**ETHICS STATEMENT**

This study utilized the publicly available MP-IDB (Malaria Parasite Image Database) dataset, which is distributed under MIT license and does not contain any patient-identifiable information. The original dataset was created with appropriate ethical approvals as documented in Loddo et al. (2019) [19]. No additional ethical approval was required for this computational study as it involves only analysis of de-identified publicly available data. The research complies with the principles outlined in the Declaration of Helsinki and follows best practices for responsible AI in healthcare.