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**AI-Driven Forensic Pathology: Determining Cause of Death Through Heart Valve Image Analysis**

**Abstract:**

Cardiovascular diseases (CVDs) have been listed as the leading cause of human deaths globally. Reports show that more than 18 million people are dying because of these yearly. Traditional forensic pathology may very well be used to identify the cause of death related to heart malfunctions by pathologists through manual inspection. But it is associated with so much human errors and subjectivity, inefficiency, and sometimes even inaccuracies. The proposed project works with an AI system that could automate the segmentation, classification, and further analysis of images of heart valves to determine the cause of death. With deep learning methods such as CNNs, the system will analyze high-resolution autopsy images of heart valves to identify pathological conditions which may lead to heart failure or embolism. The developed AI model will assist forensic pathologists in arriving at a diagnosis more accurately and in lesser time spent over the investigation. Additionally, the web interface will be designed to render the results such that the doctors and forensic agents may access the analyses seamlessly. In essence, this AI-based solution has further applications in clinical settings for early detection of heart valve diseases that would subsequently lead to better patient outcomes and saving lives.

**Keywords -** AI-Driven Image Analysis, Cause of Death, Deep Learning (CNN), Forensic Pathology, Heart Valve Segmentation