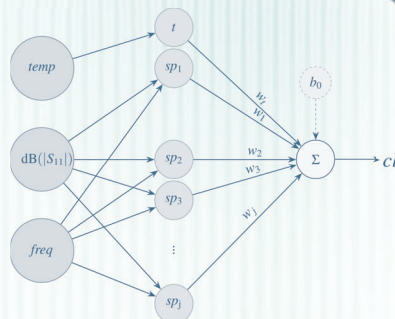


AI-Driven Microwave Sensing for Coolant Level and Leak Detection

The AI-driven microwave sensing system integrates a **planar wideband antenna** with an **AI-driven neural network** for **precise, non-contact measurement** of coolant levels and **real-time leak detection** in non-conductive dielectric immersion fluids for data centres, while **compensating for temperature variations**.



The invention significantly **reduces coolant waste** through accurate monitoring, **lowers energy consumption** by avoiding inefficient cooling, **extends hardware lifespan**, and **minimises data centre downtime** from undetected leaks—**potentially saving USD 2.4 million annually in a 10MW data centre**, while supporting the unprecedented demands of AI and high-performance computing.

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FEATURES AND ADVANTAGES

98% prediction accuracy:

AI-driven system for microwave signal processing and analysis of complex S-parameters

01

Compensates for temperature variations

02

Excels in challenging

non-conductive environments, trained with real lab data to map wide frequency (0.5–6 GHz) S-parameters to liquid levels

03

Low computational overhead and low risk of overfitting

04

Ultra-small dimensions

(1.6 mm × 30 mm × 19.3 mm) for high-density data centres

05

30% extension of hardware lifespan,

reducing company capital expenditure

06

CO₂ reductions of 15–21%

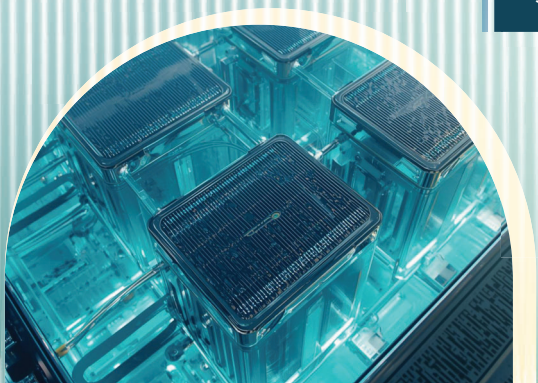
with widespread adoption of immersion cooling

07

Up to USD 2.4 million annual savings

for a 10 MW facility via reduced waste, energy, maintenance, and downtime

08



FUTURE DEVELOPMENTS

- **Effective detection of heavy rain and flooding**, lowering risks for workers in subway environments
- **Implemented for detection of water leakage problems**

Any opinions, findings, conclusions or recommendations expressed in this material/event (or by members of the project team) do not reflect the views of the Government of the Hong Kong Special Administrative Region, the Innovation and Technology Commission or the Vetting Committee of the General Support Programme of the Innovation and Technology Fund.