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Data driven decision-making and policy for application in water and sanitation systems

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This project looks at the use of data to develop evidence-based decision-making and policy for application in water and sanitation systems. It includes a review and understanding of local and global databases and resources, developing data mining and management standards and practices, and applying data analysis techniques to advance water and sanitation systems in South Africa.

Data mining and management plays an important role in advancing water and sanitation systems, ensuring sufficient monitoring and the sustainable delivery of essential services. The application of data mining and management encompasses the collection, processing, and storage of vast datasets derived from various sources such as local and global databases, dashboards, sensor networks, satellite imagery, and public health records.

Data analysis and modelling techniques then facilitate the identification of patterns, trends, and anomalies, which are important for informed decision-making, strategic planning and public policy. By leveraging predictive analytics and forecasting, government departments and water management authorities can anticipate demand fluctuations, optimise resource allocation, and enhance the efficiency of water distribution networks. Similarly, in water sanitation, data mining and analysis assists in monitoring system performance, detecting potential failures, and mitigating health risks by providing early warnings of contamination events.

The adoption of robust data management frameworks ensures the integration, storage, and accessibility of diverse datasets, supporting real-time monitoring and long-term strategic initiatives. Challenges such as data privacy, accuracy, and the need for interdisciplinary collaboration need to be addressed to ensure the reliability and efficacy of these systems. The convergence of data mining and management in water and sanitation sectors holds significant promise for enhancing operational efficiency, ensuring resource sustainability, and safeguarding public health.

Data integration poses a significant hurdle due to varying formats and structures across different sources. The primary challenge is data quality and accuracy including issues like missing values and statistical outliers. Water databases may contain a diverse range of data, including spatial, temporal, and multi-dimensional information. Integrating and reconciling these different types of data can be challenging, especially when they come from various sources with different formats and structures.

Student or Postdoc?

Email address

Co-Authors

CHPC User

CHPC Research Programme

Workshop Duration

Primary author: SULIMAN*, Ridhwaan (CSIR)

Presenter: SULIMAN*, Ridhwaan (CSIR)

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