EMILEE HENDERSON, KRISTY HENSON, & JOSH GEORGE, College of Science and Technology, Fairmont State University, Fairmont, WV, 26554. Automating Postmortem Interval Estimation with Computational Forensic Tools

Postmortem intervals (PMI) are the stages of decomposition that occur after death and help investigators determine the time of death. This project's goal is to develop a tool that enhances the speed, accuracy, and consistency of PMI estimation for law enforcement and forensic investigators. PMI estimation is one of the most critical and complex parameters in forensic science, as it is highly variable dependent. Current PMI determination techniques rely heavily on human observation of morphological change and are often recorded by untrained personnel in the field. These manual approaches, though based on validated models, are highly susceptible to human error, environmental variation, and time delays. The proposed project addresses these challenges by creating a next-generation PMI estimation system that computationally determines PMI which limits human error. The platform incorporates established Mathematical Models: Encoding traditional and empirically validated PMI formulas (Glaister Equation, Henßge Nomogram, and rigor and livor mortis progression models) to establish baseline computational predictions. Investigators will enter environmental and case-specific data, and the system will generate an estimated postmortem interval. Over time, the system will continue to improve through iterative data collection and model refinement, allowing for more precise estimations across different geographic and climatic conditions. By creating the first integrated computational PMI estimation tool tailored for West Virginia law enforcement, this research has the potential to transform time-of-death analysis, reducing uncertainty, human error, and investigative delays, supporting more efficient and accurate forensic investigations. Preliminary results of this system provide a user-friendly software with explanatory PMI estimation results.

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