

A computational platform of Air Quality Analysis for better future sustainability

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ABSTRACT

Sustainability has been the key to reaching a better human well-being. Recently, an emerging paradigm named the computational sustainability (Gomes et al., 2019; Gomes 2023) advocates innovative researches by crossing over computational approaches and sustainability issues. In this paper, we propose an air-quality analysis platform based on multiple computational approaches.

Firstly, we acquired the time series of PM2.5 concentrations from many low-cost sensors as video streams. The shot boundary detection method was applied to segment the video into several short clips. The image frames in the same clip are more homogeneous than those in different clips. Secondly, every clip is transformed to a single gesture energy image for clustering such that more similar clips are put into a group. On the other hand, the pollution regions in the image frame are labeled according to government 10-level air pollution categories. The 2D Be-string technique is applied to represent the spatial relationship between pollution regions. With the above-noted processes, our computational platform can offer fruitful query means such as pollution-frame retrieval, pollution-clip retrieval, pollution-cluster retrieval, and pollution spatial retrieval. The retrieval results can be further analyzed in our platform such as association rule mining and regression forecasting.

REFERENCES

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