



C8 Examination of First-Year Research Findings for the Safer Viewing Platform: A Convergence of Convolutional Neural Network Predictions and a Safer Viewing Technology to Speed Up the Triage of Sex Assault Multimedia While Managing the Investigator's Stress Level

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Learning Overview: After attending this presentation, attendees will understand the stressors and technological demands placed on digital investigators who conduct sexual assault cases. Knowledge gained through interviews with digital investigators and their managers from several local, state, federal, and international jurisdictions regarding conducting sex assault digital investigations will be presented. Attendees will learn about the observed effectiveness of applying deep learning technology to triage large datasets of sexually explicit materials, as well as the techniques to reduce the exposure of this content to digital investigators during the triage examination.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the ability and effectiveness in conducting multimedia analysis by using deep learning techniques to give structure to previously unstructured multimedia content. This technique may identify investigative leads more quickly than using traditional file system forensic techniques.

A multidisciplinary team from the MITRE Corporation built a proof-of-concept technology in 2017 and 2018, named the Safer Viewing Platform. The Safer Viewing Platform is a technology that combines an ensemble of convolutional neural networks, a Safer Viewing Layer, and a rapid imaging and carving technology. This study used a simplified workflow that focused on analyzing the multimedia directly, rather than conducting a lengthy traditional file system examination. The team evaluated a tasking and retrieval mechanism that lets the digital investigator ask the Safer Viewing Platform to find specific content based on a custom query of age and gender estimation, display of nudity, face identification, and image or video frame scene attributes. This study experimented with random datasets that represent sex assault investigation data with as many as 500K multimedia files. This study worked with federal law enforcement to evaluate key parts of the Safer Viewing Platform on real sex assault content. It was found that it is possible to produce sex assault automated investigative leads based on the digital investigators initial query. It was observed that an Android™ (16GB) phone with 43K images could be processed using this technique, and that previously unknown sexual assault content can be found within 20 minutes from the start of acquisition. Further, this study developed a new concept called the Safer Viewing Layer, which creates a localized transparent layer over the nudity region in a digital image or video frame. This presentation will report on findings from an on-going pilot of the Safer Viewing Layer with federal digital forensics examiners. The Safer Viewing Layer experiment is designed to evaluate the effectiveness of the technology to help the examiner manage their stress level during the triage process of sex assault content.

Safer Viewing, Multimedia Analysis, Sexual Assault