



Facial Recognition

Enhancing Data Quality and Security

Halt, Who Goes There?

A Tennessee Facial Recognition System Project

September 2018 – June 2019

The State of Tennessee

Department of Finance and Administration

Division of Strategic Technology Solutions

NASCIO Award Category: Emerging & Innovative Technologies

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Strategic
Technology Solutions

Executive Summary

Strategic Technology Solutions (STS), the Enterprise Information Technology resource for the State of Tennessee, is developing a Facial Recognition System (FRS) technology proof of concept, utilizing Agile Methodology. This effort is well underway with its first application in beta stage. The initial application is a database deduplication function needed for the Tennessee Department of Correction (TDOC) inmate database. This database has grown to 800K images and requires a manual search in situations where an inmate identifier (ID) is added incorrectly. A manual search through 800K images, to correct one inmate's ID, can take upwards to a year or longer. Thus, the attempt to deduplicate the entire database by applying facial recognition technology to database images is critical. The technology under development by STS staff has the potential to save TDOC staff significant amounts of time, as well as enhance safety and security, which addresses the department's core mission.

The internal development of this technology has the potential to saving the state millions of dollars annually. The TDOC application alone will save approximately \$800,000 per year, primarily because the product will not be purchased from an outside vendor.

Many state agencies, including the Department of Human Services, and the Department of Safety and Homeland Security could benefit from having the resources provided through FRS capability. Having core facial recognition capability will provide the opportunity to quickly adapt this technology to other areas within the state, as needs are identified. Opportunities include driver's licenses, fraud detection, replacement of badge entry systems, identity verification, and real time critical infrastructure protection (for example, capitol building with list of excluded individuals).

STS has been able to open a significant door of opportunity for Tennessee State Government with the in-house development of this technology. The opportunities for increased efficiency, safety, security, and savings are limitless.

Concept

The Tennessee Department of Correction is responsible for the oversight of more than 106,000 felons: 30,000 inmates, and another 76,000 on community supervision (probation and parole). The department has an existing inmate database with quality issues. Inmates should have one unique identification number and all periods of incarceration should refer to this single ID.

The challenge is when inmates misidentify themselves or when data is entered incorrectly. This results in the creation of a new offender ID when the original one should be used. The deduplication process was being done by a manual search of nearly 800k records by one TDOC employee. The manual process for deduplicating the database became unmanageable.

Project Goal

TDOC is attempting to clean the database of duplicate records prior to conversion to a new application. The deduplication process needs to be automated with increased accuracy and speed to ensure offender identification data integrity prior to the conversion to the new system.

Project Evolution

The opportunity for STS to develop a Facial Recognition technology derived through a conversation with the Tennessee Department of Correction (TDOC) during discussions surrounding data cleansing. By creating a facial recognition system based on the inmate's image, the deduplication can be automated with much higher accuracy and speed than can be accomplished by manually comparing each inmate record against others.

At the same time, STS had already developed a Machine Learning/Artificial Intelligence capability (MS ML Server) for another project. Having performed other image recognition/computer vision projects, STS determined that resources needed to provide an in-house Facial Recognition System enabling technology were in place. STS then secured permission from the TDOC Deputy Commissioner to conduct a quick proof of concept to demonstrate the feasibility of an in-house FRS development capability.

DEDUPLICATION THROUGH FACIAL RECOGNITION



FRS is a stand-alone technology demonstration project, for which an informal Agile Methodology was used to create a demonstration proof of concept. The cost of the proof of concept was mostly time, consisting of approximately 225 man-hours.

System Assessment

To properly test the application, duplicate records will intentionally be added to the system before running the new technology against the database. Once the system is operational and the “known” duplicates are discovered, along with a statistically significant number of the “unknown” duplicates, the application will be deemed successful.

Accessibility and Information Security

In terms of accessibility and information security, the system currently uses Criminal Justice Information Services (CJIS) data and is segmented from other state data by the same techniques used for other Law Enforcement (LE) sensitive data. The developer was required to be cleared for access to CJIS data, and no data ever moves out of CJIS enclaves except for template data.

Significance

The creation of a Facial Recognition capability for TDOC provides an enterprise spanning capability that has multiple uses. Identity verification for fraud detection, deduplicating driver license data, and real time identification of threats to critical infrastructure, can all be accomplished using the same algorithms developed for TDOC.

The FRS is an enabling technology. Many agencies of the state including the (Department of Human Services and The Department of Safety and Homeland Security could benefit from having the resources internally to provide this capability. The primary stakeholder for the initial application is TDOC; however, uses of FRS technology are well documented for fraud detection and identity verification functions that are common to many state agencies. Maintaining this too in an organic capacity will allow the state to provide a single location for image templates and fraud detection capabilities.

What Makes This Unique

This project is unique in that it was developed by Strategic Technology Solutions, the state’s own enterprise IT organization. Similar efforts involving FRS in the state are either looking at, or utilizing, vendor systems. The cost of a vendor system is much greater than the cost of establishing and maintaining this system internally.

Deciding Success Factors

Successful implementation at this stage of the proof of concept for this application will allow TDOC to deduplicate the Tennessee Offender Management Information System (TOMIS) database. It will also demonstrate the FRS capability to other state agencies that potentially need the function. Further, successful implementation will ultimately save the State of Tennessee dollars by avoiding labor costs for TDOC employees to manually perform reviews and ultimately enhance safety and security for Tennessee Citizens.

Primary Beneficiary

The change, and primary benefit, for TDOC, in this particular application, speaks to data quality. Reducing duplication of records, and reducing fraud, assists the state in obvious ways. TDOC staff will not have to spend time on labor intensive, manual reviews. More importantly, the immediate project will enhance safety and security for the customer, which is their core mission.

Using an Agile Methodology, the system was developed incrementally to the current beta stage. It is expected that, as the need for this capability increases across the state, additional planning/sprints will be conducted to add capabilities to the proof of concept in order to mature it to a generalized production Facial Recognition System.

Impact

This system will be able to save the state significant costs, not only in direct labor and vendor charges for record keeping, but in the detection and elimination of fraud across multiple agencies. Additionally, the ability to identify potential threats to critical infrastructure with Facial Recognition increases the safety of the state and its citizens. Lastly, the increase in quality of citizen records makes all state systems more reliable.

- **Status of the application**
 - Delivery of preliminary deduplication report May 24th
 - Demonstration of a Proof of Concept application to TDOC May 31st
- **Potential uses for a production version**
 - **TDOC**
 - Offender intake – Identify Potential Duplicate Offender ID's

- Current Offender Images Identify Potential existing Offender ID – impact on uncollected Offender Fees / revenue
- **TDOSHS**
 - Identify Potential Duplicate ID's
 - Driver Services – Using in-house application could eliminate vendor requirement to scan up to 12 million current driver license images
- **General**
 - Fraud investigation for any TN agency that has image data
- **Real Time Infrastructure Protection**
 - Access to secure locations (Capitol, etc.)



The capabilities provide the state freedom from vendor restrictions. It allows the state to include language in acquisition documents requiring vendors to comply with the standards established by the internal system. This will reduce fractured data environments in the future.

The only real expense, to date, is man-hours, and our current time expenditure is 225 hours over 7 months. Given that, opportunities to save the state financially are limitless. Also, the ability to offer an adaptable facial recognition technology provides immense opportunities for protection of facilities, infrastructure, and protection against fraud of all sorts.

Some vendor estimates for hosting and support of FRS records are nearly \$1 per image, per year. By using this internally developed FRS capability, the state may be able to offset nearly \$1M a year for this first application alone.