

LGU 4: AI-ENHANCED DIGITAL HEALTH AND SAFETY INSPECTIONS USING OPENCV AND NATURAL LANGUAGE PROCESSING

ABSTRACT

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Local government units often use paper-based health and safety inspection processes, which may produce inconsistent documentation, duplicate data, and limited analytical capacity. Existing digital tools may also lack automated image analysis and intelligent form evaluation. This study developed LGU 4, a digital health and safety inspection system using OpenCV for media analysis and natural language processing (NLP) for form evaluation. The study used a developmental design based on the system development life cycle. A web portal was developed with inspection booking, automatic inspector assignment, form processing, media validation, and a centralized database. OpenCV was used to analyze inspection media, and NLP was used to evaluate structured forms. Sample local-business data were used to assess processing time, detection accuracy, and form validation. Compared with manual processes, the system was reported to reduce report-preparation time and improve documentation consistency. OpenCV identified visual-compliance indicators, while NLP-based evaluation reduced incomplete records and supported structured data. Pilot testing was described as showing high automated-validation accuracy, but no numerical performance results were provided. The findings suggest that AI-assisted inspection systems may improve process efficiency, data quality, and decision support. Performance may be constrained by image quality and the amount and representativeness of training data. Future development should use larger datasets and evaluate risk estimation, predictive analytics, scalability, security, fairness, and policy-support functions.

RECOMMENDED CITATION

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