Memory Extracting Technology

The Hidden Truth

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

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The rapid evolution of technology in law enforcement has dramatically increased the effectiveness and speed by which criminal suspects are apprehended. Moreover, advancements in biological sciences have improved the manner in which criminal suspects are identified and convicted, while mechanisms such as DNA analysis have proven pivotal in increasing public safety and minimizing false arrests. An emerging biometric technology, memory extraction, when used immediately and regulated cautiously, may further enhance law enforcement's efforts to increase the rate by which criminal suspects are identified and apprehended, will cut delays otherwise associated with interviewing witnesses and filtering through information, and will help reduce the number of the wrongly accused.

Benefits of Technological Innovations in Law Enforcement

The advantage of technology has played out successfully in the justice system, but not without controversy. DNA analyses, for example, which has greatly enhanced the apprehension of those who commit serious crimes and which has also increased accountability on the part of law enforcement, has revolutionized the way we identify suspects. The advent of DNA testing in 1985, where the collection of biological material, including skin, hair, blood and other bodily fluids, has emerged as the most reliable physical evidence collected at a crime scene. DNA (deoxyribonucleic acid) contains the intricate genetic makeup that distinguishes each individual. Forensic testing determines the distinctive patterns in the genetic material found at a crime scene that can distinguish the DNA in a potential perpetrator with an accuracy of 99%. In 1987, Florida rapist

Tommie Lee Andrews became the first person in the U.S. to be convicted as a result of DNA evidence; he was sentenced to 22 years behind bars (James, 2009).

It is not only law enforcement and prosecutors who have embraced DNA testing. Because genetic matches are incredibly reliable in identifying criminals, they are virtually foolproof in exonerating the innocent. As of 2009, approximately 240 convictions have been overturned in 33 states and the District of Columbia. According to the Innocence Project, a nonprofit advocacy group that aims to free the wrongly convicted, seventeen people have been released from death row after DNA evidence was used to exonerate them (James 2009).

Recognizing the changes that modern science and technology have made to law enforcement, other recent discoveries in medical science have been sought to improve the adequacy of evidence and other processes which can lead to the apprehension of suspects and the prosecution of the guilty. To that end, research associated with memory recall, Alzheimer's, and dementia, have assisted in work that may create a broader array of studies and technological tools that will eventually advance the ability of law enforcement to further improve its processes and apprehension rates. One of these possibilities is memory retrieval, which could transform the effectiveness of the police interview with victims and witnesses following the commitment of a crime.

Memory Extraction Technology (MET) is an emerging science meant to capture pictographic information stemming from actual memory recall. It aims to assist individuals who are either too traumatized or otherwise emotionally affected to recall events on their own recognizance. This form of technology, like DNA analyses, is meant to not only streamline law enforcement procedures, but also assist criminal prosecution

efforts. Perhaps the most significant method by which MET can assist police is by reducing, or eliminating altogether, the delays between the occurrence of crime and the capture of those responsible.

One of the greatest obstacles to apprehending criminal suspects is the delay associated with knowing who they are, what they look like, and other identifying characteristics. The initial impediments are associated with circumstances that lead to the identification of suspects stemming first from patiently interviewing victims and witnesses. This is often symptomatic of the state of mind witnesses are in, the circumstances surrounding the crime, and fine line police must traverse when attempting to be considerate of the witness's emotional state while attempting to get the necessary information. For example, extensive literature on eyewitness identification attests to the frailty of eyewitness memory following a crime. Moreover, research has suggested that certain crime types could systematically affect eyewitness memory, potentially activating racial stereotypes, thereby causing eyewitnesses to remember the perpetrator as appearing more (or less) representative of his or her racial or ethnic group (Osborne 2009). Still, law enforcement personnel are not extensively trained to understand the psychological intricacies of the trauma and emotional state of victims and witnesses and its affect on perception and memory. At the same time, police are tasked with eliciting as much information as possible to help identify suspects as quickly as possible. Evidence suggests that under these circumstances and with current protocols, victims and witnesses often feel intimidated and pressured, thereby further compromising the quality of the information provided (Fisher et al, 2010).

Research conducted on human memory and recall has revealed that individuals have two distinct modes of processing information (Seymour 1994). Where rational-thinking mode occurs during low emotional arousal states, experiential-thinking mode happens during states of high stress and emotional arousal (Seymour 1994). It is these high-stress and emotionally charged circumstances that result in significant delays to accurately identify suspects. In situations where the police may most need quick and accurate identity and criminal incident information, experiential thinking may significantly hamper that due to:

- fragmented memory vs. integrated narrative;
- based on past experiences vs. a conscious appraisal of events;
- intuitive & holistic vs. analytic & logical;
- oriented toward immediate action vs. reflection and delayed action;
- highly efficient & rapid cognitive processing vs. slow & deliberative thinking via logic and evidence. (Seymour 1994).

According to Seymour, victims and witnesses are still in the midst of trauma after the event to process or be emotionally available for interviews. This experiential thinking results in critical delays. To that end, having technology in place that can assist in recognizing these biological and mental characteristics while carefully capturing the necessary information is critical in minimizing delays.

What is Memory Extraction Technology?

Preliminary research on MET suggests it will be designed to function similar to an MRI machine (Miyawaki et al 2008). It will look more like an incubator with the option for

an individual to either sit or lay down depending on preference. The precise design, including lighting and temperature controls, will allow for comfort to the extent feasible without compromising the efficacy of the technology. In essence, MET involves the ability to bypass the emotional impulses that negligibly affect an individual's perception of events and memories (experiential thinking) in an effort to grasp a more rational and thoughtful analysis of the pertinent and factual information associated with the crime.

Scientists in Japan have been able to reconstruct binary images and decode brain activity using functional magnetic resonance imagine (fMRI) (Miyawaki et al 2008). Basic binary images were used (i.e., simple black and white pixilated images), but the outcomes suggest that further development in categorizing the different brain activity characteristics and their correlated patterns could eventually help reconstruct constraint-free visual images (from human memory vs. an actual physical image) would help understand how brain activity processes image information. This is a form of technology that can bypass the traumatic stress and triggers in the body and gathering pictographic images and associated information that can be easily transferred electronically and analyzed to the benefit of identifying and apprehending criminal suspects.

MET would allow law enforcement to more quickly receive and distribute vital information. The value of this and other technologies is essential in increasing apprehension rates and subsequently getting criminals off the streets before they are able to become repeat offenders. In light of incidents of government malfeasance, though, there is and will continue to be scrutiny regarding the motives and intention of implementing new and expensive technologies as part of the standard procedures in law enforcement agencies, despite the enormous help it will have in identifying criminal

suspects. Furthermore, as we've learned with civil rights challenges to the application of DNA analysis in the past, the related ethical implications often trigger questions associated with right to privacy and adequate due process.

Impediments to Memory Extraction Technology & Recommendations for its Implementation

There are two principal limitations that may hinder the implementation of memory extraction technology: social acceptance and funding. Due to the extensive research that remains to be undertaken in the scientific sector, it is difficult to predict the perception the general public will have when MET becomes available for use by law enforcement. In addition, there needs to be substantial gains in the legal sector as to how memory can be defined and applied in a court of law (Conway, 2008).

Civil Rights groups often argue that the use of DNA violates the 4th Amendment (search and seizure), turning the presumption of innocence on its head (Simoncelli et al., 2007). Although memory extraction technology has yet to be fully researched and designed, the promise of its ability to enhance criminal apprehension would save agencies man hours to devote to more pro-active policing efforts, where crime prevention strategies would garner a more prominent role within law enforcement's identity. Among them, engaging community support groups and local schools, assisting and establishing business improvement districts, and design-out crime guidelines in existing proposed developments, just to name a few.

This and other factors affect the feasibility of implementing such a potentially controversial technology. Another obstacle, of course, involves the detrimental financial

condition at all levels of government and the extremely slow pace of recovery. This in turn affects funding for the implementation of new technology. The uncertainty of when the economic environment will begin to improve can further complicate the matter. By the time the technology is available, though, questions regarding its use and limitations, and concerns about the trustworthiness of the law enforcement agency using it must already have been answered.

To implement MET, it is safe to assume that, similar to the public's initial response to the application of DNA analyses, the public will be resistant and apprehensive. For that reason, a detailed process by which a law enforcement agency can begin to inform and educate the public about the value, benefits, and expectations of memory extraction will help secure the public's trust. In addition, a programming effort meant to engage all stakeholders on the strict application and regulator procedures that will be followed when applied should be transparent and made available for public review. A phased in approach where only the most serious of crimes will be considered first is critical to this effort. Less serious crimes can be slowly introduced as the public's opinion allows for it.

Finally, it can be summarized that the potential benefits of Memory Extraction are contingent not only on the economic recovery from which investment can be drawn, but by the investments that are to be made in enforcing relationships with the community and elected officials. The public's buy-in is one of the external factors that can have negligible implications to the success of memory extraction technology. The sad state of the economy will significantly delay the ability of investing and incorporating new and presumably expensive resources.

Conclusion

Although MET is still a relatively new form of technology, of which significant progress remains to be made, it holds incredible promise. The intent of MET's use is to assist law enforcement while simultaneously gaining the necessary information from victims and witnesses in a manner that does not result in further damage or emotional trauma. Based on the pace of memory extraction technology, it is most likely it will not emerge in a useful form for at least another decade; the remaining number of unknowns associated with the intricacies of the human brain must be resolved before a reliable standard of use will emerge (Kolber, 2006).

In the meantime, it then becomes important that law enforcement restructure its resources, relationships, and processes to quickly adapt and respond to the availability of new technologies in a manner that best serves the public and simultaneously improves the transparency, and thereby the reputation of, law enforcement agencies. In this sense, to restructure means to evaluate its current methods of training, working with the public, finding additional funding sources, and streamlining protocols in a manner that allows for flexibility in easily incorporating technological tools and innovations.

Given our understanding of how DNA triggered ethical debates and legal challenges, it has been incredibly helpful in providing some insight into how law enforcement may pre-empt any potential opposition. A detailed and thought out protocol for implementation of potentially controversial technologies can serve as an effective tool aimed at improving the ability of law enforcement agencies to serve the interests of the communities they serve. Memory extraction technology will not only minimize the need for corroborating and follow-up interviews, but it can serve as an effective tool in law

enforcement and help enhance the public trust. Although its emergence into the mainstream may be years in the future, the time to plan is now; the time to lay the groundwork of both legal acceptance and public endorsement must occur before progress can be made. Doing so now will set the stage to capitalize on MET and its promise as soon as possible after it surfaces into the public's consciousness.

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