



The Computerworld Honors Program

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Final Copy of Case Study

YEAR:
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STATUS:
Laureate

Organization:
Commonwealth of Pennsylvania Justice Network

Organization URL:
www.pajnet.state.pa.us

Project Name:
JNET Facial Recognition System

What social/humanitarian issue was the project designed to address? What specific metrics did you use to measure the project's success?

The Pennsylvania Justice Network (JNET) is an integrated portal that provides authorized users with access to public safety and criminal justice information from numerous federal, state and local sources. Over 39,000 county, state and federal justice professionals use JNET to conduct secure investigations in a web-based environment. The ability to identify unknown suspects is paramount in law enforcement's efforts to protect and serve the public. JNET developed a Facial Recognition System (JFRS) to assist law enforcement in the identification of individuals contained within photographic or video images. Frequently, suspects or witnesses are caught on surveillance footage; JFRS allows investigators to compare these images against photographs in existing criminal databases. Using distinct measurements of an individual's facial features, JFRS is able to identify matches between the unknown person and the Commonwealth Photo Imaging Network (CPIN). At the time of arrest, an offender is fingerprinted and photographed. When that photograph is captured in CPIN, a facial plate is created from the individual's picture. This plate detects and measures facial measurements that are then documented for use within the JFRS system. With JFRS deployed statewide through JNET, over 800 law enforcement professionals from over 500 agencies have been trained to search and analyze suspect photographs against an ever expanding database of criminal mug shots. To date, Pennsylvania has captured over 3.5 million criminal booking photographs, each with a photograph and facial plate linked to a unique fingerprint record. JNET measures the number of authorized users accessing the JFRS system, as well as the number of hits generated by photographs placed on the JFRS watch list. Recently,

JNET implemented functionality that allows a user to confirm their search results, allowing JNET to measure the number of successful searches conducted with the JFRS investigative tools.

Please describe the technologies used and how those technologies were deployed in an innovative way. Also, please include any technical or other challenges that were overcome for the successful implementation of the project.

There are three key technologies that have enabled JFRS to be both effective and fully adopted across the commonwealth: 1) The cornerstone of any facial recognition system is the ability to compare photographs or images in an attempt to identify or match individuals. JFRS is unique in that it deploys two distinct algorithms when comparing faces. This dual search engine concept is unique to Pennsylvania in that it combines two disparate technologies into a single result. Facial recognition technology is based on measuring and comparing known points on an individual's face. With dual algorithms analyzing facial features, JFRS ensures that investigators are provided with a thorough set of results. 2) Facial recognition algorithms can only provide useful results when there is a database of high-quality, standardized photographs to analyze. Pennsylvania's CPIN provides a uniform platform with centralized quality control for the capturing, storing, and processing of offender mug shots and images. When an offender is arrested and processed in Pennsylvania, they are taken to one of over 200 central booking locations to be fingerprinted and photographed with the CPIN system. Not only do these photographs exceed National Institute of Standards and Technology (NIST) requirements, but they are also a key component to the Facial Identification Scientific Working Group (FISWIG) standards and best practices. Most importantly, however, CPIN creates a distinct facial plate of each image captured. The facial plate provides the digital road map for use with JFRS algorithms, thus providing Pennsylvania with an extremely large and reliable database of useful photographs to search against. 3) Finally, the JFRS system is accessed through JNET, making it available to every trained law enforcement agency in Pennsylvania regardless of their size or technological sophistication.

Please list the specific humanitarian benefits the project has yielded so far.

The JFRS system has proven itself as a powerful tool in the investigation of criminal activity. As such, the system has aided investigators in solving numerous cases including: homicides, robberies, burglaries, fraud, and identity theft. With the use of our facial recognition capabilities, suspects and offenders have been captured and incarcerated. Without the JFRS system, these offenders may have never been identified and could have remained free to continue committing crimes and victimizing citizens. Additionally, through the swift apprehension and administration of justice, JFRS provides crime victims a modicum of fairness and integrity. Apprehending and prosecuting criminal offenders in a timely manner may offer victims peace of mind as well as restitution and other restorative services. Finally, the JFRS system enhances the efficiency and effectiveness of law enforcement. When faced with no other leads or information, JFRS may provide law enforcement its only option in identifying suspects. This can save weeks or months of investigative work, not to mention hundreds or thousands of man hours. As JFRS is available statewide to all law enforcement at no cost, the positive impact on taxpayers is immeasurable.

Please provide the best example of how the project has benefited a specific individual, enterprise or organization. Feel free to include personal quotes from individuals who have directly benefited from the work.

A few examples of JFRS use by investigators: Homicide: The Philadelphia Police Department used JFRS to identify a witness in an ongoing homicide investigation. The witness image was pulled from a video surveillance camera from a location near the murder. The image was run through JFRS and the search provided a list of candidates. Based on further investigation, detectives interviewed a candidate who provided information which lead to an arrest and

conviction. Child Predator: The Office of the Attorney General Child Predator Unit uses facial recognition to help identify child predators. In one example, a suspect was communicating via the Internet with an agent posing as a minor. The suspect sent a photo of himself to the agent. The Child Predator Unit used JFRS to identify and eventually arrest the suspect. Serial Bank Robber: Allegheny County detectives had reason to believe that one individual was responsible for several area bank robberies. Detectives ran the surveillance images from multiple banks through JFRS. Detectives then placed the suspect under surveillance and he eventually robbed another bank, resulting in his immediate arrest. Armed Robbery: Delaware County detectives used JFRS to help identify a suspect from an armed robbery. The suspect robbed a store and the event was captured on video surveillance. The image was run through JFRS, which provided detectives with a list of potential candidates. The suspect, who was wanted for multiple armed robberies in several jurisdictions, was eventually arrested. Stolen Identity: A suspect stole a victim's identification and opened accounts which were used to steal over \$50,000 worth of merchandise in several states. The suspect then applied for a membership card from a large wholesale club. Investigators were able to use the store membership ID to search JFRS and identify the individual, resulting in the suspect's arrest.