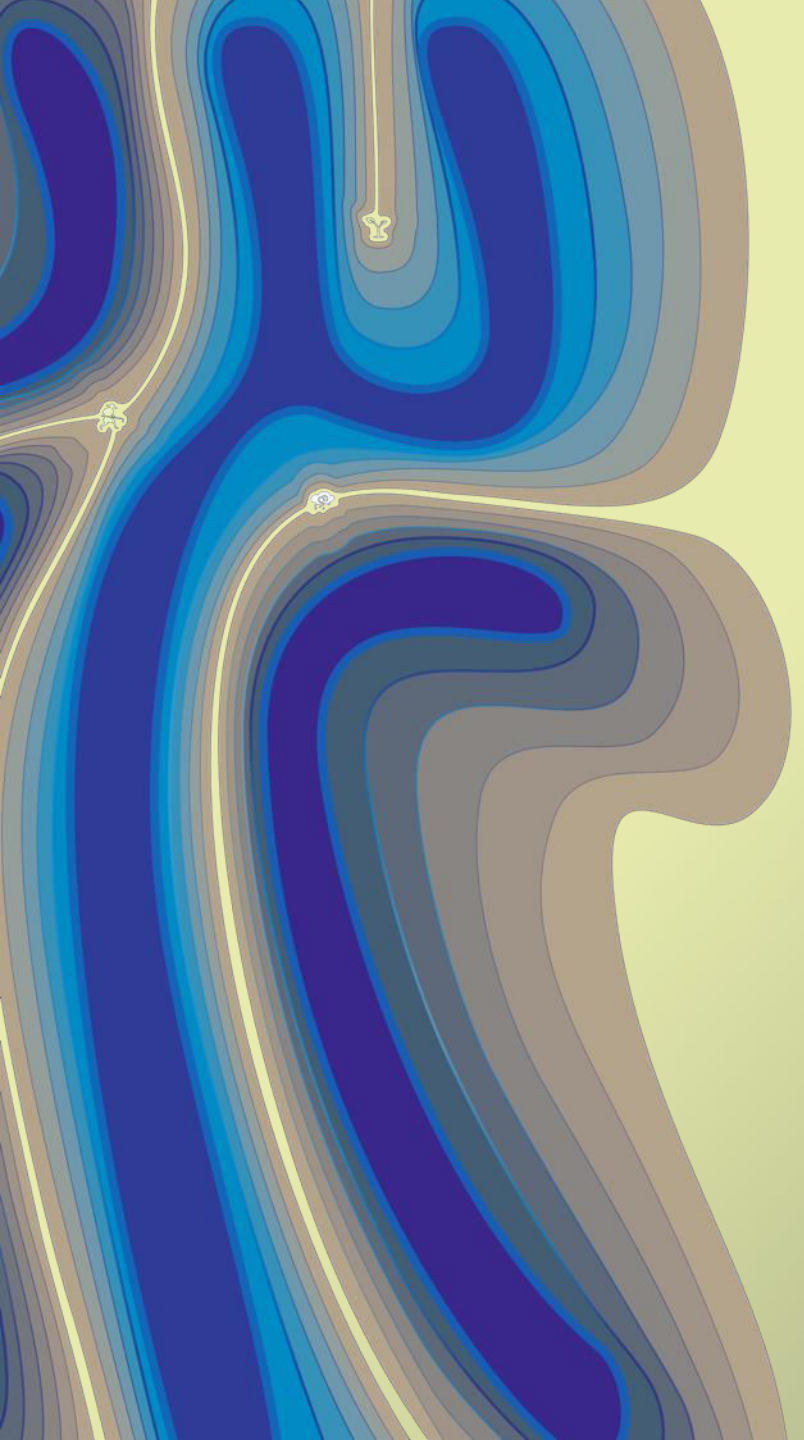

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SMART WATER AUDITING SYSTEM

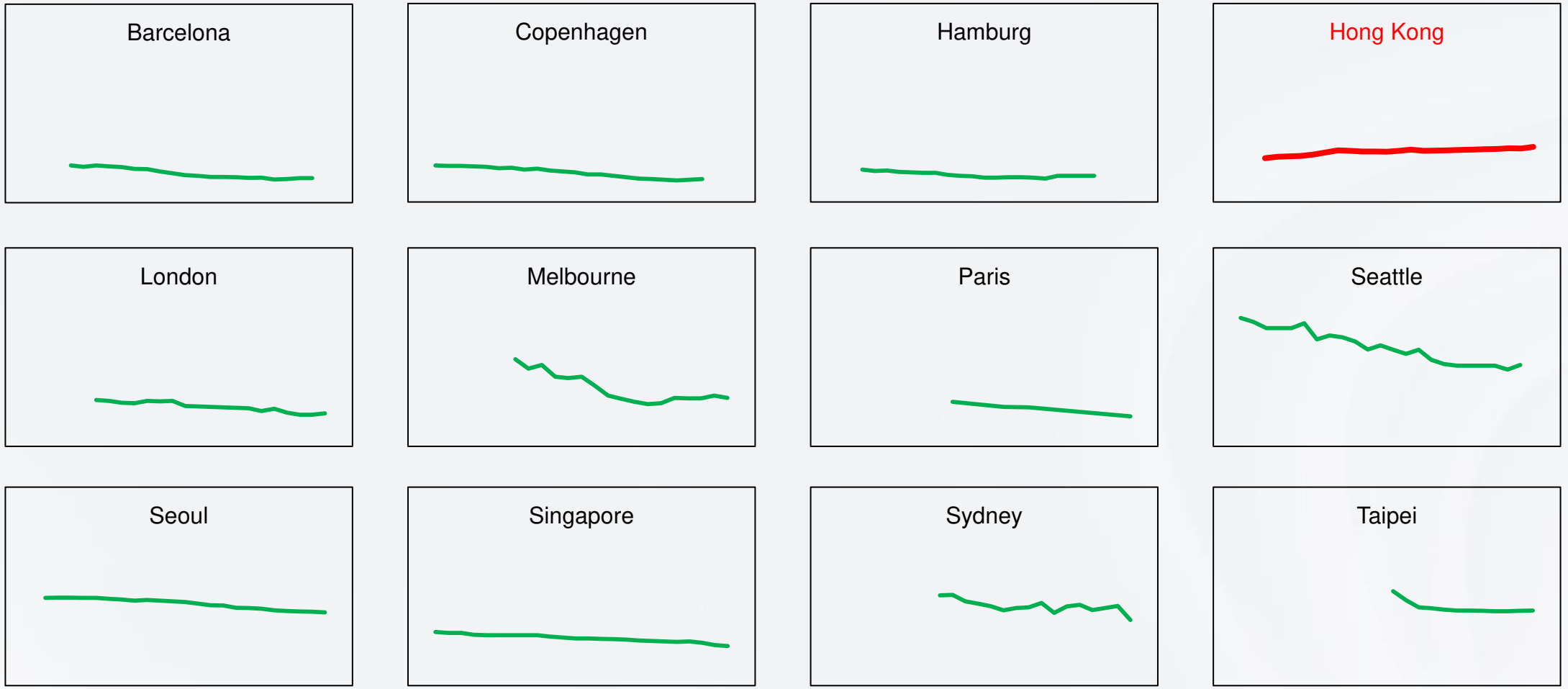
Dr. Angela Lee

Centre for Water Technology and Policy,
The University of Hong Kong

XVIII WORLD WATER CONGRESS Water for All Harmony between Humans and Nature

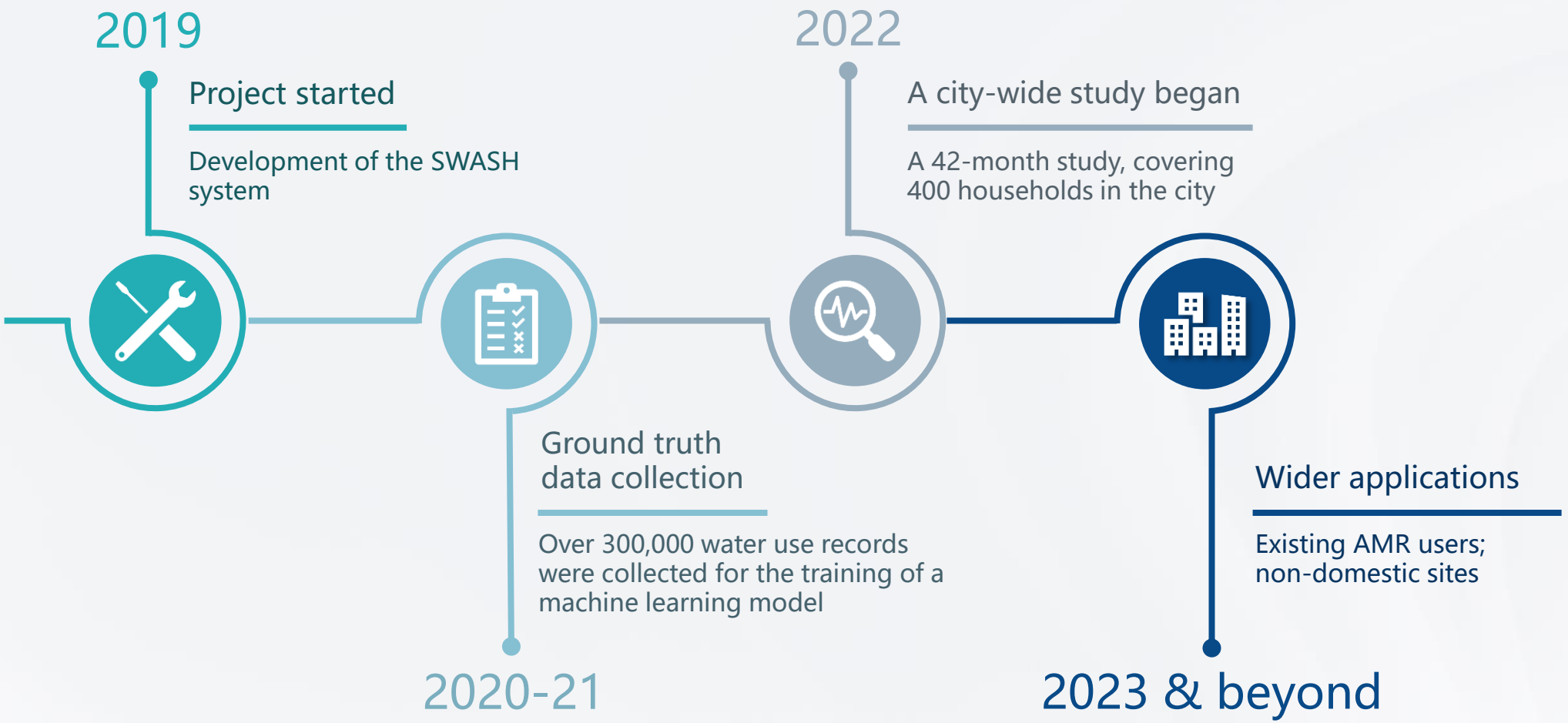
第18届 世界水资源大会 水与万物: 人与自然和谐共生

The problem…



Project Timeline

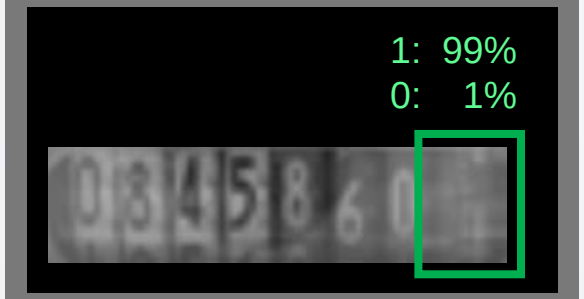
The SWASH project was started in 2019, aiming at collecting and analysing policy-relevant empirical data to improve urban water system performance.



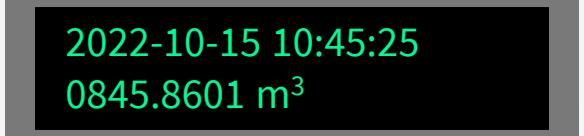
Digitalised meter reading for meters without MIU

1 A clamp-on device

2 Meter reading image

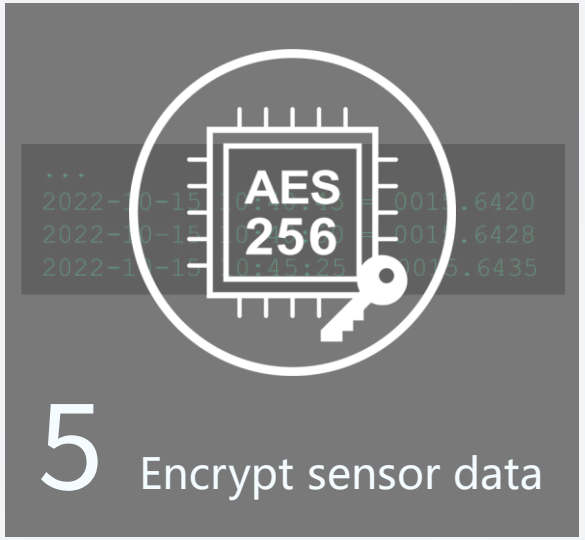


3 >99.5% accuracy in digit recognition



4 Digitalised record

Low-power wireless IoT node



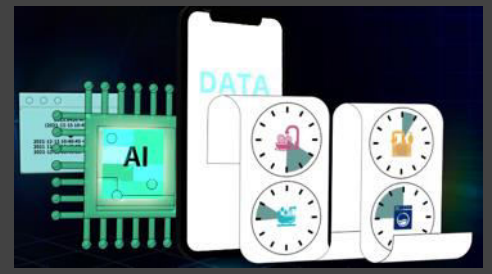
5 Encrypt sensor data

6 Transmit to cloud via low-power radio

IoT data analytics platform

7 Sensor data storage and management

8 Visualisation



9 Data analytics

An AI-empowered diagnostic tool

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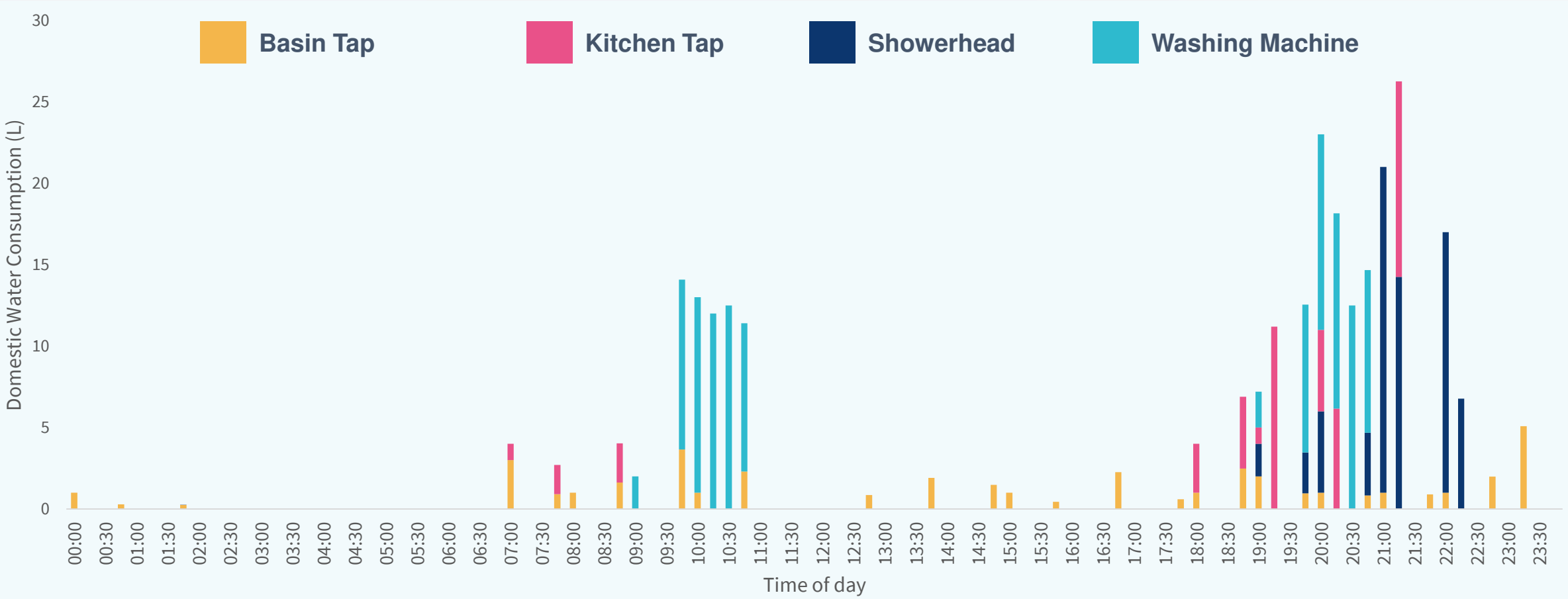
Household-level water-use profiles disaggregated by a Machine Learning model into major end-use categories.



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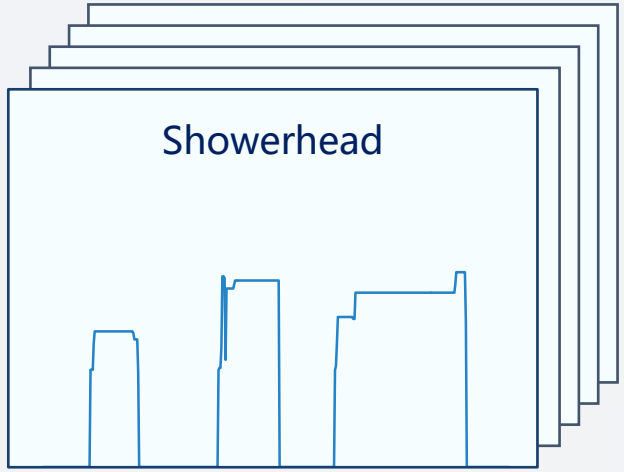
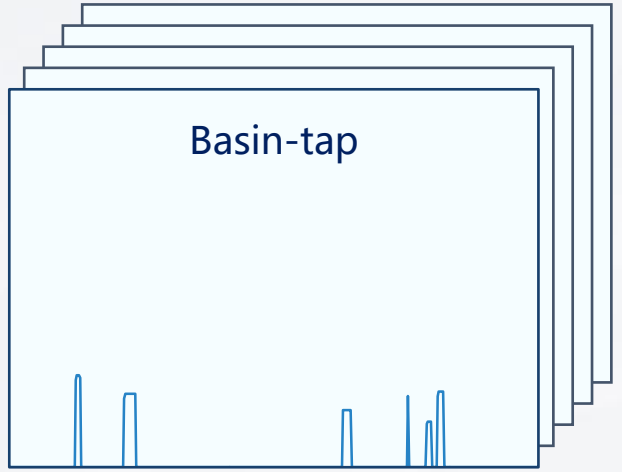
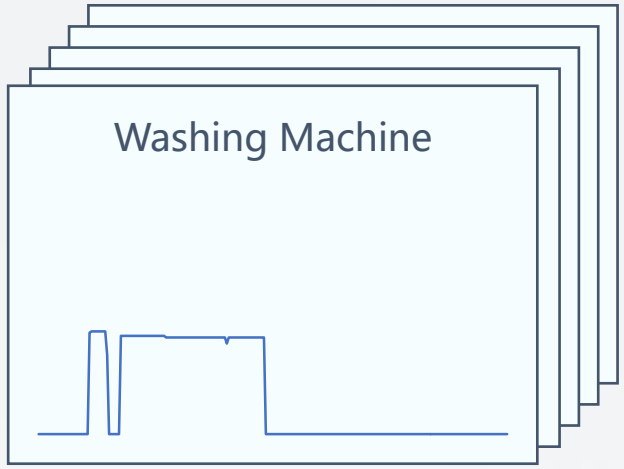
In the pilot study, tap-sensors were used to collect sufficient ground truth (labelled) data in multiple households.







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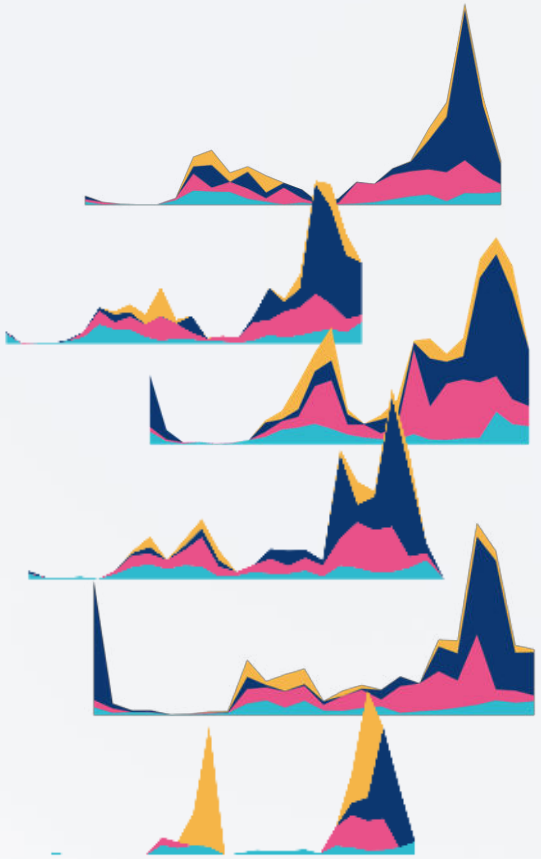
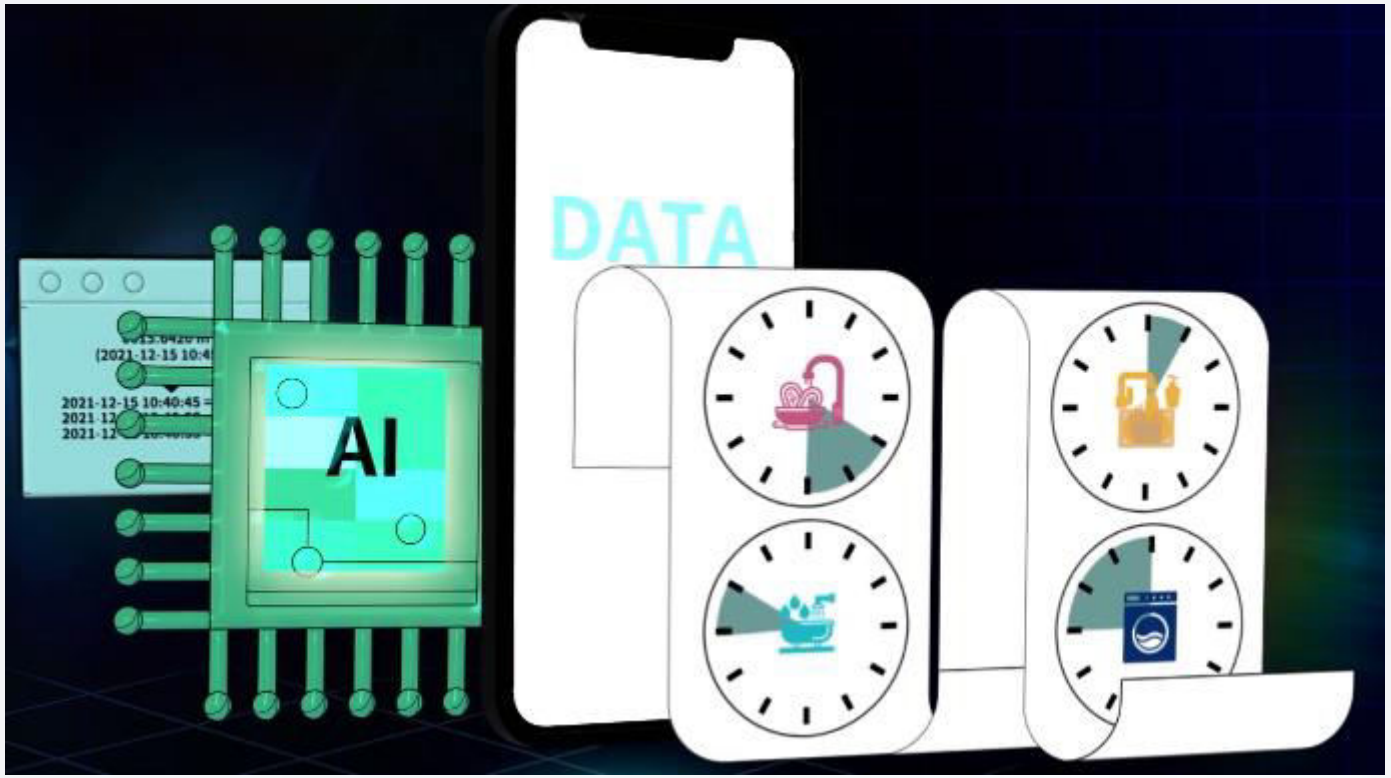
Machine Learning models are able to pick up the habitual patterns of water-use of participating households.

Thousands of 24-hour water-use data



Feature extraction by a high-performance computer



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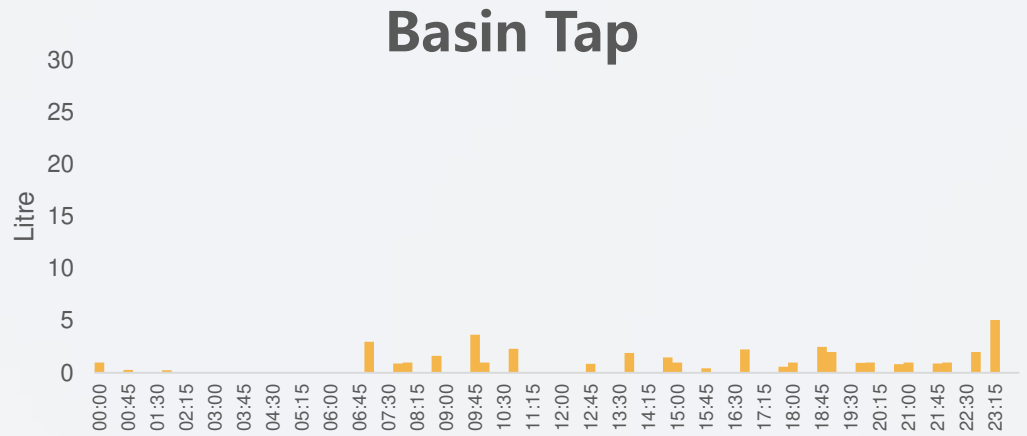
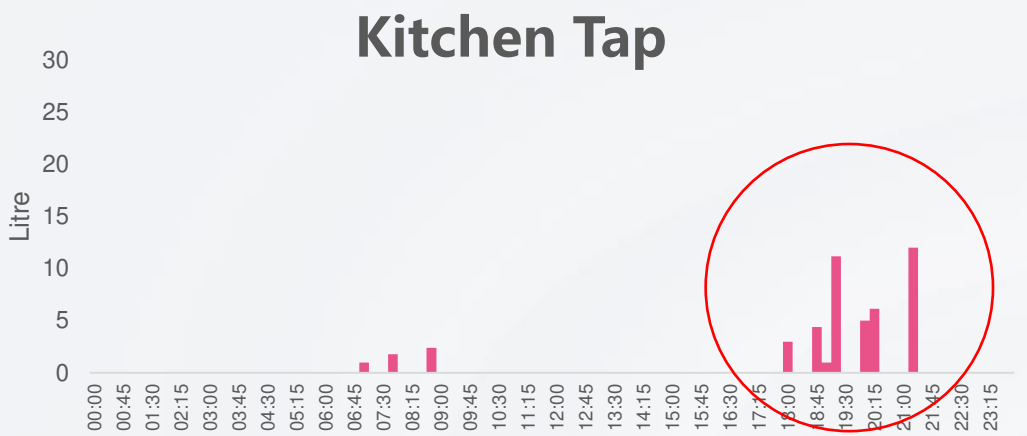
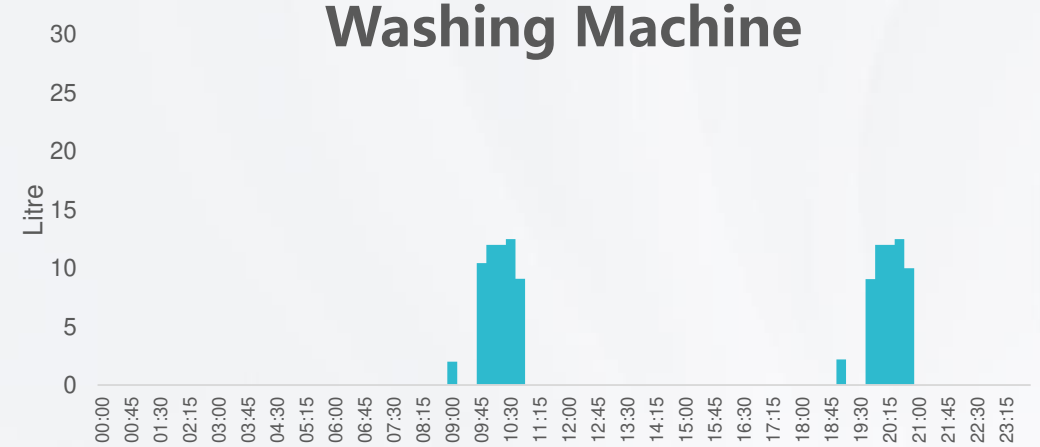
Water usage patterns at the Kitchen Tap and the Showerhead are closely related to the time of day.







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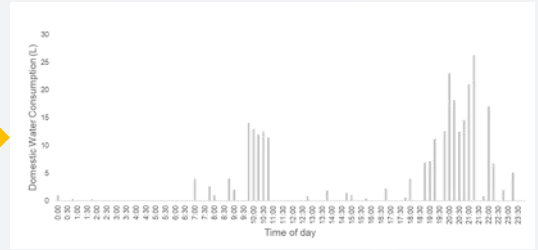
Requisite data for policy analysis can be collected at any location, at any time.

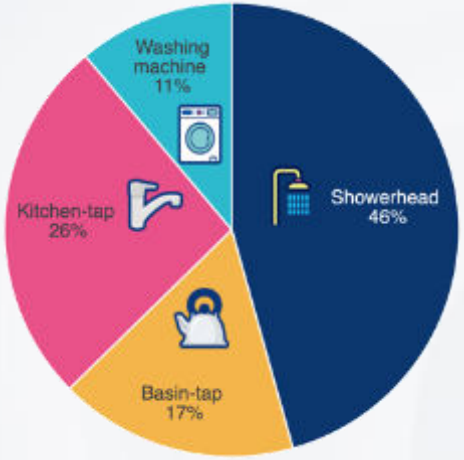
SMAN

Household-level water-use profile



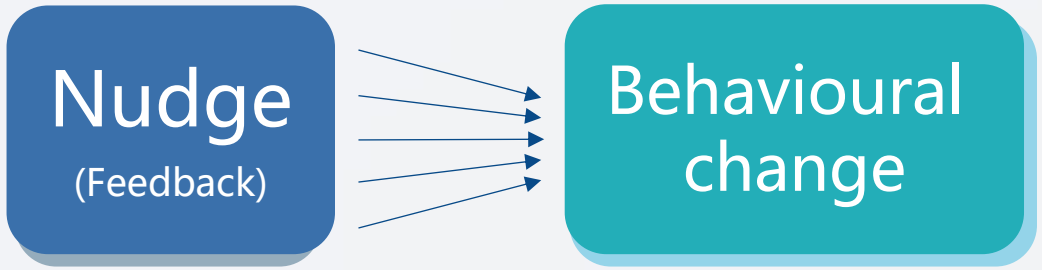
Machine Learning algorithms

End-use distribution



Nudging tool

An interactive webapp showing real-time water usage data.

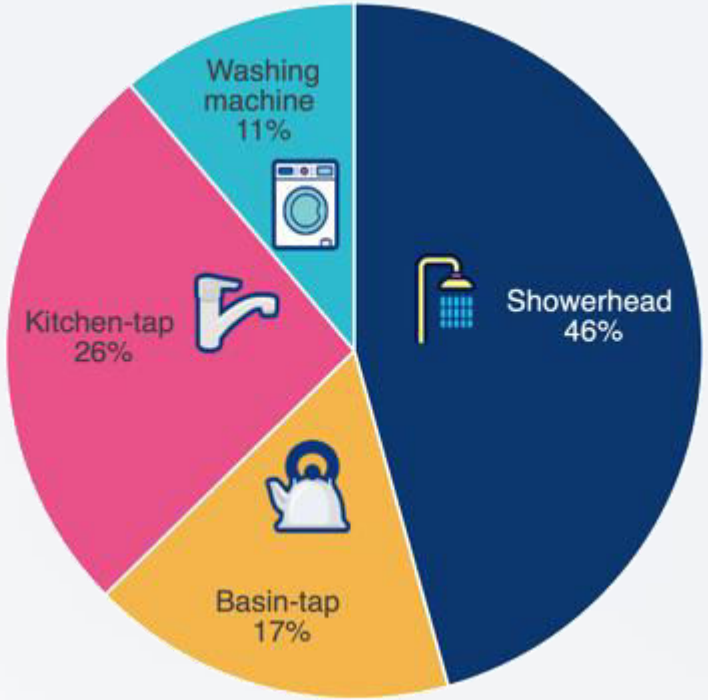


- 63% viewers browse landing page only
- Less is more
- Household-specific

Expected outcome

An accurate, and nuanced understanding of how much water people are using at home, when they use it, and for what purposes. Such information can be used to nudge people to reduce water consumption.

End-use distribution



Behavioral change