ID 422

Spatial Modeling of Two-Dimensional Road Traffic Noise in Urban Zones: A Case Study in Ratnapura Municipal Council

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Addressing the global concern of noise pollution emanating from urban motor traffic, this study employed a sound model to assess the noise landscape in the Ratnapura Municipal Council area of Sri Lanka. Field observations provided crucial data on vehicle speed, type, and density at various points within the study area, serving as input for the sound model. Data collection spanned two distinct periods, 7:00 a.m. to 9:00 a.m. and 12:30 p.m. to 2:30 p.m., strategically chosen to capture peak noise levels. Utilizing multiple interpolation techniques, decibel values were extrapolated, with the Kriging-Spherical technique identified as the optimal method based on field-observed noise readings at corresponding locations. The study reveals zones within the municipality experiencing elevated noise pollution levels, and regional distribution maps illustrate the intricate relationships between contributing factors and noise pollution. The findings provide recommendations for mitigating noise pollution, with a specific focus on the Ratnapura context. Moreover, this study underscores the importance of adapting strategies to the dynamic nature of urban environments, enhancing our comprehension of the current state of noise pollution. The findings provide practical insights for governments and urban planners, offering sustainable solutions to address this pervasive issue. Additionally, it emphasizes the necessity for continuous, long-term research to comprehensively grasp evolving noise patterns, supporting ongoing data collection and analysis initiatives.

Keywords: *Kriging-Spherical interpolation, noise pollution, sound model, urban motor traffic*