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PC-based AFIS System: Efficient Crime Fighting Tool

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ABSTRACT

Fingerprint identification has, for many years, been recognized as an accurate means of identification. This method is based upon the uniqueness of an individual's prints that do not change during that person's lifetime. The idea of using fingerprint evidence to identify and arrest individuals has been in use by the majority of agencies in Texas and all over the world. The individuality and uniqueness of fingerprints in criminal cases has been used for generations.

Current budget constraints require an affected police agency to examine all forms of technology as a means of reducing expenditures while maintaining or increasing the productivity and efficiency of their investigators. Computers have been in use for many years in various ways to increase the efficiency of the services provided. PC's have made it possible for agencies using fingerprint identifications to become more efficient in their identifications saving time and money in making arrests.

Insight for this paper was gained by reviewing articles, journals and other publications located within the library system of the Sam Houston State University (Huntsville, Texas), the U.S. Department of Justice and the world wide web. Subject matter contained within these articles provided positional arguments for both sides of the issue. However, at the end of the review of this information, it was discovered that a system such as this is affordable, efficient, and required when providing any community with quality of life and the safety they deserve. It was also shown that inter-agency cooperation is fostered when officers work together using similar systems.

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INTRODUCTION

A fingerprint from a crime scene is perhaps one of the most encountered and sought after pieces of physical evidence and is surely one of the most familiar to citizens. Fingerprints have been used for decades to identify suspects and to link various cases to each other. The fingerprints found at a scene are compared to known print cards, which have been stored, manually for many years, after each arrest. Having the ability to use the two sources of information has had an undeniable impact on the ability of local law enforcement to serve the community and keep them safe.

The use of an Automated Fingerprint Identification System (AFIS), one of the major advances in the investigation of criminal activity, has been in use for a number of years on a worldwide basis. Nationally, AFIS systems were routinely used by law enforcement since about 1983 (Cole, 2004). Initially, these systems were expensive and local agencies were not in a position, financially, to purchase a system similar to that used by the Federal Bureau of Investigation (FBI). However, with advances in technology, state and local agencies could better afford systems of their own.

Perhaps one of the more recent advances in the technology concerning the affordability of AFIS systems for law enforcement agencies has been the availability of PC-based (desk-top models) systems. As the technology advanced and the prices dropped, any agency of any size could purchase a system suited and built to their specifications. This allows the officers on the local level a better and more efficient chance of identifying suspects in a more timely fashion.

The use of fingerprints can be traced back more than 2000 years in Babylonia (according to ancient writings) when they were used to seal contracts. Fingerprints

were similarly used by the Chinese with bills of sale. They were later used to settle disputes between the involved parties (Carmack, 1991).

In more modern times, as compared to the Babylonians and the Chinese, a fingerprint filing system was developed by Sir Edward Henry, a London Police Commissioner, which has become known as the "Henry" system. This system assigns an alphanumeric code to a print card. This code assisted officers in classifying the various print patterns (loops, arches and whorls) and to file these patterns together. It has been recognized for a multitude of years that using fingerprints as a means of identification (criminal or personal) is infallible (Cole, 2005; Farelo, 2009; Lamkins, 2004).

Take for instance a case of misidentification (not from fingerprints) involving Will West, who was an inmate entering the Leavenworth prison facility in Kansas. In this incident, Will West was mistaken for a man named William West who was also an inmate there. At that time, there were three forms of identification used and they were names, photographs, and physical measurements known as Bertillon Measurements (Lamkins, 2004). The images in Figure 1 are of Will West and William West. When one looks upon this image, it is very easy to see how easily someone could mistakenly identify another person when relying upon physical characteristics and measurements alone. This incident happened on May 1, 1905, and it allowed fingerprint advocates to show "that they could infallibly distinguish one man from another" through the use of fingerprints (Farelo, 2009, p. 5).
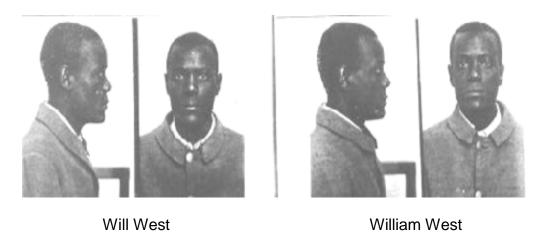
Will West   William West

Figure 1. Intake photos of Will West and William West (Farelo, 2009).

Since Bertillon, the Federal Bureau of Investigation (FBI) has built up perhaps the largest single repository of fingerprints, known as ten-prints, which have been examined by experienced fingerprint examiners. With all of these examiners, no two fingerprints have ever been shown to be identical (United States Department of Justice, 1998; Lamkins, 2004). This manual system of filing and comparing the accumulated fingerprint cards was used "until the automated systems in the 1970s were invented and proven effective" (Cole, 2005, p. 1).

These systems started out large and too expensive for even some of the larger municipalities to afford. However, advances in technology, some of these same agencies were able to implement their own systems. Further advances in technology, in time, allowed even the smallest of agencies to afford starting up their own AFIS systems. These systems, which were PC desktop units, came onto the market in the late 1990s and later. The local database built up by a small agency allowed them to run their latent fingerprints against cards of suspects they dealt with on a routine basis in their specific jurisdictions. Two of the earliest PC-based systems AFIX Tracker from the Phoenix Group (based in Pittsburg, Kansas and first offered in 1998) (Scigliano, 1999,

p. 67) and later PrintQuest AFIS-APIS from Spex Forensics (based in New Jersey). Both systems allow agencies to satisfy the majority of the identification requirements of any law enforcement agency worldwide by searching against their local fingerprint database (ten prints and palm prints) (Kanable, 2002).

Any law enforcement agency must include, when upgrading its technological capability, the consideration of an automated fingerprint identification system (AFIS) to assist in their investigations. Officers will be encouraged to thoroughly process a crime scene, with accurate identifications, allowing them to quickly obtain the necessary legal documents. It will save time, and when it does not take an investigator very long to name a suspect, they know they can bring that person to justice sooner and give the victim some sense of closer. Those same investigators will also experience the ability to connect various unsolved cases to each other. It is one of the best tools that can do the most good at the best possible price. It is a necessary piece of equipment integral to the success of any police agency.

Patrol officers and investigators in small to medium sized agencies all over the United States know they must have evidence to support their probable cause to secure an arrest warrant. Few things are more stressful than "knowing" who committed the crime and not being able to do something about. The evidence may be an eyewitness, a security video, or some other form of evidence. While these are good forms of evidence many times, it is just simply not available. Outside of these two forms of evidence, one of the best pieces of evidence that can be obtained is one or more fingerprints.

One small police department in East Texas was able to obtain a PC-based AFIS System just over 12 years ago. This department acknowledged that help was needed because identifications were not being made in a timely manner. The time it took to compare a latent print to a hard copy fingerprint card, in an ever-increasing manual filing system, was too large of a burden to deal with. If an investigator is not able to effect identifications manually, the normal course of business was for that investigator to send the latent print to a state agency and wait for the results. If that yields no results, then the unidentified latent print is sent to the FBI's Integrated Automated Fingerprint Identification System (IAFIS). After the FBI has made their comparison and a latent fingerprint has been identified, quite a bit of time has passed. With backlogs encountered at each level, anyone will see that it could take months to get to this point. Even if the identification was made through a state AFIS system, it can still be a rather long time to even begin to examine the latent once those examiners worked through their caseload to it. After obtaining a verified identification from a state or federal AFIS system that the latent print belongs to a well-known local burglar living a few blocks from a hard hit area, city council members and victims alike will be very pleased when it is announced in the local newspaper that an arrest has been made. Yet the question remains as to what took the local agency so long. This situation could have been easily avoided if the original submitting agency had a locally based AFIS system checking latent prints first against the known prints of suspects in their immediate area.

Many other problems can be solved with the acquisition of a local AFIS system containing the fingerprints of local criminals. The problem of not working efficiently and quickly enough will be solved. The fewer personnel hours spent to match a latent print

to a previously unknown suspect and get that person incarcerated, the sooner the investigator or detective can devote his time to another incident. No longer will this person have to worry as much about a backlog of cases. While reducing the number of personnel hours, there is also a cost per latent identification savings. Reducing the number of work hours simply saves money.

The job of an investigator, detective, or police officer is hard enough as it is without having the best and most efficient equipment available. All departments, regardless of their location, are part of a team and have been set aside to serve and protect. Each community should demand of their city councils or county commissioners to provide the necessary funds to give their departments the best equipment to arrest and incarcerate those who wish to do the community harm. Too many times, officers, especially in smaller and less populated communities, have been placed behind the proverbial "eight ball" because of the lack of funds and are required to work with a very severe disadvantage.

Too many times, it has been shown that not only do the officers know who is committing the burglaries, thefts, forgeries or any other crimes, but depending on what is happening, the citizens of any jurisdiction know just as well as the police who is doing what. What happens at this point is that the mayor of a municipality, the councilperson, the ordinary citizens, and the victims themselves come to the police asking why this person is not behind bars. This is assuming that the police officers and the detectives have done everything possible to move the case along.

The crime scene or evidence is processed as thoroughly as possible with what is available. The latent fingerprints are taken from the scene and logged as evidence.

Now the long and detailed oriented search begins. The department's latent print examiner, if a suspect is known, then obtains a fingerprint card from a jail facility. Depending upon the quality of the latent, the job can be accomplished fairly easy. If there are not any qualified persons to examine fingerprints or if a print card is not locally available, the only thing to do is send the latent to a person or agency that has all the tools necessary to do the job. This is especially true if the detective has no idea who the prints might belong to and it is still the same even when they do have a possible suspect but no print card. The prints are sent, by mail, to an agency such as the Texas Department of Public Safety (TXDPS) or the FBI, which both have a large electronic database. This is fine except for one thing. When the latent is sent to someone such as this, it is put in line behind all of the other prints that have been sent to them to compare. This is not even considering the subsequent cases that have a higher priority because of the nature of the crime. This process can take a few weeks, but more likely than not, it can months. Remember what was said about the pubic wanting to know how long it is going to be before someone is put in jail. All that can be said is, "It has been referred to someone higher up." All this time, police officers may be thought of as being incapable of doing the job.

To help correct this perception problem, an administrator needs to take stock of what his future plans are for the department. Whatever the plans may be, it should be something that can be of use on a regular basis and not require a large amount of money and still be beneficial to an entire department and not just to a specialized unit. As stated earlier in this paper, perhaps one of the most recognizable pieces of evidence at a crime scene is a fingerprint.

A PC-based AFIS is a fairly inexpensive piece of equipment that can fit on a desk as opposed to a large state-style AFIS, which runs into the hundreds of thousands of dollars and would need considerably more room. The PC AFIS would store images in a compact space and can be used by someone that has had minimal training. Having a system installed that is housed locally and which be accessed by local officers is what a community needs to invest in because it has been shown in some studies that local crimes are done by local suspects (Polisenska, 2008). Taking care of what is at home is what a small department has to do to make everyone safer. Identifying a person through local means is the fastest way a department can started reducing crime and deterring others.

There is ample evidence of asserting the position of a PC-based system as being an efficient crime-fighting tool. The basis of this assertion was obtained by reviewing countless articles found in published research, magazines articles, journals, and information housed at the Sam Houston State University located in Huntsville, Texas. The information obtained is intended to show the history of fingerprints and how officers were able to adapt and create an environment where investigators would have an upper hand in fighting crime. From the start of fighting crime until now, the advances have been tremendous, but the review of the literature shows that the acquisition of a PC-based AFIS is cost effective, effectively fights crime, and is a very good public relations tool.

POSITION

A PC-based Automated Fingerprint Identification System (AFIS) is an efficient and affordable crime fighting tool by use by police officers on a local level. This type of

system can have many benefits, one of which is that it will give some sort of closer to victims of crime. This is a benefit on a personal level, but there is also a monetary benefit to the political entity that an officer works for, which is the savings of personnel hours: With the saving of work hours, there is savings of money.

A PC-based Automated Fingerprint Identification System has been one of the best crime fighting tools to come along in the last 10-20 years. It has opened many new horizons for law enforcement. One of the major benefits is that it has allowed police and sheriff's departments to solve crimes that may not have been possible before (Slawinski, 1988). This system is not intended to replace a large state or federal system. What it is meant to do is allow an agency of any size the ability to compare fingerprints from a crime scene in their respective jurisdictions with the known prints of someone in their area. This piece of equipment will allow an officer to do their own work instead of sending the fingerprints to a state system or the FBI. A high percentage of offenders come into the system for the first time on lower class crimes (Scigliano, 1999).

With all of the advantages of a PC-based system, so much can be said about the public relation aspect of what this system can do for a police department. Secondly, there is the inter-agency cooperation that is built between two or more agencies. Lastly, the PC system was simply built to identify fingerprints but one major benefit is that a PC-based AFIS can and will save an agency money in personnel hours spent to put someone into jail.

Manual fingerprint comparisons and the associated record systems are not very good at meeting the needs of a modern law enforcement agency for the timely and accurate information that is needed to put suspects into jail. Great strides have been

made over the past several years that have helped to automate this process. An automated system permits a law enforcement agency to run far more fingerprint comparisons that were possible with manual processing. The greatest payoff is when a partial print is compared to the known prints of previously arrested subjects.

Prior to the use of a locally based PC AFIS, an officer would refer the fingerprints to someone who is trained to compare partial to known prints. If matches or identifications are not made there are one or two choices to make. The first is that the latent prints are put into the case file with the hope of a potential suspect being named later or they would be sent to a state AFIS system. Either way, there is a lag in time in getting a suspect identified. It makes sense to have a system with the known prints of local suspects going on the idea that the majority of crimes in any given area may or may not have been committed by persons from the area before they branch out to other communities (Polisenska, 2008). When a latent print is referred or mailed to a state AFIS or the FBI IAFIS, the response time can be from a few weeks to months. For all of this time, officers wait to find out who committed the crime. The arrest is delayed and the community keeps on wondering when the police are going to do something about them being violated. The agency that has their own PC-based system has total control of the quality of the images that are put into the system. This will increase the efficiency of the department in getting the job done. The review of literature and common sense indicated that if a department has quality control, they will get the best images into the system and give the best chance possible for the officer to make his identification. The quality of the images put into a system is enhanced by the use of a live-scan device.

The live-scan device will allow the best possible prints to be put into the AFIS system (PC-based or large state systems) and the process is much quicker (Gale, 2005).

Comparing fingerprints to a local database has a faster turn around time, and as such, the sooner a person is put into jail, the sooner that a police department can release the news of the arrest to the local news outlets. The local news outlets love a good story, and a police department can always use a good word. Everyone likes the fact that a person is put into jail, especially if the crime involved is high profile in nature. At the time of the arrest, it may not be told what the evidence is, but eventually it can be. Once this information is put out to the general public, everyone in the community sees that their officers are using some of the best technology available. Hearing that someone was put into jail because of AFIS rings a bell with the general public. Modern crime fighting shows have taught people to recognize the name "AFIS," and they understand what has happened. There is a better connection with the department which fosters pubic support.

After the trial has finished and a conviction obtained, the story of the identification can be told, and this gives the police department and the community an added benefit. That is crime deterrence. It is felt that some people will either stop someone else from committing the same type of crime or at the very least slow another person down just enough to think twice about it. Of course the future suspect may think about this and do something that will prevent the discovery of fingerprints. There is not much that can be done, but somewhere along the way, a mistake is made that still connects the suspect to the crime. When crime is deterred, rates can go down, and when the end-of- year reports are compiled for the city council or commissioner's court, they will see the

department is doing the job that they are being paid to do. For a job well done, the police or sheriff's department is usually rewarded to some degree with additional funding. A governmental body normally does not mind funding requests for equipment when there is proof that it will be put to good use.

The idea that a police department is here to serve the public cannot be disputed. A police department's job is to bring a criminal into the justice system as soon as possible. When a criminal act is committed, it means there is a victim, and the victim deserves to have their case investigated to a successful conclusion. They deserve to know that they can sleep at night knowing their officers did something right. When the victims and citizens alike feel good about their police department, they act much like the city council. They give freely of their support through donations or other sources of funding. Civic clubs and organizations will get in on the act and lend their support. Public donations come into the PD's when the department is perceived as being competent and worth supporting.

All of the evidence that is gathered or developed by a police officer is always put to good use. As stated earlier, one of the best pieces of evidence to be found at a crime scene is a fingerprint because of the uniqueness of a print. The International Association for Identification (IAI), the oldest and largest organization of forensic science professionals, supports the idea or principle that finger, palm and footprints are unique to each and every individual. This has been established through biological sciences of anatomy, embryology, and genetics. This has become the foundation for the individualization of a print to a single person. What better evidence would a prosecuting attorney want than a fingerprint found at a scene in a particular spot and or

position that can refute just about any alibi. When a fingerprint is properly documented, it is difficult for a defendant to explain why his or her print is at a scene when that person claims not to have been there.

For many years, it was not unusual for an agency to worry only about the crimes in its jurisdiction and not check with other agencies to see if they had anything similar. This held true for the longest time but when society became more mobile so did the criminals who preyed upon the weak (Polisenska, 2008). Being able to travel afforded any suspect with the opportunity to explore new territory. They could travel greater distances to places where the authorities were not aware of their identities. As agencies started identifying the new suspects, they also learned where they lived. An officer would make contact with someone from the area where the suspect lived to gain any additional evidence. Through manual comparison of fingerprints, sometimes the crimes in two different areas would be connected but sometimes they would not be compared.

The acquisition of an AFIS by one agency can and will benefit other agencies in the area. Once the news gets out that someone has this system, it is only a matter of time before the other agencies in nearby communities will ask for the help of the host agency. Most any agency will gladly do the comparisons free of charge on the idea that all agencies are in the business of putting criminals in jail and it does not matter who gets the credit. The same police department in East Texas that was mentioned earlier obtained their PC-based AFIS in 1998, and they quickly began making identifications that were never made before. They were able to do their own work and have great success. As more and more identifications were made, talk of what was being done by

this agency became known, and eventually, they were asked for help. As more and more agencies used the services of this East Texas police department, it was a matter of routine that a suspect could be tracked. As news traveled even further out from this police department, other agencies became involved in the use of AFIS on a local basis, and other agencies started getting systems of their own. There are a considerable number of agencies in the United States that have purchased the same type of system. One provider of PC-based AFIS systems, AFIX Technologies located in Pittsburg, Kansas, sells systems of this type to agencies nationwide. According to Brandy Olivera, Director of Client Services, AFIX Technologies has provided 184 PC-based AFIS systems. Specifically, in Texas, 32 PC-based systems have been installed, and in the surrounding states (Oklahoma, Arkansas and Louisiana), 14 such systems have been installed (Olivera, personal communication, August 4, 2011). One may think it would not matter if other agencies purchase a similar system. The answer is that this type of system allows one agency to search (remotely) the database of another agency without getting that other agency involved. When agencies know that others will be searching their database, they are encouraged to get the best images into their systems. All agencies work to help each other out. In addition to being able to search remotely, if one agency just has to have their own images of suspect prints, then they can be e-mailed to the requesting agency. Sending a copy of prints this way saves the hassle of having to request a set, wait for that set to be delivered, and then scanned into the system. Everyone works efficiently.

Budgets are a major concern for any agency no matter what the economic climate is for a given area. All departments have been asked by the respective

governing bodies to save whenever and where ever it can be done. Over the past several years, agencies have seen what an AFIS can do for a department and the savings that is actually realized. For the past 15-20 years, the ability of AFIS has improved and it has allowed each department to realize how many more people can be put in jail. Prior to the use of computers, the comparison of fingerprints was done manually. This required a large amount of time on the part of the officer to look at a partial print and compare it to the known cards of past arrestees. It was not always a good outcome. Many latent prints from a crime scene or other evidence are partial and not of the best quality, and many latent prints may be over-looked because of the poor quality. It does not take very much to realize when an agency has a large number of print cards it takes a very long time to search through all of the cards on file.

Take, for instance, the same small East Texas police department that acquired a PC-based AFIS and the number of cards that they have accumulated over decades of work. This same agency calculated the approximate cost it would be for a latent print examiner to manually compare a latent against known print. It was decided the known prints already in their AFIS system would be used instead of the print cards still in a manual filing system not entered into the AFIS. The system currently in use by this agency contains at a minimum 3,800 fingerprint cards. Each card has 20 prints, but the calculation would be figured using the rolled prints. This would be 38,000 different prints to look at manually. Assuming that a person would spend just a few seconds on each print, it would take approximately eight to ten workings days to complete this comparison at a cost of approximately $820.00. Now consider this same latent and the same number of fingerprint cards but with a twist and make this same comparison on a

PC-based AFIS. The search would take an average of four to six minutes and come up with some possibilities. What a big difference in the amount of time and money. All during this time, the same officer could be doing other things or entering additional prints. Also remember that a remote search of other data bases can be conducted. The search is begun and the officer can go about his other duties.

COUNTER POSITION

With any point to be made, there will always be someone who would say no to an idea such as this. One of the first arguments that has been encountered by the requesting agency is why should they be allowed to buy into a local system when the services of the Texas Department of Public Safety and the FBI are offered at no cost. While it is true their services come without a monetary price, there is a price none the less. The price is the time that any agency has to wait to get a response. It can depend upon the backlog of the TXDPS or FBI. When a latent gets to one of these two agencies, it is put in line behind all of the others waiting to be examined. This process can take several weeks to possibly months. All during this time, the victim is waiting for an answer as to when an arrest will be made.

The purchase of a system will allow, as previously mentioned, for the latent to be checked against local suspects. If there are no matches, the latent can be checked against the DPS and FBI files. However, they need not be sent to them through the mail system. Free software has been made available from the FBI that allows a small agency to transmit the search request via encrypted e-mail. This software is called a Universal Latent Workstation (ULW). This can be used on just about any PC even if the agency does not have a PC-based AFIS. However, the best use of this software is in

combination with a PC-based AFIS. When the latent is initially put into the system the resulting image is then imported into the ULW. Depending upon the traffic at the time the return is made within minutes. The sooner the agency gets a reply and it is verified the sooner the suspect is put into jail.

The other and most often cited reason for not buying a PC-based system is the cost to the political subdivision involved. Depending on how large of a database is desired by the agency the cost can range from around $17,000 to $30,000. That is a lot to some agencies, but federal and state grant money is still available. After the initial cost is the price of keeping the system up to date. This is very much like buying a car. The initial cost of maintenance cannot be forgotten and must be maintained. Buying an AFIS is an investment in the future of the community and its continued safety.

CONCLUSION

A police department is in the business of preventing crime, and when the crime is not prevented, then it is their job to investigate and to use all available resources. Those resources may not be easily available to a department. There is so much that can be accomplished. It is priceless when a named individual can be matched to a previously unknown or unidentified latent. The little old lady down the street will have her piece of mind when an officer can announce that her burglar has been incarcerated.

Every effort must be made to make use of the present technology and to prepare itself for what is yet to come. In the near future, all systems will be able to communicate with each other and not be bothered by state boundaries. All agencies should have available to them the best equipment that money can buy.

REFERENCES

Carmack, L. (1991). *A study of the automated fingerprint identification systems impact on law enforcement.* Huntsville, TX: The Bill Blackwood Law Enforcement Management Institute of Texas.

Cole, G. (2005). *An examination of a local fingerprint identification system for a large-sized police department.* Huntsville, TX: The Bill Blackwood Law Enforcement Management Institute of Texas.

Cole, S. (2004). History of fingerprint recognition. In N. Ratha & R. Bolle (Eds.). *Automatic Fingerprint Recognition Systems* (pp. 3-25). New York, NY: Springer

Farelo, A. (2009, April). A history of fingerprints. Retrieved October 29, 2009 from http://www.interpol.int/public/Forensic/fingerprints/History/ Default.asp

Gale, T. (2005). Integrated automated fingerprint identification system. In *World of Forensic Science.* Retrieved October 29, 2009 from http://www.encyclopedia.com/doc/1G2-3448300313.html

Lamkins, G. (2004). *Recognition and use of fingerprint evidence for investigative purposes.* Huntsville, TX: The Bill Blackwood Law Enforcement Management Institute of Texas.

Kanable, R. (2002, March). Fingerprint and palm-print identification: Vendors say sales are increasing and technology is changing. Law Enforcement Technology, 29(3) 60, 62, 64-66.

Polisenska, V. (2008, Spring). A Qualitative approach to the criminal mobility of

burglars: questioning the "near home" hypothesis. Retrieved February 2, 2011

from Eccajournal.org: http://www.eccajournal.org/

Scigliano, E. (1999 January/ February). The tide of prints. *Technology Review*, *102*(1),

63-67.

Slawinski, J. (1988, December). AFIS: Not just a purchase. Law and Order, (12), 57-

59.

United States Department of Justice, Federal Bureau of Investigation. (1998, March).

Fingerprint Identification.