Digital Water, Digital Twin

We produce digital twins (DT) of all innovative technologies that we develop at CTET. The digital twins are developed through a combination of use of CFD tools, chemical kinetic modelling and system integration software. The DTs developed at CTET are presented through immersive technologies (VR/AR) that allow simulation models to be reviewed as a virtual prototype in a "physical world".

Digital Water

UNSW Centre for Transformational Environmental Technologies

Competitive advantage

We incorporate Industry 4.0 perspectives in the development of innovative water and wastewater treatment technologies

- A strong simulation-based technology/product development process leveraging our decades of professional experience in Computational Fluid Dynamics (CFD) and chemical kinetic modelling.
- Digital Twin of water and wastewater treatment technologies presented using Virtual Reality (VR) and Augmented Reality (AR).
- Operating data streamed live from our treatment plants used to prevent unplanned downtime, improve the accuracy of the digital twin and shorten the time required for development of the next generation of products.

Applications

- Three levels of DTs: Status Twin, Operational Twin and Simulation Twin
- Status Twin: Monitor the conditions of water treatment plants. Integrate operational data from network sensors (e.g. pressure in pipes, flowrate and location of assets) for easy training and maintenance.
- Operational Twin: Users can interact with the DT and exchange various operating parameters. Mainly used to support training of plant operators, provide real time technical support and optimise plant operation.
- Simulation Twin: DTs are linked to our simulation results (e.g. CFD, chemical kinetic modelling, chemical process modelling and Artificial Intelligence/Machine Learning). Mainly used to support the design of new processes/plants, predict plant performance and operational cost.
- We have developed a Simulation Twin of membrane bioreactors for visualisation of fluid flow surrounding the membranes and an Operational Twin of membrane capacitive deionisation (mCDI) units which are used for improving process design and to provide training to operators.
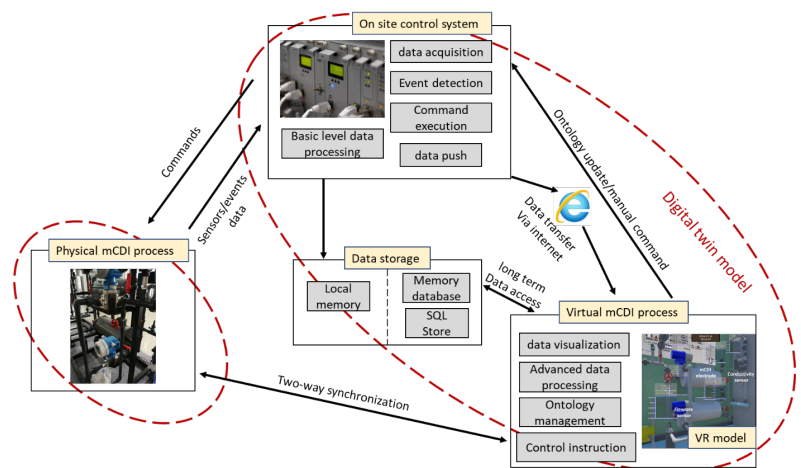
Facilities and infrastructure

- 86-inch 4k interactive touch monitor
- HoloLens 2
- Razers laptops with RTX2080
- HTC Vive Pro HMDs
- Oculus Quest
- Barco F80 projector

More information

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新南威尔士大学火炬创新园区
Torch Innovation Precinct at UNSW