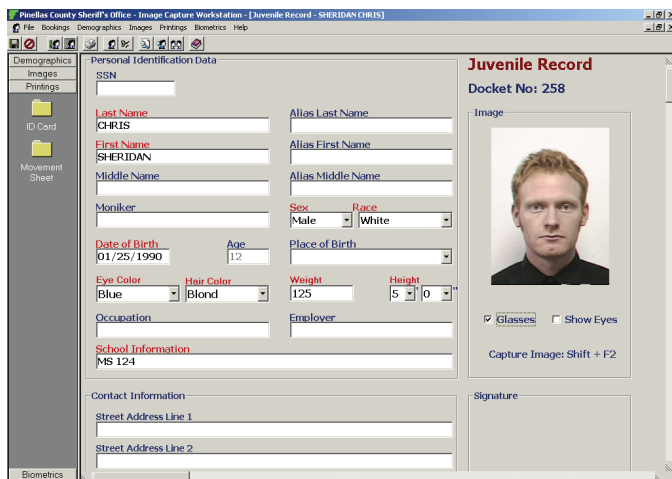
The application software design is based on a component-based architecture. The key principle in this design approach is to develop re-usable, easily replaceable, and loosely coupled components that encapsulate specific application functionality. Components can be developed, tested and deployed separately from other functionality. To facilitate loose coupling among components, the dependency injection pattern is extensively used in the application design. The dependency injection is implemented using interface injection technique. In this technique, standard interfaces for various components are defined and used in the application. Components that implement these interfaces are then loaded at run-time using .NET reflection. The system supports standard WS-Security over HTTP for data transmission.

The system is designed to be easily customized to the customer's requirements. The data entry forms - built with Microsoft .NET WPF framework — are completely customizable at run-time. Based on customer requirements, new data fields can be incorporated as well as existing fields can be configured as mandatory or optional. The system can be easily re-configured to run as enrollment station at jail visitation center or as registration terminal for criminal or sex offender registrants.

Image Acquisition

The state of the art image capture module captures face and other images with vast range of digital and video cameras. The booking system works with digital cameras from multiple vendors including Cannon, Nikon and Olympus. The system also supports image capture from video cameras that provide pan-tilt-zoom support. All images captured are fully compliant with NIST specifications. For mobile version of the application, the system supports Windows Imaging Automation (WIA) Interface which allows the application to run with virtually any off-the-shelf digital camera.

For face images, the system includes face finding support which automatically locates eyes, zooms the camera to the subject's face and captures fully NIST compliant images with a click of a button. This feature is implemented for both digital and video cameras.
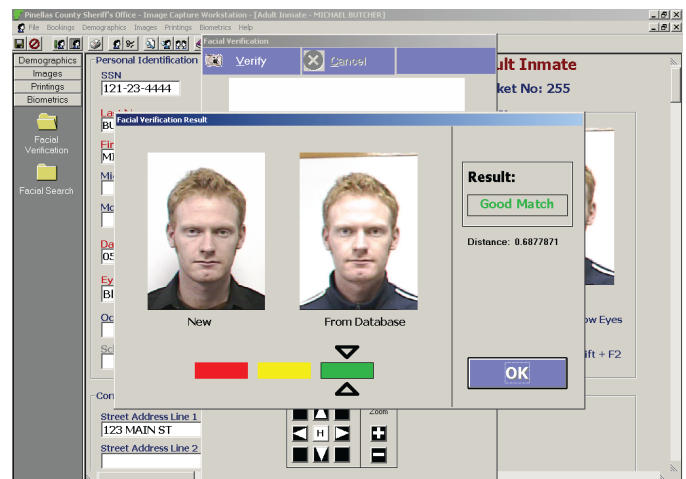
Integration Capabilities

The biometric identification system provides comprehensive integration capabilities and can be integrated with other systems such as jail management systems, court house docketing systems, finger prints identification systems (AFIS) etc. The input data adapters provide interfaces for new booking requests. The data transfer from external systems will trigger a new booking request in the application. The design of the Data Adapter layer is fully extendable so that integration with new partners can be developed and seamlessly integrated into the application. The application supports standards-based integration with industry standards including NIST Type-10 and XML documents.

Key Features

- ◉ Real time One-to-One and One-to-Many Search Capability against up to 500,000 Faces
- ◉ Intelligent Face Finder for fast Facial Image Acquisition
- ◉ ID card and Badge printing capability
- ◉ Powerful Facial Investigation Tools
- ◉ Mobile identification system for police cars

Software Product Engineering

www.techlogix.com/software-product-engineering

Techlogix provides technology development teams that can address the full product lifecycle including conceptualization, detailing of functional specifications, user experience design, software development, testing and verification, release management, product maintenance and support activities. Our SPE practice covers engagements ranging from complete platform development to specific module development to targeted enhancements on existing products. Developing complex, high performance web scale platforms with multiple front ends including mobile and HTML is a particular focus area.

Contact

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About Techlogix

Techlogix is an IT Services, Consulting and Business Solutions company that helps its global clientele achieve enterprise transformation by harmonizing people, process, and technology. Techlogix builds high performance solutions using practice-specific delivery methodologies that utilize its globally distributed development teams. Our people combine the spirit of engineering excellence with a strong commitment to end-to-end customer experience. Techlogix employs approximately 300 people in 5 delivery centers worldwide.

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