

A82 The New Revolution of Bone Collection and the Necessity for the International Digital Bone Collection Center (IDBCC)

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After attending this presentation, attendees will better understand the revolution of bone collection and the IDBCC. This presentation will also provide information on challenges faced by the Fourth Industrial Revolution era in the field of forensics.

This presentation will impact the forensic science community by suggesting mid- to long- term solutions for the facilitation of information sharing that can be achieved by the digitization of skeletal collections scattered in different parts of the world through 3D, Computed Tomography (CT), and Magnetic Resonance (MR) images, then sharing them through Memorandum Of Understanding (MOU) with research institutes and countries.

Modern society is evolving into the era of the Fourth Industrial Revolution — the main theme at the World Economic Forum in 2016. The Fourth Industrial Revolution refers to the new industrial era of Information Technology (IT) convergence and infrastructure in which advanced information and communication technologies, such as Artificial Intelligence (AI), the Internet of Things (IoT), big data, and mobile, are converged into the economy and society as a whole.

With the emergence of the digital era, the field of forensic science has evolved into various areas through the introduction of digital forensics and precision scientific equipment. Bone collection is being pursued by universities and research institutes around the world and is very helpful for researchers in anthropology and forensic science; however, in order to conduct research on the collected bones, researchers have to physically travel around the world. It entails a substantial amount of time, manpower, and costs. Such limitations inevitably prolong the research period and increase the costs, thereby discouraging dynamic research activities.

The digital measurement method is compatible with the current manual measurement method and allows for easier access to the ethnic specification by population group, age, and gender. In addition, the level of reliability and accuracy of the judgments can be enhanced as various analytical methods can be employed through computers due to the development of digital technology.¹ Above all, as the information on bone collections can be accessed freely regardless of time and location, various methods can be developed and shared. In this regard, information sharing is revolutionary as it can eliminate aforementioned problems pertaining to workforce, time, expenses, and residence issues all at once. Also, by doing so, it will provide many young scholars and university students with abundant examples of digital data on the remains found in all different parts of the world.² The digital information will allow the analysis of not only human remains, but also others, such as animal bones and crime scenes around the world.

As such, The Ministry of National Defense Agency for KIA Recovery and Identification (MAKRI) of the Republic of Korea is in the process of collecting digital data of remains from around the world to establish the IDBCC. Ultimately, this is to build an environment where labs and organizations around the globe can freely access and contribute to the data collection for further research.

In order to achieve this, a system in which digital data can be donated and shared through cooperation from other nations and organizations is necessary. The center can either digitize collections of remains that are already stored around the world or can gather and centralize medical information such as CT from hospitals or medical institutions with patients' approvals. As the world's widely used medical digital video uses Digital Imaging and Communications in Medicine (DICOM), collections of remains can be managed if stored in the form of Stereolithography (STL), which is compatible worldwide. The data to be stored at the IDBCC will not only facilitate the study of measurement statistics but also characteristics of morphology, culture, era, physical, and biology.³ A change in the research environment is necessary as we move into the digital era and MAKRI hopes that researchers and scientists around the world will join in the establishment of the IDBCC. This presentation will discuss the effectiveness of the digital bone collection and the necessity for IDBCC.

Reference(s):

1. Venansius Baryamureeba, and Florence Tushabe. 2004. The Enhanced Digital Investigation Process Model Digital Forensics Research Workshop.
2. Ashish Singh, and Chatterjee Kakali. 2017. Cloud security issues and challenges: A survey. *Journal of Network and Computer Application*. 79: 88-115.
3. Brian Carrier, and Eugene H. Spafford. 2003. Getting Physical with the Investigation Process. *International Journal of Digital Evidence*. 2, no.2 (fall): 1-20.

Digital Bone Collection, Intl. Digital Bone Collection Center, Fourth Industrial Revolution