



C28 The Forensic Utility of Smart Doorbells

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Learning Overview: After attending this presentation, attendees will have an understanding of the current forensic utility of smart doorbells in regard to data extraction and image quality.

Impact on the Forensic Science Community: This presentation, a research project conducted by the Office of the Chief Scientist (the Research, Development, Testing, and Evaluation arm of the Defense Forensic Science Center), will impact the forensic science community by demonstrating how and what types of data may be extracted from smart doorbells, as well as demonstrating if the image quality is sufficient for image analysis.

There are numerous SmartHome devices currently available to the consumer, from home automation hubs to function-specific items. Valuable data can be recovered from such devices that may be useful to forensic investigations. Smart doorbells are devices with cameras, microphones, speakers, and motion-sensing abilities that operate via a mobile device or through Wi-Fi. Through their normal use, smart doorbells may capture visual information about a suspect, timeline, or series of actions during, before, and/or after the commission of a crime. Such information could impact the investigation of a crime where breaking and entering through a doorway occurred.

With the increased use of smart video doorbells, there is a need to determine appropriate data extraction methods, the extent to which data can be recovered, and the image quality of the recovered data. The current research examines two smart doorbells with video-recording capabilities to examine their potential for future forensic applications. Both an Amazon® Ring® and Google® Nest Hello™ video doorbells were used in the course of this research. These two devices were chosen based on availability to the researchers. Both devices offer live video-streaming and motion-sensing abilities.

Each device was installed on the doorframe at a traditional doorbell height. Placement was viewed to ensure the area being captured would properly capture people in proximity to the door. Researchers used each device over the course of several months in order to collect recordings from various times of the day and weather conditions. During this time, each doorbell was in continuous use; however, recording only took place when there was motion to activate the doorbell. At the completion of this timeframe, an extraction was conducted on each mobile device used to access the doorbells (iPhone® 7 Plus and iPhone® 6) using standard computer forensic methods. The two methods of extraction employed a Physical Analyzer. First, a physical extraction was performed. Second, a logical extraction was completed. Results of the extractions were compared to determine what type of data was retrievable and what affects the extraction had, if any, on image quality. The image quality was further assessed through an analysis of the metadata (e.g., resolution and file size) and visual analysis of the details present (e.g., scars, facial features, hats, and shirt tags).

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SmartHome, Doorbells, Image Analysis